Volume 1 of 1

BID ISSUANCE: FEBRUARY 6, 2024

PROJECT MANUAL

Nanuet Union Free School District

Nanuet Bond Projects Phase 4

101 Church Street, Nanuet, NY 10954

SED Control Numbers:

Nanuet HS School: 50-01-08-03-0-003-036

Barr Middle School: 50-01-08-03-0-004-021

Miller Elementary School: 50-01-08-03-0-001-025

Architect: KSQ Design dba KSQ Architects P.C. 215 West 40th Street, 15th Floor New York, NY 10018 T. 646.435.0660	**MEP Engineer:** Sage Engineering Associates, LLP 9 Columbia Circle Albany, NY 12203 T. 518.453.6091
Structural Engineer: Clapper Structural Engineering 160 Partition Street Saugerties, NY 12477 T. 845.943.9601	**Environmental Engineer:** Quest Environmental Solutions 1376 Route 9 Wappingers Falls, NY 12590 T. 845.298.6251
Construction Manager: Jacobs One Penn Plaza 24th Floor, Suite 2400 New York, NY 10119 T. 646.908.6550	**Owner:** Nanuet Union Free School District 101 Church Street Nanuet, NY 10308 T. 845.343.1481

Design conforms to applicable provisions of the New York State Uniform Fire Prevention and Building Code, New York State Energy Conservation Construction Code, and NY State Education Department Building Standards

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SECTION 00 03 00 - NOTICE TO BIDDERS

PART 1 - GENERAL

1.1 The Nanuet Union Free School District, Rockland County, NY, invites bid proposals for the following:

NUFSD Phase 4 Capital Projects:

A. Nanuet High School

1. Doors and Window Treatments: (GC-01)
2. Admin Wing Renovations: (GC-01, MC-01, EC-01, PC-01)
3. HVAC & Hydronic Upgrades: (GC-01, MC-01, EC-01)
4. Electrical Panel Replacements: (EC-01)
5. Kitchen Fume Hood Replacements: (MC-01, EC-01)

B. Barr Middle School

1. Doors and Window Treatments: (GC-01)
2. Toilet Room Renovations: (GC-01, MC-01, EC-01, PC-01)
3. Fire Alarm Upgrades: (EC-01)

C. Miller Elementary School

1. Doors and Window Treatments: (GC-01)
2. Masonry Restoration, and Site work: (GC-01)
3. Security Vestibule Renovations: (GC-01, MC-01, EC-01)
4. HVAC Upgrades: (MC-01, EC-01)
5. Fire Alarm & Electrical Upgrades: (EC-01)

1.2 CONTRACTS:

A. Separate Prime Contracts will be let for:

1. General Construction #1 – (GC-01)
2. Mechanical Construction #1 – (MC-01)
3. Plumbing Construction #1 – (PC-01)
4. Electrical Construction #1 – (EC-01)

1.3 SCHEDULE:

A. Bidding Documents Available:

1. At **12:00 p.m. on March 5, 2024** Bidding Documents for the proposed project will be on file and publicly exhibited online at http://revplans.biddyhq.com

2. Copies of said Bidding Documents can be obtained from **Rev Plans, 28 Church Street, Unit #7, Warwick, NY 10990** or http://revplans.biddyhq.com

3. Digital Download: Bid documents can be downloaded for **Forty Nine Dollars ($49.00).** Non-refundable fee payable by credit card fromhttp://revplans.biddyhq.com .

4. Hard Copy Drawings: $ 100 refundable upon return of set in good condition. Make checks or Money Orders payable to Nanuet Union Free School District.

5. Any bidder requiring documents to be shipped shall make arrangements with the printer and pay for all packaging and shipping costs.

6. All bid addenda will be transmitted to registered plan holders via email and will be available at http://revplans.biddyhq.com. Plan holders who have paid for hard copies of the Bidding Documents will need to make the determination if hard copies of the addenda are required for their use, and coordinate directly with the printer for hard copies of addenda to be issued. There will be no charge for registered plan holders to obtain hard copies of the bid addenda.

B. Pre-Bid Conference:

1. Date & Time: Thursday, March 14, 2024 @ 1:00 PM

2. Location: Nanuet Senior High School

3. Address: 103 Church street, Nanuet, NY 10954

4. Prospective bidders are strongly encouraged to attend.

C. Bid Due Date:

1. Sealed proposals will be received as indicated below, and at that time and place will be publicly opened and read aloud in the administrative conference room. All bidders shall comply with the General Municipal Law (103).

2. Date: Wednesday, April 3, 2024

3. Time: 1:30 PM (local time)

4. Location: Nanuet Union Free School District Business office

5. Address: 101 Church Street, Nanuet, NY, 10954

D. Request for Information:

1. All pre-bid "Request For Information" (RFI) or Clarification must be submitted NO LATER THAN **Wednesday, March 27, 2024 by 12:00pm (noon)**

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 PROVISIONS:

A. Wages to workers, laborers and mechanics employed to work on this project, shall be paid in accordance with Section 220 of the Labor Law, and in accordance with the Prevailing Rate Schedules (PRC # found in the Project Manual) and proof of such payments will be required.

B. Each bid for <u>each</u> Contract must be identified, in typed format, on the outside of a sealed manila envelope, with the name and address of the bidder and designated as bid for the Project titled above and appropriate Contract number and name titled above. The Nanuet Union Free School District is not responsible for bids opened prior to the bid opening if bid contract number and opening date do not appear on the envelope. Bids opened prior to date and time indicated are invalid. The bidder assumes the risk of any delay in the mail, or in the handling of the mail by employees of the Nanuet Union Free School District, as well as improper hand delivery.

C. Each proposal must be accompanied by a certified check in the sum of five percent (5%) of the amount of the bid, drawn upon a National or State Bank or Trust Company, payable to the order of the Nanuet Union Free School District, or a bond from a surety licensed to practice business in the State of New York with sufficient sureties in a penal sum equal to five percent (5%) of the bid, conditioned that if this bid is accepted, successful bidder will enter into a contract for the same and that he will execute such further security as may be required for the performance of the contract.

D. A separate Performance Bond, equal to one hundred percent (100%) of the contract amount will also be required of the successful bidders, and the bond shall be from a surety licensed to practice business in the State of New York, satisfactory to the School Board.

E. A separate Payment Bond, equal to one hundred percent (100%) of the contract sum will also be required of the successful bidders, and the bond shall be from a surety licensed to practice business in the State of New York, satisfactory to the School Board.

F. The bidders to whom the above referenced contracts may be awarded, shall within seven (7) days after the date of notification of the acceptance of their proposal, provide insurance and security as required by the above referenced contracts in a form acceptable by the Owner. In case of the bidders' failure to do so, or in case of the bidders' failure to give further security as herein prescribed, the bidders will be considered as having abandoned the same, and the certified check or other bid security accompanying the proposal shall be forfeited to the School District.

G. Each bidder shall agree to hold his/her bid price for forty -five (45) days after the formal bid opening

H. By Order of the Nanuet Union Free School District

1. Dated: March 5, 2024

2. Mr. Mario Spagnuolo, Attorney/Asst. Superintendent of Business

END OF SECTION 00 0300

SECTION 00 03 01 – REQUEST FOR CLARIFICATION

Project Name: **Nanuet UFSD**
Nanuet Bond Projects-Phase 4

Contractor Name: _____

Respond to: _____

Fax Number: _____

Address: _____

_____

Subject: _____

Drawing/Reference No.: _____

Request: _____

_____

_____

_____

Reply: _____

_____

_____

_____

_____

By: _____ Date: _____

Request to: **KSQ Design**
Attn: Ofe Pearson
Email: opearson@ksq.design

END OF SECTION 00 0301

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Instructions to Bidders

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

NANUET UNION FREE SCHOOL DISTRICT
NANUET BOND PROJECTS PHASE 4
Nanuet HS School: 50-01-08-03-0-003-036
Barr Middle School: 50-01-08-03-0-004-021
Miller Elementary School: 50-01-08-03-0-001-025

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

Nanuet Union Free School District
101 Church Street
Nanuet, N.Y. 10954

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

KSQ Architects
215 W 40th Street
Floor 15
New York, NY 10018
T. 914.682.3700

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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.

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ARTICLE 1 DEFINITIONS

§ 1.1 Bidding Documents include the Bidding Requirements and the Proposed Contract Documents. The Bidding Requirements consist of the advertisement or invitation to bid, Instructions to Bidders, supplementary instructions to bidders, the bid form, and 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.)

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

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

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

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

§ 3.2 Modification or Interpretation of Bidding Documents

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

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

§ 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.

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§ 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.)

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

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

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

ARTICLE 4 BIDDING PROCEDURES

§ 4.1 Preparation of Bids

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

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

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

§ 4.1.4 Make no erasures, cross-outs, whiteouts, write-overs, obliterations, or changes of any kind in the Bid Form phraseology, in the entry of unit prices, or anywhere on the Bid form. Fill in all blanks spaces legibly. An illegible entry may disqualify the bid in its entirety. If a mistake is made, use a new Bid Form. No post bid meetings will be afforded to any bidder to explain or clarify illegible or changed entries.

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

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

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

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

§ 4.2 Bid Security

§ 4.2.1 Each Bid shall be accompanied by a bid security in the form and amount required if so stipulated in the Instructions to Bidders. The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and will, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty. Each Bid shall be accompanied by the following bid security:

(Insert the form and amount of bid security.)

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Five Percent (5%) of the contract sum of work

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

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

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

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

§ 4.4 Modification or Withdrawal of Bid

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

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

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

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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.

§5.3.3 A tie-bid is defined as an instance where bids are received from two or more Bidders who are the low responsive Bidders, and their offers are identical. It is the policy of the District to settle the outcome of tie-bids by either drawing a name from a hat or flipping a coin within 24 hours of the bid opening. All affected firms will be notified of the tie, the time and place of the resolution of the tie and shall be invited to witness the outcome. Attendance is not mandatory. The drawing/flip will be held at the District Administration Office. Two impartial witnesses will be provided and shall be present. All attendees will acknowledge the results of the tie-breaker on the bid tabulation sheet. All firms affected by the bids will be notified of the results. The results pursuant to this provision shall be considered final.

§5.3.4 All bids must be accompanied by:

- Fully complete bid form
- Bid Bond
- Non-Collusive Certification
- Iran Divestment Certification
- Corporate Resolutions
- Substitution List
- List of Subcontractors
- Unit pricing (if applicable)
- Schedule of Values (filled out fields on bid form)
- Insurance certification accompanied by Accord form. (All carriers for policies must be **licensed and admitted** in New York State) – See AIA 232 for more details.

Failure to provide all these documents will be grounds for bid disqualification.

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 The apparent low bidder must submit the required pre-award submittal package described below to the Owner and Architect within 48 hours after the bids are opened.

Nanuet Union Free School District

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Rudy Villanyi, Director of School Facilities
Email: **rvillanyi@nanuetsd.org**

KSQ Design
Ofe Pearson
Email: **opearson@ksq.design**
215 W 40th Street
15th Floor
New York, NY 10018

Submissions must be emailed and must include the Project Name of this contract in the Subject Line of the Pre-Award submission email.

(1) Pre-award Submittal Package
  (i) Fully execute AIA A305 Contractors Qualification Statement
  (ii) Most recent financial statement by CPM
  (iii) References and experience:
    1. List of all past contracts with K12 Public School Districts
    2. Provide three (3) references (Name, Title, and Phone Number) associated with three (3) different projects (public or private sector) of similar scope and size to the one identified in this contract. Additionally, include the names of two major suppliers used for each of these three (3) projects.

(2) Workforce and Work Plan – Provide a detailed written Work Plan which shall demonstrate the contractor's understanding of overall project scope and shall include, but not be limited, to the following:
  (i) Sequential listing of specific project activities required to successfully complete the Work of the contract.
    1. Include Critical Milestones,
    2. Include phasing of the Work, if required.
    3. Include listing of long lead items.
    4. Impact of weather and restricted work period(s).
    5. Statement that the project can be completed in established time.
  (ii) Resumes for Contractor's proposed supervisory staff, including qualifications for specialized expertise or any certification(s) required to perform the Work.
  (iii) Names of proposed major sub-contractors (more than 15% of the bid amount) and a listing of the related trade of work and value.
  (iv) Any special coordination requirements with other trades.
  (v) Any special storage and staging requirements for construction materials.
  (vi) Any other special requirements.

(3) Detailed Cost Estimate:
  (i) A copy of a Detailed Cost Estimate outlined in CSI format.

§ 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.

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§ 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 ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS

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

.1 AIA Document A132™–2009, Standard Form of Agreement Between Owner and Contractor, unless otherwise stated below.
(Insert the complete AIA Document number, including year, and Document title.)

.2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds, unless otherwise stated below.
(Insert the complete AIA Document number, including year, and Document title.)

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.3 AIA Document A232™–2019, General Conditions of the Contract for Construction, unless otherwise stated below.
(Insert the complete AIA Document number, including year, and Document title.)

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

.5 Drawings

Number	Title	Date

.6 Specifications

Section	Title	Date	Pages

.7 Addenda:

Number	Date	Pages

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

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

[ ] The Sustainability Plan:

Title	Date	Pages

[ ] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

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

ARTICLE 9 TAXES

§ 9.1 SALES TAX

§ 9.1.1 State and local sales tax on materials incorporated into the construction shall not be included in the Bid. Owner is a tax-exempt organization and will take title to materials used in the Project in order to permit tax exemption.

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§ 9.1.2 Owner will furnish certificate with Owner's Tax Exemption Number to successful Bidder for use in purchasing tangible personal property required for Project.

§ 9.1.3 Tax Exemption does not apply to machinery, equipment, tools, or other items purchased, leased, rented, or otherwise acquired for contractor's use even though machinery, equipment, tools, or other items are used either in part or entirely on Work. Exemption shall apply only to materials fully incorporated into Work of Contract as accepted and approved by Architect.

ARTICLE 10 BONDS

§10.1 PERFORMANCE BOND AND PAYMENT BOND

§ 10.1.1 Successful Bidder shall furnish to Owner bonds covering faithful performance of Contract and payment obligations there under.

§ 10.1.2 Separate payment and performance bonds shall be furnished for each contract. Should a contractor bid multiple contracts. Each contract requires its own individually packaged submission and shall include all contract documents. Any submission consisting of multiple bids packaged as one, could be rejected.

ARTICLE 11 EXAMINATION OF THE SITE

§11.1 PRIOR ARRANGEMENTS

§ 11.1.1 Bidders may visit the existing facilities by making prior arrangements with Mr. Rudy Villanyi, Director of Facilities, telephone 845-627-9852.

ARTICLE 12 SUBSTITUTIONS OF MATERIALS AND EQUIPMENT

§12.1 EQUIVALENCY CLAUSE

§ 12.1.1 Whenever a material, article, or piece of equipment is identified on the Drawings or in the Specifications by reference to manufacturers' or vendors' names, trade names, catalog numbers, or the like, it is so identified for the purpose of establishing a standard, and any material, article, or piece of equipment of other manufacturers or vendors which will perform adequately the duties imposed by the general design will be considered equally acceptable provided the material, article, or piece of equipment so proposed is, in the opinion of the Architect, of equal substance, appearance, and function. It shall not be purchased or installed by the Contractor without the Architect's written approval.

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Additions and Deletions Report for

AIA® Document A701® – 2018

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PAGE 1

NANUET UNION FREE SCHOOL DISTRICT
NANUET BOND PROJECTS PHASE 4
Nanuet HS School: 50-01-08-03-0-003-036
Barr Middle School: 50-01-08-03-0-004-021
Miller Elementary School: 50-01-08-03-0-001-025

...

Nanuet Union Free School District
101 Church Street
Nanuet, N.Y. 10954

...

KSQ Architects
215 W 40th Street
Floor 15
New York, NY 10018
T. 914.682.3700

PAGE 4

§ 4.1.4 ~~Edits to entries made on paper bid forms must be initialed by the signer of the Bid.~~Make no erasures, cross-outs, whiteouts, write-overs, obliterations, or changes of any kind in the Bid Form phraseology, in the entry of unit prices, or anywhere on the Bid form. Fill in all blanks spaces legibly. An illegible entry may disqualify the bid in its entirety. If a mistake is made, use a new Bid Form. No post bid meetings will be afforded to any bidder to explain or clarify illegible or changed entries.

...

§ 4.2.1 Each Bid shall be accompanied by a bid security in the form and amount required if so stipulated in the Instructions to Bidders. The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and will, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty. Each Bid shall be accompanied by the following bid security:

PAGE 5

Five Percent (5%) of the contract sum of work

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Paper Copy

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§5.3.3 A tie-bid is defined as an instance where bids are received from two or more Bidders who are the low responsive Bidders, and their offers are identical. It is the policy of the District to settle the outcome of tie-bids by either drawing a name from a hat or flipping a coin within 24 hours of the bid opening. All affected firms will be notified of the tie, the time and place of the resolution of the tie and shall be invited to witness the outcome. Attendance is not mandatory. The drawing/flip will be held at the District Administration Office. Two impartial witnesses will be provided and shall be present. All attendees will acknowledge the results of the tie-breaker on the bid tabulation sheet. All firms affected by the bids will be notified of the results. The results pursuant to this provision shall be considered final.

§5.3.4 All bids must be accompanied by:

- Fully complete bid form
- Bid Bond
- Non-Collusive Certification
- Iran Divestment Certification
- Corporate Resolutions
- Substitution List
- List of Subcontractors
- Unit pricing (if applicable)
- Schedule of Values (filled out fields on bid form)
- Insurance certification accompanied by Accord form. (All carriers for policies must be **licensed and admitted** in New York State) – See AIA 232 for more details.

Failure to provide all these documents will be grounds for bid disqualification.

...

§ 6.2 ~~Owner's Financial Capability~~The apparent low bidder must submit the required pre-award submittal package described below to the Owner and Architect within 48 hours after the bids are opened.

Nanuet Union Free School District
Rudy Villanyi, Director of School Facilities
Email: **rvillanyi@nanuetsd.org**

KSQ Design
Ofe Pearson
Email: **opearson@ksq.design**
215 W 40th Street
15th Floor
New York, NY 10018

~~A Bidder to whom award of a Contract is under consideration may request in writing, fourteen days prior to the expiration of the time for withdrawal of Bids, that the Owner furnish to the Bidder reasonable evidence that financial arrangements have been made to fulfill the Owner's obligations under the Contract. The Owner shall then furnish such reasonable evidence to the Bidder no later than seven days prior to the expiration of the time for withdrawal of Bids. Unless such reasonable evidence is furnished within the allotted time, the Bidder will not be required to execute the Agreement between the Owner and Contractor.~~Submissions must be emailed and must include the Project Name of this contract in the Subject Line of the Pre-Award submission email.

(1) Pre-award Submittal Package
(i) Fully execute AIA A305 Contractors Qualification Statement

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(ii) Most recent financial statement by CPM
(iii) References and experience:
1. List of all past contracts with K12 Public School Districts
2. Provide three (3) references (Name, Title, and Phone Number) associated with three (3) different projects (public or private sector) of similar scope and size to the one identified in this contract. Additionally, include the names of two major suppliers used for each of these three (3) projects.

(2) Workforce and Work Plan – Provide a detailed written Work Plan which shall demonstrate the contractor's understanding of overall project scope and shall include, but not be limited, to the following:
(i) Sequential listing of specific project activities required to successfully complete the Work of the contract.
1. Include Critical Milestones,
2. Include phasing of the Work, if required.
3. Include listing of long lead items.
4. Impact of weather and restricted work period(s).
5. Statement that the project can be completed in established time.
(ii) Resumes for Contractor's proposed supervisory staff, including qualifications for specialized expertise or any certification(s) required to perform the Work.
(iii) Names of proposed major sub-contractors (more than 15% of the bid amount) and a listing of the related trade of work and value.
(iv) Any special coordination requirements with other trades.
(v) Any special storage and staging requirements for construction materials.
(vi) Any other special requirements.

(3) Detailed Cost Estimate:
(i) A copy of a Detailed Cost Estimate outlined in CSI format.

PAGE 8

.1 AIA Document ~~A101™–2017,~~ A132™–2009, Standard Form of Agreement Between Owner and Contractor, unless otherwise stated below.

PAGE 9

.3 AIA Document ~~A201™–2017,~~ A232™–2019, General Conditions of the Contract for Construction, unless otherwise stated below.

...

ARTICLE 9 TAXES

§ 9.1 SALES TAX

§ 9.1.1 State and local sales tax on materials incorporated into the construction shall not be included in the Bid. Owner is a tax-exempt organization and will take title to materials used in the Project in order to permit tax exemption.

§ 9.1.2 Owner will furnish certificate with Owner's Tax Exemption Number to successful Bidder for use in purchasing tangible personal property required for Project.

§ 9.1.3 Tax Exemption does not apply to machinery, equipment, tools, or other items purchased, leased, rented, or otherwise acquired for contractor's use even though machinery, equipment, tools, or other items are used either in part or entirely on Work. Exemption shall apply only to materials fully incorporated into Work of Contract as accepted and approved by Architect.

ARTICLE 10 BONDS

§10.1 PERFORMANCE BOND AND PAYMENT BOND

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§ 10.1.1 Successful Bidder shall furnish to Owner bonds covering faithful performance of Contract and payment obligations there under.

§ 10.1.2 Separate payment and performance bonds shall be furnished for each contract. Should a contractor bid multiple contracts. Each contract requires its own individually packaged submission and shall include all contract documents. Any submission consisting of multiple bids packaged as one, could be rejected.

ARTICLE 11 EXAMINATION OF THE SITE

§11.1 PRIOR ARRANGEMENTS

§ 11.1.1 Bidders may visit the existing facilities by making prior arrangements with Mr. Rudy Villanyi, Director of Facilities, telephone 845-627-9852.

ARTICLE 12 SUBSTITUTIONS OF MATERIALS AND EQUIPMENT

§12.1 EQUIVALENCY CLAUSE

§ 12.1.1 Whenever a material, article, or piece of equipment is identified on the Drawings or in the Specifications by reference to manufacturers' or vendors' names, trade names, catalog numbers, or the like, it is so identified for the purpose of establishing a standard, and any material, article, or piece of equipment of other manufacturers or vendors which will perform adequately the duties imposed by the general design will be considered equally acceptable provided the material, article, or piece of equipment so proposed is, in the opinion of the Architect, of equal substance, appearance, and function. It shall not be purchased or installed by the Contractor without the Architect's written approval.

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User Notes: (1731676215)

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, David Short, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 15:06:55 ET on 02/07/2024 under Order No. 2114442937 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A701™ – 2018, Instructions to Bidders, other than those additions and deletions shown in the associated Additions and Deletions Report.

_____

(Signed)

_____

(Title)

_____

(Dated)

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User Notes: (1731676215)

SECTION **00 30 01 - GC BID FORM**

CONTRACT 2 – GENERAL CONSTRUCTION PROPOSAL (GC-01):

_____

Bidding Firm Name

To The Board of Education,

The undersigned hereby proposes to furnish all labor, materials, devices, appliances, supplies, equipment, services and other facilities necessary to complete all of the work of the above referenced Contract for the Nanuet Union Free School District, Nanuet, New York, as required by, and in accordance with, the provisions of the Instructions to Bidders, the Supplementary Instructions to Bidders, the Conditions of the Contract, the Drawings and Specifications, all as prepared by KSQ Design designated as Nanuet Union Free School District Phase 4 Projects, dated **February 6, 2024** and that, if this Proposal is accepted, the Undersigned agrees to enter into an Agreement with the owner to perform this work for the lump sum of:

NANUET HIGH SCHOOL:

_____

_____Dollars & No Cents

($_____ .00)

herein referred to as the Base Bid.

BARR MIDDLE SCHOOL:

_____

_____Dollars & No Cents

($_____ .00)

herein referred to as the Base Bid.

MILLER ELEMENTARY SCHOOL:

_____

_____Dollars & No Cents

($_____ .00)

herein referred to as the Base Bid.

ALLOWANCES:

The undersigned Contractor has included the Allowance(s) as specified in Section 01 2100 in their Base Bid.

UNIT PRICE:

A. **Unit Price GC-#1:** $_____ Dollars $ No Cents

B. **Unit Price GC-#2:** $_____ Dollars $ No Cents

C. **Unit Price GC-#3:** $_____ Dollars $ No Cents

D. **Unit Price GC-#4:** $_____ Dollars $ No Cents

E. **Unit Price GC-#5:** $_____ Dollars $ No Cents

F. **Unit Price GC-#6:** $_____ Dollars $ No Cents

G. **Unit Price GC-#7:** $_____ Dollars $ No Cents

H. **Unit Price GC-#8:** $_____ Dollars $ No Cents

I. **Unit Price GC-#9:** $_____ Dollars $ No Cents

ALTERNATES:

Add Alternate GC-01 Alt #1: $_____ Dollar $ No Cents

Add Alternate GC-01 Alt #2: $_____ Dollar $ No Cents

ADDENDA:

The undersigned acknowledges the receipt of the following addenda:

Addendum Number	Date	Addendum Number	Date
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

The Undersigned understands that the Owner reserves the right to accept or reject any or all proposals, but that if notice of the acceptance of the above Proposal is sent via United States Postal Service or any other overnight carrier, with signature required, to the Undersigned within sixty (60) days after the formal opening of Bids or anytime thereafter before this Proposal is withdrawn, the Undersigned will enter into, execute, and deliver a Contract within five (5) days after the date of said notification.

1. Time of Commencement and Completion:

The Undersigned agrees in the Base Bid to complete the work as per the Milestone Schedule provided in the Specifications.

2. Rejection of Bids:

The Bidder acknowledges that the Owner reserves the right to waive any informality in, or to reject any or all Bids.

3. Attachments:

Obtain and attach the following documents to each individual Bid.

a. Corporate Resolutions
b. Non-Collusive Bid Certification
c. Iran Divestment Act Affidavit
d. Bid Security
e. Subcontractor List
f. Substitution List

CLOSING: (signature)_____

DATE: _____

BY: _____

TITLE: _____

FIRM: _____

ADDRESS: _____

_____

TELEPHONE NUMBER: _____

FAX NUMBER: _____

CONTACT PERSON: _____

E-MAIL: _____

4. Work Cost Breakdown:

This form shall be filled out and submitted by the Contractor. The grand total must equal the BASE BID under Section I (A) "THE BID". UNIT PRICES are required for the items listed in the Unit Prices section of the work cost breakdown. Unit prices will be provided for use if the required quantities are more or less than the quantities indicated in the plans and specifications. Failure to complete the work cost breakdown may result in the disqualification of the bid. As itemized in the "Instructions to Bidders" for a complete Bid Form include the following which must be filled out completely, failure to comply with any listed below bid will be a rejected bid:

a. Bid Form, all costs must be shown in each CSI section and totaled, failure to breakdown these costs will be subject to disqualification of bid.

b. Unit costs

Contract Number: Contract No. 02 – General Construction (GC-01)

Contract Titles: As noted in the Notec to Bidders 00 03 00

Date:

* Refer to specification Section 012900 Payment Procedures for additional information

Description	QTY	Unit	Total
General Requirements (Submittals, Punchlist, etc.)			
012100 Allowances - Unforeseen Conditions	1	NA	
020800 Asbestos Abatement			
024100 Selective Demolition (Labor)			
024100 Selective Demolition (Material)			
033400 Self-Leveling Toppings (Labor)			
033400 Self-Leveling Toppings (Material)			

037330 Concrete Repair Work (Labor)			
037330 Concrete Repair Work (Material)			
040120 Maintenance and Restoration of Brick Masonry (Labor)			
040120 Maintenance and Restoration of Brick Masonry (Material)			
040305.13 Restoration Mortars (Labor)			
040305.13 Restoration Mortars (Material)			
040305.16 Restoration Masonry Repointing (Labor)			
040305.16 Restoration Masonry Repointing (Material)			
042200 Concrete Unit Masonry (Labor)			
042200 Concrete Unit Masonry (Material)			
051200 structural steel (Labor)			
051200 structural steel (Material)			
053100 steel decking (Labor)			
053100 steel decking (Material)			
055000 metal fabrications (Labor)			
055000 metal fabrications (Material)			
055213 pipe and tube railings (Labor)			
055213 pipe and tube railings (Material)			
061000 Rough Carpentry (Labor)			
061000 Rough Carpentry (Material)			
064023 Interior Architectural Woodwork (Labor)			
064023 Interior Architectural Woodwork (Material)			
072100 Thermal Insulation (Labor)			
072100 Thermal Insulation (Material)			
078413 Penetration Firestopping (Labor)			
078413 Penetration Firestopping (Material)			
079200 Joint Sealant (Labor)			

079200 Joint Sealant (Material)			
081113 Hollow Metal Doors and Frames (Labor)			
081113 Hollow Metal Doors and Frames (Material)			
081116 fire rated aluminum full vision doors and frames (Labor)			
081116 fire rated aluminum full vision doors and frames (Material)			
081416 flush wood door (Labor)			
081416 flush wood door (Material)			
083113 access doors and frames (Labor)			
083113 access doors and frames (Material)			
084113 Aluminum Framed Entrances and Storefronts (Labor)			
084113 Aluminum Framed Entrances and Storefronts (Material)			
085671 Bullet-Resistant Steel Window (Labor)			
085671 Bullet-Resistant Steel Window (Material)			
087100 Door Hardware (Labor)			
087100 Door Hardware (Material)			
088300 Mirrors (Labor)			
088300 Mirrors (Material)			
088717 safety and security glazing films (Labor)			
088717 safety and security glazing films (Material)			
090370 bonded terrazzo to match existing (Labor)			
090370 bonded terrazzo to match existing (Material)			
092216 non-structural metal framing Labor)			
092216 non-structural metal framing (Material)			
092900 gypsum board (Labor)			
092900 gypsum board (Material)			

093013 ceramic tile (Labor)			
093013 ceramic tile (Material)			
095123 acoustical ceiling tile (Labor)			
095123 acoustical ceiling tile (Material)			
096513 resilient base and accessories (Labor)			
096513 resilient base and accessories (Material)			
096519 resilient flooring (Labor)			
096519 resilient flooring (Material)			
096723 resinous flooring (Labor)			
096723 resinous flooring (Material)			
096813 tile carpeting (Labor)			
096813 tile carpeting (Material)			
099100 painting (Labor)			
099100 painting (Material)			
099720 wall coverings (Labor)			
099720 wall coverings (Material)			
099100 painting (Labor)			
099100 painting (Material)			
101400 interior signage (labor)			
101400 interior signage (Material)			
102100 toilet partitions (Labor)			
102100 toilet partitions (Material)			
102800 toilet and bath accessories (Labor)			
102800 toilet and bath accessories (Material)			
111600 Bullet resistant fiberglass panels (labor)			
111600 Bullet resistant fiberglass panels (Material)			
122413 roller window shades (Labor)			
122413 roller window shades (Material)			

123661 simulated stone countertops (Labor)			
123661 simulated stone countertops (Material)			
124813 entrance mats and frames (Labor)			
124813 entrance mats and frames (Material)			
144200 wheelchair lift (Labor)			
144200 wheelchair lift (Material)			

Submit Bid Form in duplicate.

END OF SECTION 00 30 01

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SECTION 00 30 02 - EC BID FORM

CONTRACT 3 – ELECTRICAL CONSTRUCTION PROPOSAL (EC-01):

_____

Bidding Firm Name

To The Board of Education,

The undersigned hereby proposes to furnish all labor, materials, devices, appliances, supplies, equipment, services and other facilities necessary to complete all of the work of the above referenced Contract for the Nanuet Union Free School District, Nanuet, New York, as required by, and in accordance with, the provisions of the Instructions to Bidders, the Supplementary Instructions to Bidders, the Conditions of the Contract, the Drawings and Specifications, all as prepared by KSQ Design designated as Nanuet Union Free School District Phase 4 Projects, dated **February 6, 2024** and that, if this Proposal is accepted, the Undersigned agrees to enter into an Agreement with the owner to perform this work for the lump sum of:

NANUET HIGH SCHOOL:

_____

_____Dollars & No Cents

($_____ .00)

herein referred to as the Base Bid.

BARR MIDDLE SCHOOL:

_____

_____Dollars & No Cents

($_____ .00)

herein referred to as the Base Bid.

MILLER ELEMENTARY SCHOOL:

_____

_____Dollars & No Cents

($_____ .00)
herein referred to as the Base Bid.

ALLOWANCES:

The undersigned Contractor has included the Allowance(s) as specified in Section 01 2100 in their Base Bid.

UNIT PRICE: NONE

ALTERNATES:

Add Alternate EC-01 Alt #1: $_____ Dollar $ No Cents

Add Alternate EC-01 Alt #2 $_____ Dollar $ No Cents

Add Alternate EC-01 Alt #3 $_____ Dollar $ No Cents **Add**

Alternate EC-01 Alt #4 $_____ Dollar $ No Cents

ADDENDA:

The undersigned acknowledges the receipt of the following addenda:

Addendum Number	Date	Addendum Number	Date
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

The Undersigned understands that the Owner reserves the right to accept or reject any or all proposals, but that if notice of the acceptance of the above Proposal is sent via United States Postal Service or any other overnight carrier, with signature required, to the Undersigned within sixty (60) days after the formal

opening of Bids or anytime thereafter before this Proposal is withdrawn, the Undersigned will enter into, execute, and deliver a Contract within five (5) days after the date of said notification.

1. Time of Commencement and Completion:

The Undersigned agrees in the Base Bid to complete the work as per the Milestone Schedule provided in the Specifications.

2. Rejection of Bids:

The Bidder acknowledges that the Owner reserves the right to waive any informality in, or to reject any or all Bids.

3. Attachments:

Obtain and attach the following documents to each individual Bid.

a. Corporate Resolutions
b. Non-Collusive Bid Certification
c. Iran Divestment Act Affidavit
d. Bid Security
e. Subcontractor List
f. Substitution List

CLOSING: (signature)_____

DATE: _____

BY: _____

TITLE: _____

FIRM: _____

ADDRESS: _____

_____

TELEPHONE NUMBER: _____

FAX NUMBER: _____

CONTACT PERSON: _____

E-MAIL: _____

4. Work Cost Breakdown:

This form shall be filled out and submitted by the Contractor. The grand total must equal the BASE BID under Section I (A) "THE BID". UNIT PRICES are required for the items listed in the Unit Prices section of the work cost breakdown. Unit prices will be provided for use if the required quantities are more or less than the quantities indicated in the plans and specifications. Failure to complete the work cost breakdown may result in the disqualification of the bid. As itemized in the "Instructions to Bidders" for a complete Bid Form include the following which must be filled out completely, failure to comply with any listed below bid will be a rejected bid:

a. Bid Form, all costs must be shown in each CSI section and totaled, failure to breakdown these costs will be subject to disqualification of bid.

b. Unit costs

Contract Number: Contract No. 03 – Electrical Construction (EC-01)

Contract Titles: As noted in the Notec to Bidders 00 03 00

Date:

* Refer to specification Section 012900 Payment Procedures for additional information

Description	QTY	Unit	Total
General Requirements (Submittals, Punchlist, etc.)			
012100 Allowances - Unforeseen Conditions	1	NA	
078413 Penetration Firestopping (Labor)			
078413 Penetration Firestopping (Material)			
079200 Joint Sealant (Labor)			
079200 Joint Sealant (Material)			

144200 Wheelchair Lift (Labor)			
144200 Wheelchair Lift (Material)			
260505 selective demolition for electrical (Labor)			
260505 selective demolition for electrical (Material)			
260519 low-voltage electrical power conductors and cables (Labor)			
260519 low-voltage electrical power conductors and cables (Material)			
260526 Grounding and Bonding for Electrical System (Labor)			
260526 Grounding and Bonding for Electrical System (Material)			
260529 hangers and supports for electrical systems (Labor)			
260529 hangers and supports for electrical systems (Material)			
260533.13 conduit for electrical systems (Labor)			
260533.13 conduit for electrical systems (Material)			
260533.16 boxes for electrical systems (Labor)			
260533.16 boxes for electrical systems (Material)			
260533.23 surface raceways for electrical systems (Labor)			
260533.23 surface raceways for electrical systems (Material)			
260553 identification for electrical systems (Labor)			
260553 identification for electrical systems (Material)			
260923 lighting control devices (Labor)			
260923 lighting control devices (Material)			
262416 panelboards (Labor)			
262416 panelboards (Material)			
262421 circuit breakers for existing panelboard (Labor)			
262421 circuit breakers for existing panelboard (Material)			
262726 wiring devices (Labor)			

262726 wiring devices (Material)			
262813 Fuses (Labor)			
262813 Fuses (Maaterial)			
262816.16 enclosed switches (Labor)			
262816.16 enclosed switches (Material)			
262913 enclosed controllers (Labor)			
262913 enclosed controllers (Material)			
262923 variable-frequency motor controllers (Labor)			
262923 variable-frequency motor controllers (Material)			
265100 interior lighting (Labor)			
265100 interior lighting (Material)			
271000 structured cabling-voice and data- inside (Labor)			
271000 structured cabling-voice and data- inside (Material)			
284600 fire detection and alarm (Labor)			
284600 fire detection and alarm (Material)			

Submit Bid Form in duplicate.

END OF SECTION 00 30 02

SECTION **00 30 03 - MC BID FORM**

CONTRACT 4 – MECHANICAL CONSTRUCTION PROPOSAL (MC-01):

_____

Bidding Firm Name

To The Board of Education,

The undersigned hereby proposes to furnish all labor, materials, devices, appliances, supplies, equipment, services and other facilities necessary to complete all of the work of the above referenced Contract for the Nanuet Union Free School District, Nanuet, New York, as required by, and in accordance with, the provisions of the Instructions to Bidders, the Supplementary Instructions to Bidders, the Conditions of the Contract, the Drawings and Specifications, all as prepared by KSQ Design designated as Nanuet Union Free School District Phase 4 Projects, dated **February 6, 2024** and that, if this Proposal is accepted, the Undersigned agrees to enter into an Agreement with the owner to perform this work for the lump sum of:

NANUET HIGH SCHOOL:

_____

_____Dollars & No Cents

($_____ .00)

herein referred to as the Base Bid.

BARR MIDDLE SCHOOL:

_____

_____Dollars & No Cents

($_____ .00)

herein referred to as the Base Bid.

MILLER ELEMENTARY SCHOOL:

_____

_____Dollars & No Cents

($_____ .00)
herein referred to as the Base Bid.

ALLOWANCES:
The undersigned Contractor has included the Allowance(s) as specified in Section 01 2100 in their Base Bid.

UNIT PRICE:

A. **Unit Price MC-#1:** $_____ Dollars $ No Cents

B. **Unit Price MC-#2:** $_____ Dollars $ No Cents

ALTERNATES:

Deduct Alternate MC-01 Alt #1: $_____ Dollar $ No Cents

Add Alternate MC-01 Alt #2: $_____ Dollar $ No Cents

Add Alternate MC-01 Alt #3: $_____ Dollar $ No Cents

ADDENDA:
The undersigned acknowledges the receipt of the following addenda:

Addendum Number	Date	Addendum Number	Date
_____	_____	_____	_____
_____	_____	_____	_____

_____ _____ _____ _____

_____ _____ _____ _____

_____ _____ _____ _____

The Undersigned understands that the Owner reserves the right to accept or reject any or all proposals, but that if notice of the acceptance of the above Proposal is sent via United States Postal Service or any other overnight carrier, with signature required, to the Undersigned within sixty (60) days after the formal opening of Bids or anytime thereafter before this Proposal is withdrawn, the Undersigned will enter into, execute, and deliver a Contract within five (5) days after the date of said notification.

1. Time of Commencement and Completion:

The Undersigned agrees in the Base Bid to complete the work as per the Milestone Schedule provided in the Specifications.

2. Rejection of Bids:

The Bidder acknowledges that the Owner reserves the right to waive any informality in, or to reject any or all Bids.

3. Attachments:

Obtain and attach the following documents to each individual Bid.

a. Corporate Resolutions
b. Non-Collusive Bid Certification
c. Iran Divestment Act Affidavit
d. Bid Security
e. Subcontractor List
f. Substitution List

CLOSING: (signature)_____

DATE: _____

BY: _____

TITLE: _____

FIRM: _____

ADDRESS: _____

_____

TELEPHONE NUMBER: _____

FAX NUMBER: _____

CONTACT PERSON: _____

E-MAIL: _____

4. Work Cost Breakdown:

This form shall be filled out and submitted by the Contractor. The grand total must equal the BASE BID under Section I (A) “THE BID”. UNIT PRICES are required for the items listed in the Unit Prices section of the work cost breakdown. Unit prices will be provided for use if the required quantities are more or less than the quantities indicated in the plans and specifications. Failure to complete the work cost breakdown may result in the disqualification of the bid. As itemized in the “Instructions to Bidders” for a complete Bid Form include the following which must be filled out completely, failure to comply with any listed below bid will be a rejected bid:

a. Bid Form, all costs must be shown in each CSI section and totaled, failure to breakdown these costs will be subject to disqualification of bid.

b. Unit costs

Contract Number: Contract No. 04 – Mechanical Construction (MC-01)

Contract Titles: As noted in the Notice to Bidders 00 03 00

Date:

* Refer to specification Section 012900 Payment Procedures for additional information

Description	QTY	Unit	Total

General Requirements (Submittals, Punchlist, etc.)			
012100 Allowances - Unforeseen Conditions	1	NA	
028200 Asbestos Abatement			
061000 Rough Carpentry (Labor)			
061000 Rough Carpentry (Material			
078413 Penetration Firestopping (Labor)			
078413 Penetration Firestopping (Material)			
079200 Joint Sealant (Labor)			
079200 Joint Sealant (Material)			
083113 access doors and frames (Labor)			
083113 access doors and frames (Material)			
095123 acoustical ceiling tile (Labor)			
095123 acoustical ceiling tile (Material)			
096513 resilient base and accessories (Labor)			
096513 resilient base and accessories (Material)			
096519 resilient flooring (Labor)			
096519 resilient flooring (Material)			
096723 resinous flooring (Labor)			
096723 resinous flooring (Material)			
096813 tile carpeting (Labor)			
230501 basic hvac materials and methods (Material)			
230501 basic hvac materials and methods (Labor)			
230516 expansion fittings and loops for hvac piping (Material)			
230516 expansion fittings and loops for hvac piping (Labor)			
230519 meters and gauges for hvac piping (Material)			
230519 meters and gauges for hvac piping (Labor)			
230548 vibration controls for hvac piping and equipment (Material)			
230548 vibration controls for hvac piping and equipment (Labor)			

230553 identification for hvac piping and equipment (Material)			
230553 identification for hvac piping and equipment (Labor)			
230593 testing, adjusting, and balancing for hvac (Material)			
230593 testing, adjusting, and balancing for hvac (Labor)			
230713 Duct Insulation (Labor)			
230713 Duct Insulation (Material)			
230716 hvac equipment insulation (Material)			
230716 hvac equipment insulation (Labor)			
230719 hvac piping insulation (Material)			
230719 hvac piping insulation (Labor)			
230800 commissioning of hvac (Material)			
230800 commissioning of hvac (Labor)			
230923 direct-digital control system for hvac (Material)			
230923 direct-digital control system for hvac (Labor)			
232113 hydronic piping (Material)			
232113 hydronic piping (Labor)			
232114 hydronic specialties (Material)			
232114 hydronic specialties (Labor)			
232123 Hydronic Pumps (Labor)			
232123 Hydronic Pumps (Material)			
232213 steam and condensate heating piping (Material)			
232213 steam and condensate heating piping (Labor)			
232300 refrigerant piping (Material)			
232300 refrigerant piping (Labor)			
232500 hvac water treatment (Material)			
232500 hvac water treatment (Labor)			
233100 hvac ducts and casings (Material)			

233100 hvac ducts and casings (Labor)			
233300 air duct accessories (Material)			
233300 air duct accessories (Labor)			
233319 duct silencers (Material)			
233319 duct silencers (Labor)			
233423 hvac power ventilator (Material)			
233423 hvac power ventilator (Labor)			
233600 air terminal units (Material)			
233600 air terminal units (Labor)			
233700 air outlets and inlets (Material)			
233700 air outlets and inlets (Labor)			
233813 Kitchen ventilation hoods (Material)			
233813 Kitchen ventilation hoods (Labor)			
237223 packaged air to air energy recovery units (Material)			
237223 packaged air to air energy recovery units (Labor)			
238126 Small Capacity Split System Air conditioner (Labor)			
238126 Small Capacity Split System Air conditioner (Material)			
238129 variable refrigerant flow hvac systems (Material)			
238129 variable refrigerant flow hvac systems (Labor)			
238200 convection heating and cooling units (Material)			
238200 convection heating and cooling units (Labor)			
238300 Radiant Heating and Cooling Units (Labor)			
238300 Radiant Heating and Cooling Units (Material)			

Submit Bid Form in duplicate.

END OF SECTION 00 30 03

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SECTION 00 30 04 - PC BID FORM

CONTRACT 5 – PLUMBING CONSTRUCTION PROPOSAL (PC-01):

_____

Bidding Firm Name

To The Board of Education,

The undersigned hereby proposes to furnish all labor, materials, devices, appliances, supplies, equipment, services and other facilities necessary to complete all of the work of the above referenced Contract for the Nanuet Union Free School District, Nanuet, New York, as required by, and in accordance with, the provisions of the Instructions to Bidders, the Supplementary Instructions to Bidders, the Conditions of the Contract, the Drawings and Specifications, all as prepared by KSQ Design designated as Nanuet Union Free School District Phase 4 Projects, dated **February 6, 2024** and that, if this Proposal is accepted, the Undersigned agrees to enter into an Agreement with the owner to perform this work for the lump sum of:

BARR MIDDLE SCHOOL:

_____

_____Dollars & No Cents

($_____ .00)

herein referred to as the Base Bid.

ALLOWANCES:

The undersigned Contractor has included the Allowance(s) as specified in Section 01 2100 in their Base Bid.

UNIT PRICE: NONE

ALTERNATES:

Add Alternate PC-01 Alt #1: $_____ Dollar $ No Cents

ADDENDA:

The undersigned acknowledges the receipt of the following addenda:

Addendum Number	Date	Addendum Number	Date
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

The Undersigned understands that the Owner reserves the right to accept or reject any or all proposals, but that if notice of the acceptance of the above Proposal is sent via United States Postal Service or any other overnight carrier, with signature required, to the Undersigned within sixty (60) days after the formal opening of Bids or anytime thereafter before this Proposal is withdrawn, the Undersigned will enter into, execute, and deliver a Contract within five (5) days after the date of said notification.

1. Time of Commencement and Completion:

The Undersigned agrees in the Base Bid to complete the work as per the Milestone Schedule provided in the Specifications.

2. Rejection of Bids:

The Bidder acknowledges that the Owner reserves the right to waive any informality in, or to reject any or all Bids.

3. Attachments:

Obtain and attach the following documents to each individual Bid.

a. Corporate Resolutions
b. Non-Collusive Bid Certification
c. Iran Divestment Act Affidavit
d. Bid Security

e. Subcontractor List

f. Substitution List

CLOSING: (signature)_____

DATE: _____

BY: _____

TITLE: _____

FIRM: _____

ADDRESS: _____

_____

TELEPHONE NUMBER: _____

FAX NUMBER: _____

CONTACT PERSON: _____

E-MAIL: _____

4. Work Cost Breakdown:

This form shall be filled out and submitted by the Contractor. The grand total must equal the BASE BID under Section I (A) “THE BID”. UNIT PRICES are required for the items listed in the Unit Prices section of the work cost breakdown. Unit prices will be provided for use if the required quantities are more or less than the quantities indicated in the plans and specifications. Failure to complete the work cost breakdown may result in the disqualification of the bid. As itemized in the “Instructions to Bidders” for a complete Bid Form include the following which must be filled out completely, failure to comply with any listed below bid will be a rejected bid:

a. Bid Form, all costs must be shown in each CSI section and totaled, failure to breakdown these costs will be subject to disqualification of bid.

b. Unit costs

Contract Number: Contract No. 04 – Plumbing Construction (PC-01)

Contract Titles: As noted in the Notice to Bidders 00 03 00

Date:

* Refer to specification Section 012900 Payment Procedures for additional information

Description	QTY	Unit	Total
General Requirements (Submittals, Punchlist, etc.)			
012100 Allowances - Unforeseen Conditions	1	NA	
078413 Penetration Firestopping (Labor)			
078413 Penetration Firestopping (Material)			
220501 basic plumbing materials and methods (Labor)			
220501 basic plumbing materials and methods (Material)			
220553 identification for plumbing piping and equipment (Labor)			
220553 identification for plumbing piping and equipment (Material)			
220719 plumbing piping insulation (Labor)			
220719 plumbing piping insulation (Material)			
221005 plumbing piping (Labor)			
221005 plumbing piping (Material)			
221006 plumbing piping specialties (Labor)			
221006 plumbing piping specialties (Material)			
224000 plumbing fixtures (Labor)			
224000 plumbing fixtures (Material)			

Submit Bid Form in duplicate.

END OF SECTION 00 30 04

AIA® Document A305® – 2020

Contractor's Qualification Statement

THE PARTIES SHOULD EXECUTE A SEPARATE CONFIDENTIALITY AGREEMENT IF THEY INTEND FOR ANY OF THE INFORMATION IN THIS A305-2020 TO BE HELD CONFIDENTIAL.

SUBMITTED BY:
(Organization name and address.)

SUBMITTED TO:
(Organization name and address.)

TYPE OF WORK TYPICALLY PERFORMED
(Indicate the type of work your organization typically performs, such as general contracting, construction manager as constructor services, HVAC contracting, electrical contracting, plumbing contracting, or other.)

THIS CONTRACTOR'S QUALIFICATION STATEMENT INCLUDES THE FOLLOWING:
(Check all that apply.)

[ ] Exhibit A – General Information
[ ] Exhibit B – Financial and Performance Information
[ ] Exhibit C – Project-Specific Information
[ ] Exhibit D – Past Project Experience
[ ] Exhibit E – Past Project Experience (Continued)

CONTRACTOR CERTIFICATION
The undersigned certifies under oath that the information provided in this Contractor's Qualification Statement is true and sufficiently complete so as not to be misleading.

_____ _____
Organization's Authorized Representative Signature **Date**

_____
Printed Name and Title

NOTARY
State of:
County of:
Signed and sworn to before me this day of

_____
Notary Signature

My commission expires:

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.

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Additions and Deletions Report for

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There are no differences.

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Certification of Document's Authenticity

AIA® Document D401™ – 2003

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_____

(Signed)

_____

(Title)

_____

(Dated)

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AIA® Document A310™ – 2010

Bid Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)
Nanuet Union Free School District
101 Church Street
Nanuet, N.Y. 10954

BOND AMOUNT: $

PROJECT:
(Name, location or address, and Project number, if any)
NANUET UNION FREE SCHOOL DISTRICT
NANUET BOND PROJECTS PHASE 4
LIST PROJECT NUMBERS BELOW:
Nanuet HS School: 50-01-08-03-0-003-036
Barr Middle School: 50-01-08-03-0-004-021
Miller Elementary School: 50-01-08-03-0-001-025

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

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

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

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.

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

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User Notes: (1196897349)

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

Signed and sealed this day of ,

	(Contractor as Principal) *(Seal)*
(Witness)	*(Title)*
	(Surety) *(Seal)*
(Witness)	*(Title)*

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PAGE 1

Nanuet Union Free School District
101 Church Street
Nanuet, N.Y. 10954

...

NANUET UNION FREE SCHOOL DISTRICT
NANUET BOND PROJECTS PHASE 4
LIST PROJECT NUMBERS BELOW:
Nanuet HS School: 50-01-08-03-0-003-036
Barr Middle School: 50-01-08-03-0-004-021
Miller Elementary School: 50-01-08-03-0-001-025

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_____

(Signed)

_____

(Title)

_____

(Dated)

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SECTION 00 31 13 - PRELIMINARY SCHEDULES

1.1 PROJECT SCHEDULE

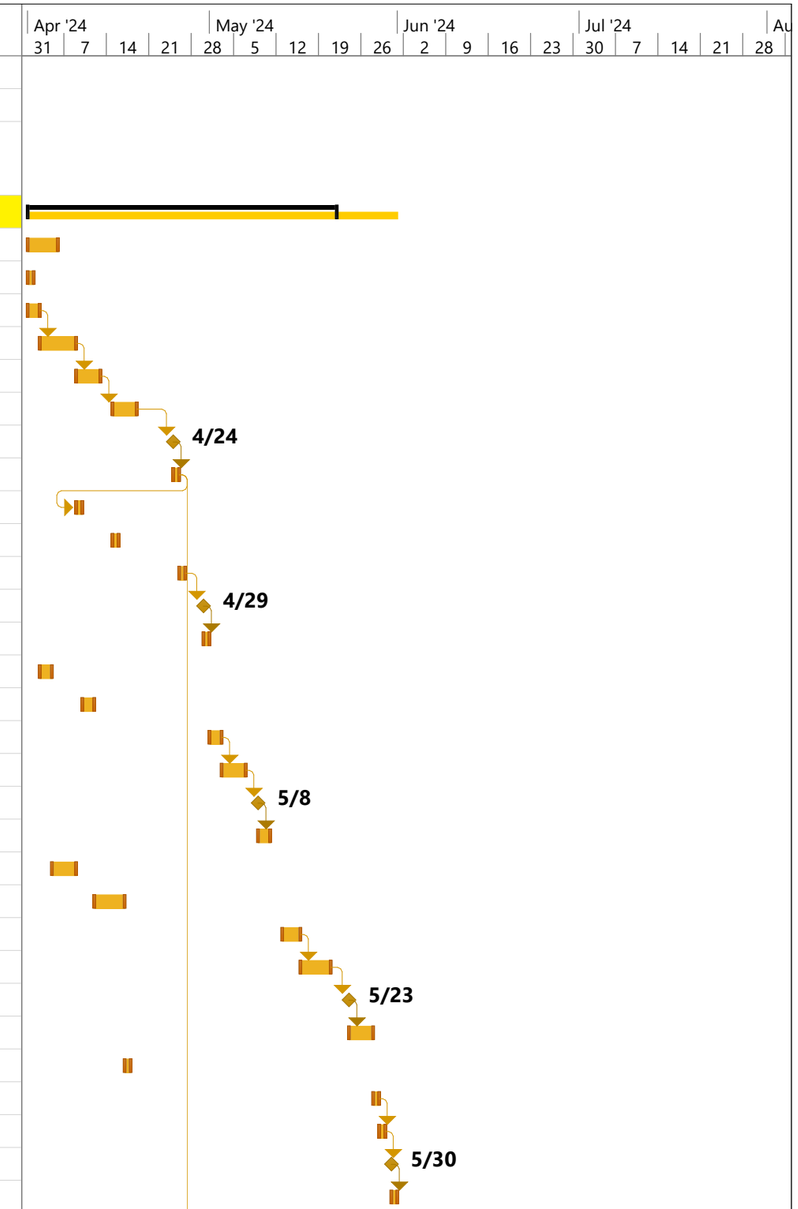
A. This Document is part of the Procurement and Contracting Requirements for the Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of Bidders' own investigations. They are made available for Bidders' convenience and information, but do not affect Contract Time requirements. This Document and its attachments are not part of the Contract Documents. The contractor is responsible to provide their own schedule and meet the substantial completion dates outlined on the contract documents.

It is a contract requirement for the contractor to meet the milestone dates outlined in this preliminary schedule. The contractor shall incorporate these dates into their master schedules. See AIA 232 General terms and conditions for the contract for construction in reference to liquidated damages associated with failure to meet milestone dates.

END OF DOCUMENT 00 31 13

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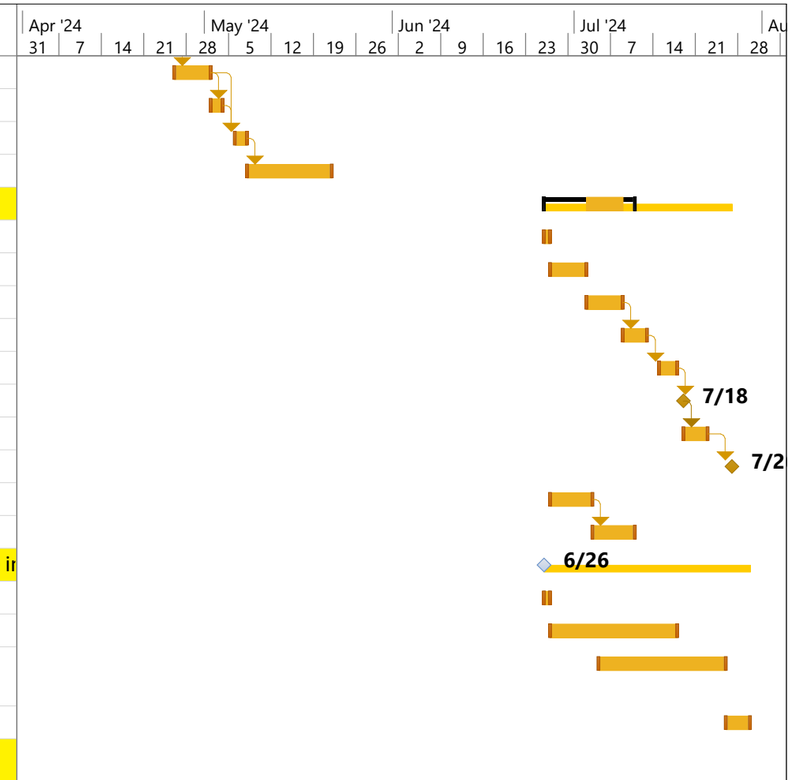
ID	Task Name	Duration	Start	Finish	Notes
1					
2	PHASE 4 CONSTRUCTION PHASE				
3	**Miller Elementary School BE-01, GC-01, MC-01, EC-01**				
4	**Miller Elementary School - Roofing - BE-01**	**37 days**	**Mon 4/1/24**	**Tue 5/21/24**	**Weekend work and double shift anticipated**
5	District PV Vendor to removal roof Photovoltaics	5 days	Mon 4/1/24	Fri 4/5/24	Spring Break School Closed April 1-5
6	Mobilization	1 day	Mon 4/1/24	Mon 4/1/24	Spring Break School Closed April 1-5
7	Roof Gravel Vacuum R1,R2,R3,R4,R5	2 days	Mon 4/1/24	Tue 4/2/24	
8	Roof Cleaning R1,R2,R3,R4,R5	4 days	Wed 4/3/24	Mon 4/8/24	
9	Roof Priming R1,R2,R3,R4,R5	4 days	Tue 4/9/24	Fri 4/12/24	
10	Base Coat R1,R2,R3,R4,R5	4 days	Mon 4/15/24	Thu 4/18/24	
11	Top Coat R1,R2,R3,R4,R5	4 days	Fri 4/19/24	Wed 4/24/24	Milestone
12	Flashings R1,R2,R3,R4,R5	1 day	Thu 4/25/24	Thu 4/25/24	
13	Roof Cleaning R6,R7	1 day	Tue 4/9/24	Tue 4/9/24	Possible Second Shift. Noise Dependant
14	Roof Priming R6,R7	1 day	Mon 4/15/24	Mon 4/15/24	
15	Base Coat R6,R7	1 day	Fri 4/26/24	Fri 4/26/24	
16	Top Coat R6,R7	1 day	Mon 4/29/24	Mon 4/29/24	Milestone
17	Flashings R6,R7	1 day	Tue 4/30/24	Tue 4/30/24	
18	Roof Gravel Vacuum R8	2 days	Wed 4/3/24	Thu 4/4/24	
19	Roof Cleaning R8	2 days	Wed 4/10/24	Thu 4/11/24	Possible Second Shift. Noise Dependant
20	Roof Priming R8	2 days	Wed 5/1/24	Thu 5/2/24	
21	Base Coat R8	2 days	Fri 5/3/24	Mon 5/6/24	
22	Top Coat R8	2 days	Tue 5/7/24	Wed 5/8/24	Milestone
23	Flashings R8	2 days	Thu 5/9/24	Fri 5/10/24	
24	Roof Gravel Vacuum R9, R10, R11	2 days	Fri 4/5/24	Mon 4/8/24	
25	Roof Cleaning R9, R10	3 days	Fri 4/12/24	Tue 4/16/24	
26	Roof Priming R9, R10	3 days	Mon 5/13/24	Wed 5/15/24	
27	Base Coat R9, R10	3 days	Thu 5/16/24	Mon 5/20/24	
28	Top Coat R9, R10	3 days	Tue 5/21/24	Thu 5/23/24	Milestone
29	Flashings R9, R10	2 days	Fri 5/24/24	Mon 5/27/24	
30	Roof Cleaning R11	1 day	Wed 4/17/24	Wed 4/17/24	
31	Roof Priming R11	1 day	Tue 5/28/24	Tue 5/28/24	
32	Base Coat R11	1 day	Wed 5/29/24	Wed 5/29/24	
33	Top Coat R11	1 day	Thu 5/30/24	Thu 5/30/24	Milestone
34	Flashings R11	1 day	Fri 5/31/24	Fri 5/31/24	



Project: \\nycfil02\PROJ\2021 p
Date: Thu 1/11/24

Task	Inactive Summary	External Tasks	Path Driving Predecessor Summary Task
Split	Manual Task	External Milestone	Path Driving Predecessor Normal Task
Milestone	Duration-only	Deadline	Critical
Summary	Manual Summary Rollup	Path Predecessor Milestone Task	Critical Split
Project Summary	Manual Summary	Path Predecessor Summary Task	Progress
Inactive Task	Start-only	Path Predecessor Normal Task	Manual Progress
Inactive Milestone	Finish-only	Path Driving Predecessor Milestone Task	

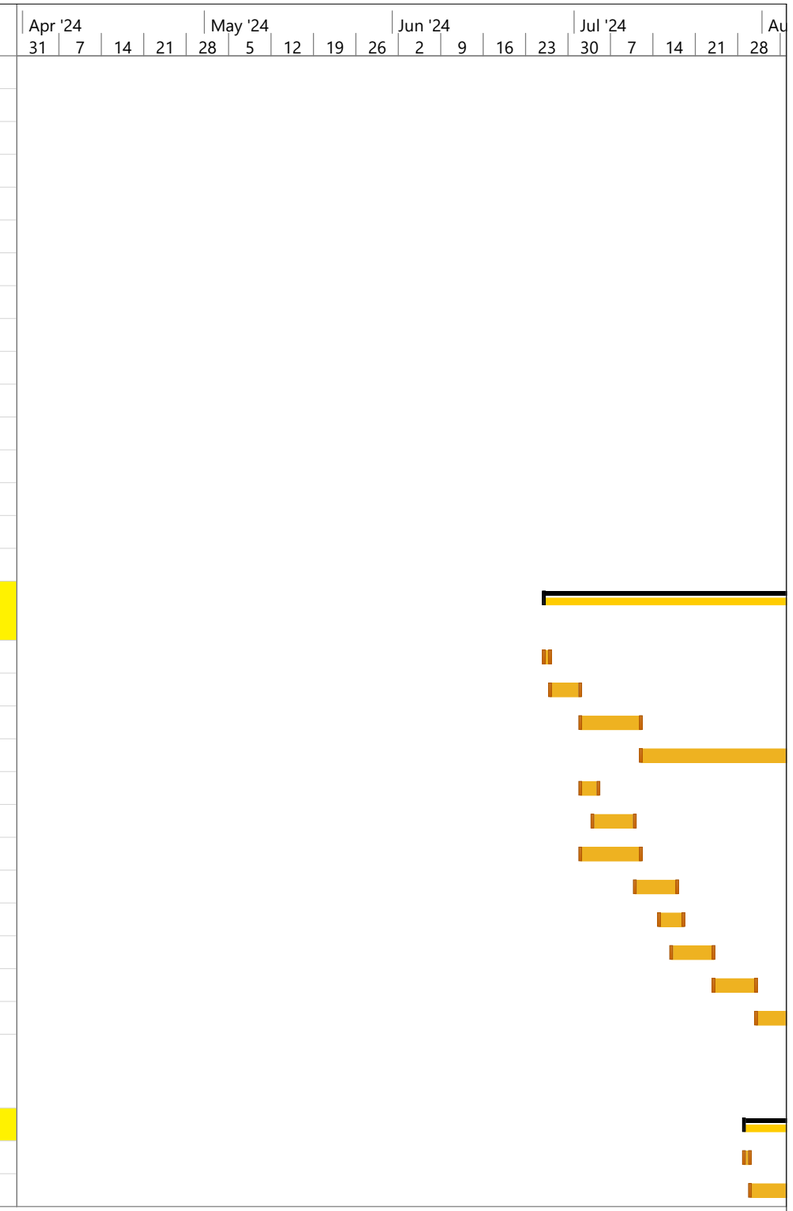
ID	Task Name	Duration	Start	Finish	Notes
35	Install Roof Ladders	4 days	Fri 4/26/24	Wed 5/1/24	
36	Painting of gas piping	2 days	Thu 5/2/24	Fri 5/3/24	
37	Roof Drain Covers	2 days	Mon 5/6/24	Tue 5/7/24	
38	District PV Vendor to reinstall solar	10 days	Wed 5/8/24	Tue 5/21/24	
39	**Miller ES- Exterior Site work & Masonry - GC -01**	**11 days**	**Wed 6/26/24**	**Wed 7/10/24**	**Summer 2024 project**
40	Mobilize	1 day	Wed 6/26/24	Wed 6/26/24	
41	Demolition	4 days	Thu 6/27/24	Tue 7/2/24	
42	Excavation & Subbase	4 days	Wed 7/3/24	Mon 7/8/24	
43	Formwork	4 days	Tue 7/9/24	Fri 7/12/24	
44	Rebar	3 days	Mon 7/15/24	Wed 7/17/24	
45	Inspections	1 day	Thu 7/18/24	Thu 7/18/24	Milestone
46	Concrete	2 days	Fri 7/19/24	Mon 7/22/24	
47	Hand Rails	4 days	Tue 7/23/24	Fri 7/26/24	Milestone
48	Repointing	5 days	Thu 6/27/24	Wed 7/3/24	
49	Window Lintel Repair	5 days	Thu 7/4/24	Wed 7/10/24	
50	**Miller ES- Doors & Window Shades - GC-01**		Wed 6/26/24	7/39/24	All Door & Window Shade Scope that cannot be ir
51	Mobilize	1 day	Wed 6/26/24	Wed 6/26/24	
52	Window shades	15 days	Thu 6/27/24	Wed 7/17/24	Possible Second Shift. Lead Time Dependant
53	Door, Hardware, & Glazing Removal and Replacement	15 days	Fri 7/5/24	Thu 7/25/24	Possible Second Shift. Lead Time Dependant
54	Cleanup & Demobilize Interior	2 days	Fri 7/26/24	Mon 7/29/24	
55	**Miller ES - Security Vestibule Renovation GC-01, MC-01, EC-01**	61 days	Sat 6/14/25	Fri 9/5/25	Weekend Work Required
56	Abatement 10 day posting	10 days	Sat 6/14/25	Thu 6/26/25	
57	Abatement Mobilization	1 day	Wed 6/25/25	Wed 6/25/25	School Half Day. Mobilize 12 PM
58	Abatement	1 day	Thu 6/26/25	Thu 6/26/25	
59	Clearances	2 days	Fri 6/27/25	Mon 6/30/25	
60	Breakdown	1 day	Tue 7/1/25	Tue 7/1/25	
61	Demolition / Shoring	3 days	Wed 7/2/25	Fri 7/4/25	
62	Structural Footings	3 days	Mon 7/7/25	Wed 7/9/25	
63	Structural Steel	3 days	Thu 7/10/25	Mon 7/14/25	
64	Wall Framing	2 days	Tue 7/15/25	Wed 7/16/25	Milestone
65	Exterior Storefront & Doors	2 days	Thu 7/17/25	Fri 7/18/25	
66	Mechanical Rough-in & Equipment Walls	2 days	Mon 7/21/25	Tue 7/22/25	
67	Electrical & Data Rough-in Walls	3 days	Wed 7/23/25	Fri 7/25/25	



Project: \\nycfil02\PROJ\2021 p
Date: Thu 1/11/24

Task	Inactive Summary	External Tasks	Path Driving Predecessor Summary Task
Split	Manual Task	External Milestone	Path Driving Predecessor Normal Task
Milestone	Duration-only	Deadline	Critical
Summary	Manual Summary Rollup	Path Predecessor Milestone Task	Critical Split
Project Summary	Manual Summary	Path Predecessor Summary Task	Progress
Inactive Task	Start-only	Path Predecessor Normal Task	Manual Progress
Inactive Milestone	Finish-only	Path Driving Predecessor Milestone Task	

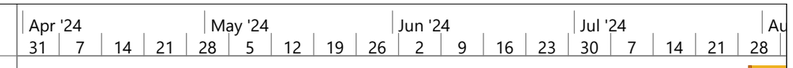
ID	Task Name	Duration	Start	Finish	Notes
68	Door Frames	1 day	Mon 7/28/25	Mon 7/28/25	
69	Bullit Resistive Panel & Sheetrock Walls	2 days	Tue 7/29/25	Wed 7/30/25	
70	Ceiling Framing	2 days	Thu 7/31/25	Fri 8/1/25	
71	Mechanical Rough-in, Controls & Equipment Clg	2 days	Mon 8/4/25	Tue 8/5/25	Milestone
72	Electrical Rough-in Clg	2 days	Wed 8/6/25	Thu 8/7/25	Milestone
73	Sheetrock & Grid Clg	2 days	Fri 8/8/25	Mon 8/11/25	
74	Electrical Fixtures	2 days	Tue 8/12/25	Wed 8/13/25	
75	Taping	3 days	Thu 8/14/25	Mon 8/18/25	
76	Painting	2 days	Tue 8/19/25	Wed 8/20/25	
77	Electrical & Mechanical Trim out	3 days	Thu 8/21/25	Mon 8/25/25	
78	Finishes & Casework	4 days	Tue 8/26/25	Fri 8/29/25	Milestone
79	Interior Doors	2 days	Thu 8/28/25	Fri 8/29/25	
80	Testing & Ballancing	1 day	Wed 9/3/25	Wed 9/3/25	
81	Commissioning	1 day	Thu 9/4/25	Thu 9/4/25	
82	District Move in	2 days	Fri 8/29/25	Mon 9/1/25	Milestone
83	Occupany	1 day	Fri 9/5/25	Fri 9/5/25	
84	**Miller ES - Roof Fans & Fire Alarm MC-01, EC-01, GC-01**	**30 days**	**Wed 6/26/24**	**Tue 8/6/24**	**Summer 2024 project**
85	Mobilization	1 day	Wed 6/26/24	Wed 6/26/24	
86	Electrical Disconnections of roof fans	3 days	Thu 6/27/24	Mon 7/1/24	Weekend Work Required
87	Electrical Removals of FA & Devices	8 days	Tue 7/2/24	Thu 7/11/24	Weekend Work Required
88	Install new FA & Devices	32 days	Fri 7/12/24	Mon 8/26/24	
89	Roof Fan & Controls Removal	3 days	Tue 7/2/24	Thu 7/4/24	
90	Roof Curb Flashing	5 days	Thu 7/4/24	Wed 7/10/24	
91	New FA to roof fans	8 days	Tue 7/2/24	Thu 7/11/24	
92	Install new roof fans	5 days	Thu 7/11/24	Wed 7/17/24	
93	Power to new roof fans	4 days	Mon 7/15/24	Thu 7/18/24	
94	New Controls	5 days	Wed 7/17/24	Tue 7/23/24	
95	Testing & Balancing	5 days	Wed 7/24/24	Tue 7/30/24	
96	Commissioning	5 days	Wed 7/31/24	Tue 8/6/24	
97	**Barr Middle School GC-01, MC-01, PC-01, EC-01**				
98	**Barr MS - Doors & Window Shades - GC-01**	**18 days**	**Mon 7/29/24**	**Wed 8/21/24**	
99	Mobilize	1 day	Mon 7/29/24	Mon 7/29/24	
100	Window shades	15 days	Tue 7/30/24	Mon 8/19/24	Possible Second Shift. Lead Time Dependant



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Task	Inactive Summary	External Tasks	Path Driving Predecessor Summary Task
Split	Manual Task	External Milestone	Path Driving Predecessor Normal Task
Milestone	Duration-only	Deadline	Critical
Summary	Manual Summary Rollup	Path Predecessor Milestone Task	Critical Split
Project Summary	Manual Summary	Path Predecessor Summary Task	Progress
Inactive Task	Start-only	Path Predecessor Normal Task	Manual Progress
Inactive Milestone	Finish-only	Path Driving Predecessor Milestone Task	

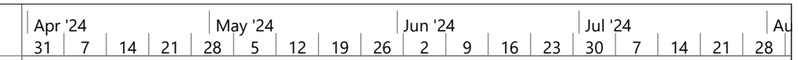
ID	Task Name	Duration	Start	Finish	Notes
101	Door, Hardware, & Glazing Removal and Replacement	15 days	Tue 7/30/24	Mon 8/19/24	Possible Second Shift. Lead Time Dependant
102	Cleanup & Demobilize Interior	2 days	Tue 8/20/24	Wed 8/21/24	
103	**Barr MS - Fire Alarm Upgrades - EC-01**	**46 days**	**Wed 6/25/25**	**Wed 8/27/25**	**Summer 2025 project**
104	Mobilization	1 day	Wed 6/25/25	Wed 6/25/25	
105	Removals	15 days	Thu 6/26/25	Wed 7/16/25	
106	New Devices & Wiring	15 days	Thu 7/17/25	Wed 8/6/25	
107	New Modules & Panel	10 days	Thu 8/7/25	Wed 8/20/25	
108	Testing & Configuration	5 days	Thu 8/21/25	Wed 8/27/25	
109	**Barr MS - Toilet Room Renovations - GC-01,MC-01,EC-01, PC-01**	**56 days**	**Thu 6/12/25**	**Thu 8/28/25**	**Summer 2025 project**
110	Abatement 10 day posting	10 days	Thu 6/12/25	Wed 6/25/25	
111	Demolition EC	3 days	Wed 6/25/25	Fri 6/27/25	
112	Mobilization & Temp Power / Water	1 day	Fri 6/27/25	Fri 6/27/25	
113	Abatement	3 days	Sat 6/28/25	Tue 7/1/25	Weekend Work Required
114	Clearances	2 days	Wed 7/2/25	Thu 7/3/25	
115	Breakdown	1 day	Thu 7/3/25	Thu 7/3/25	Second Shift
116	Demolition - GC	5 days	Thu 7/3/25	Wed 7/9/25	
117	Demolition - PC	4 days	Sat 7/5/25	Wed 7/9/25	Weekend Work Required
118	Framing	3 days	Tue 7/8/25	Thu 7/10/25	
119	Plumbing Rough-in	6 days	Wed 7/9/25	Wed 7/16/25	Weekend Work Required
120	Mechanical Rough-in	3 days	Mon 7/14/25	Wed 7/16/25	
121	Electrical Rough-in	4 days	Tue 7/15/25	Fri 7/18/25	
122	Sheetrock	3 days	Thu 7/17/25	Mon 7/21/25	Weekend Work Required
123	Taping	4 days	Mon 7/21/25	Thu 7/24/25	
124	Floor Mud	2 days	Fri 7/25/25	Mon 7/28/25	Weekend Work Required
125	Painting	2 days	Tue 7/29/25	Wed 7/30/25	
126	Tile	4 days	Thu 7/31/25	Tue 8/5/25	
127	Epoxy Floors	3 days	Wed 8/6/25	Fri 8/8/25	
128	Plumbing Fixtures	6 days	Tue 8/12/25	Tue 8/19/25	Weekend Work Required
129	Electrical Connections for Plumbing	4 days	Fri 8/15/25	Wed 8/20/25	
130	Trim out Lighting and Plumbing	2 days	Mon 8/18/25	Tue 8/19/25	
131	Partitions	3 days	Wed 8/20/25	Fri 8/22/25	
132	HVAC grills registers and diffusers	2 days	Fri 8/22/25	Mon 8/25/25	Weekend Work Required
133	Toilet Accessories & Mirrors	2 days	Mon 8/25/25	Tue 8/26/25	



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Task	Inactive Summary	External Tasks	Path Driving Predecessor Summary Task
Split	Manual Task	External Milestone	Path Driving Predecessor Normal Task
Milestone	Duration-only	Deadline	Critical
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Project Summary	Manual Summary	Path Predecessor Summary Task	Progress
Inactive Task	Start-only	Path Predecessor Normal Task	Manual Progress
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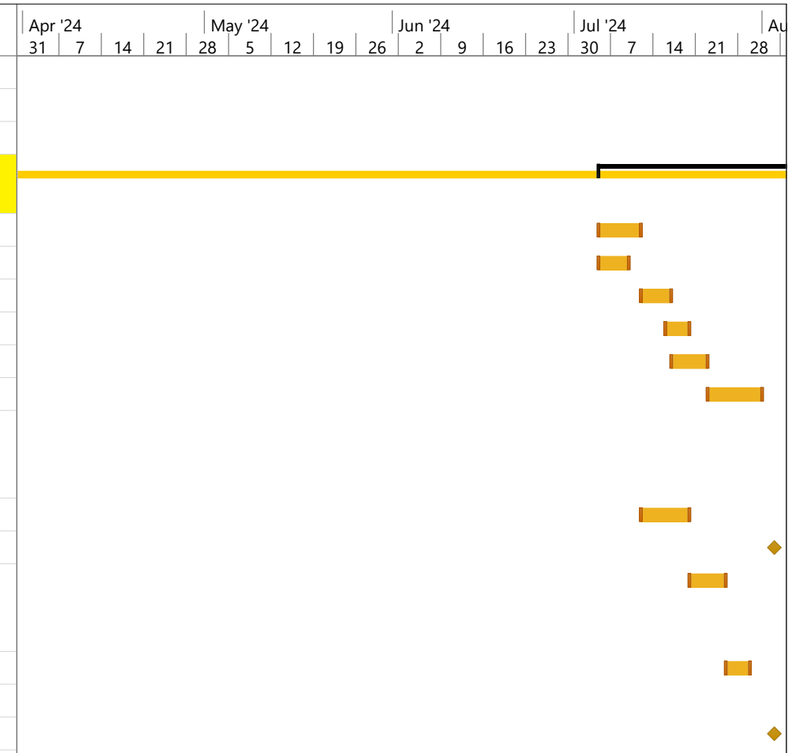
ID	Task Name	Duration	Start	Finish	Notes
134	Touchups	1 day	Tue 8/26/25	Tue 8/26/25	
135	Testing & Balancing	3 days	Mon 8/25/25	Wed 8/27/25	
136	Cleanup and Demobilize	2 days	Wed 8/27/25	Thu 8/28/25	
137	**Nanuet High School GC-01, MC-01, EC-01**				
138	**Nanuet HS - Doors & Window Shades - GC-01**	**18 days**	**Mon 8/5/24**	**Wed 8/28/24**	
139	Mobilize	1 day	Mon 8/5/24	Mon 8/5/24	
140	Window shades	15 days	Tue 8/6/24	Mon 8/26/24	
141	Door, Hardware, & Glazing Removal and Replacement	15 days	Tue 8/6/24	Mon 8/26/24	
142	Cleanup & Demobilize Interior	2 days	Tue 8/27/24	Wed 8/28/24	
143	**Nanuet HS - Admin Wing Renovation GC-01, MC-01, EC-01, PC-01**	**55 days**	**Thu 6/12/25**	**Wed 8/27/25**	**Summer 2025 project**
144	Abatement 10 day posting	10 days	Thu 6/12/25	Wed 6/25/25	
145	Demolition EC	2 days	Thu 6/26/25	Fri 6/27/25	
146	Mobilization & Temp Power / Water	1 day	Mon 6/30/25	Mon 6/30/25	
147	Abatement	5 days	Tue 7/1/25	Mon 7/7/25	
148	Clearances	2 days	Tue 7/8/25	Wed 7/9/25	
149	Breakdown	1 day	Thu 7/10/25	Thu 7/10/25	Milestone
150	Demolition - PC	1 day	Fri 7/11/25	Fri 7/11/25	Weekend Work Required
151	Demolition - GC	3 days	Fri 7/11/25	Tue 7/15/25	Weekend Work Required
152	Demolition - MC	4 days	Fri 7/11/25	Wed 7/16/25	Weekend Work Required
153	Framing	3 days	Wed 7/16/25	Fri 7/18/25	
154	Plumbing Rough-in	2 days	Wed 7/16/25	Thu 7/17/25	
155	Mechanical Rough-in	15 days	Thu 7/17/25	Wed 8/6/25	
156	Electrical Rough-in	10 days	Thu 7/17/25	Wed 7/30/25	
157	HM Frames	1 day	Sat 7/19/25	Sat 7/19/25	Weekend Work Required
158	Sheetrock	2 days	Mon 7/21/25	Tue 7/22/25	
159	Taping	3 days	Wed 7/23/25	Fri 7/25/25	
160	Ceiling Grid	5 days	Wed 7/23/25	Tue 7/29/25	
161	Mechanical Units	10 days	Sat 7/26/25	Thu 8/7/25	Milestone Weekend Work Required
162	Electrical Fixtures	7 days	Sun 7/27/25	Mon 8/4/25	Milestone
163	Flooring	5 days	Tue 8/5/25	Mon 8/11/25	
164	Casework & Glazing	2 days	Tue 8/12/25	Wed 8/13/25	
165	Testing & Balancing	4 days	Fri 8/8/25	Wed 8/13/25	
166	Ceiling White out / Painting	4 days	Thu 8/14/25	Tue 8/19/25	



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Split	Manual Task	External Milestone	Path Driving Predecessor Normal Task		
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Project Summary	Manual Summary	Path Predecessor Summary Task	Progress		
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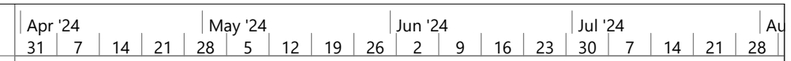
ID	Task Name	Duration	Start	Finish	Notes
167	Commissioning	4 days	Thu 8/14/25	Tue 8/19/25	
168	Turnover	1 day	Wed 8/20/25	Wed 8/20/25	Milestone
169	District move in & IT	5 days	Thu 8/21/25	Wed 8/27/25	
170	**Nanuet HS - Hydronics & AC - Second Floor West Wing - MC-01, EC-01, GC-01 (ceiling scope only)**	**41 days**	**Fri 7/5/24**	**Fri 8/30/24**	**Note: Expedite Project For Summer 2024**
171	**PHASE 3 GC to Demo Classrooms**	5 days	Fri 7/5/24	Thu 7/11/24	
172	Mechanical Demo Corridor & Roof Fans	3 days	Fri 7/5/24	Tue 7/9/24	Weekend Work Required
173	Mechanical slab cuts (teaching chase walls)	3 days	Fri 7/12/24	Tue 7/16/24	
174	Mechanical Rough-in Corridor & Roof	4 days	Tue 7/16/24	Fri 7/19/24	
175	Electrical Rough-in Corridor & Roof	4 days	Wed 7/17/24	Mon 7/22/24	
176	New corridor ceiling grid & Fixtures	7 days	Tue 7/23/24	Wed 7/31/24	
177	Mechanical Rough-in (liquid /suction lines & exhaust fan ductwork only) Classrooms 214,216,218,220,222A,222,224	5 days	Sat 7/16/22	Thu 7/21/22	Weekend Work Required
178	**PHASE 3 GC to Demo Classrooms**	6 days	Fri 7/12/24	Fri 7/19/24	
179	Corridor Ceiling White Out	2 days	Thu 8/1/24	Fri 8/2/24	Milestone
180	Mechanical Rough-in (liquid /suction lines & exhaust fan ductwork only) Classrooms 217,219,221,223,225	5 days	Sat 7/20/24	Thu 7/25/24	Weekend Work Required
181	Condensing Unit Rails/Curbs/Pitch pockets	2 days	Fri 7/26/24	Mon 7/29/24	Weekend Work Required
182	Controls & FA Classrooms Roof Fans	12 days	Sat 8/2/14	Mon 8/18/14	Weekend Work Required
183	Corridor Ceiling White Out	2 days	Thu 8/1/24	Fri 8/2/24	Milestone
184	Testing and Balancing	3 days	Mon 8/19/24	Wed 8/21/24	
185	Cx - Roof fans only	3 days	Thu 8/22/24	Mon 8/26/24	
186	Turnover	1 day	Tue 8/27/24	Tue 8/27/24	Milestone
187	Move In	3 days	Wed 8/28/24	Fri 8/30/24	
188	**Nanuet HS - Hydronics & AC - Second Floor West Wing - MC-01, EC-01, GC-01 (UV's, Condencing Units Controls, Hydronics)**	46 days	Thu 6/26/25	Thu 8/28/25	**Summer 2025 project**
190	Demolition EC - Second Floor West Wing	3 days	Thu 6/26/25	Mon 6/30/25	Weekend Work Required
191	Demolition UVS MC - Second Floor West Wing	4 days	Wed 6/25/25	Mon 6/30/25	Weekend Work Required
192	Mobilization & Temp Power / Water - Second Floor West Wing	1 day	Tue 7/1/25	Tue 7/1/25	
193	Abatement - Second Floor West Wing	5 days	Wed 7/2/25	Tue 7/8/25	Weekend Work Required
194	Clearances - Second Floor West Wing	2 days	Wed 7/9/25	Thu 7/10/25	
195	**Breakdown - Second Floor West Wing**	1 day	Thu 7/10/25	Thu 7/10/25	Milestone



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Task	Inactive Summary	External Tasks	Path Driving Predecessor Summary Task
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Milestone	Duration-only	Deadline	Critical
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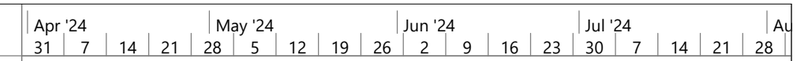
ID		Task Name	Duration	Start	Finish	Notes
196		Mechanical Demo Classrooms 214,216,218,220,222A,222,224	4 days	Fri 7/11/25	Wed 7/16/25	
197		Electrical Demo Classrooms 214,216,218,220,222A,222,224	3 days	Sun 7/13/25	Tue 7/15/25	
198		Mechanical Hydronic Rough-in Classrooms 214,216,218,220,222A,222,224	10 days	Mon 7/14/25	Fri 7/25/25	
199		UV Install Classrooms - 214, 216, 218, 220, 222A, 222,224	5 days	Sat 7/26/25	Thu 7/31/25	Weekend Work Required
200		Electrical Connections Classrooms 214,216,218,220,222A,222,224	5 days	Mon 7/28/25	Fri 8/1/25	
201		Controls & FA Classrooms 214,216,218,220,222A,222,224	10 days	Fri 8/1/25	Thu 8/14/25	
202		Mechanical Demo Classrooms 217,219,221,223,225	4 days	Thu 7/17/25	Tue 7/22/25	
203		Electrical Demo Classrooms 217,219,221,223,225	3 days	Sat 7/19/25	Tue 7/22/25	Weekend Work Required
204		Mechanical Hydronic Rough-in Classrooms 217,219,221,223,225	8 days	Mon 7/21/25	Wed 7/30/25	
205		UV Install Classrooms 217,219,221,224,225	4 days	Thu 7/31/25	Tue 8/5/25	
206		Electrical Connections Classrooms 217,219,221,223,225	7 days	Sun 8/3/25	Mon 8/11/25	
207		Controls & FA Classrooms 217,219,221,223,225	10 days	Mon 8/11/25	Fri 8/22/25	Weekend Work Required
208		Floor & Wall Patching All rooms	5 days	Mon 8/11/25	Fri 8/15/25	
209		Testing and Balancing	4 days	Fri 8/15/25	Wed 8/20/25	Weekend Work Required
210		Move In	3 days	Thu 8/21/25	Mon 8/25/25	
211		Cx	5 days	Thu 8/21/25	Wed 8/27/25	
212		Turnover	1 day	Thu 8/28/25	Thu 8/28/25	
213		**Nanuet HS - Hydronics & AC - Boiler Rm,Gym, & East Wing - MC-01, EC-01**	**57 days**	**Thu 6/12/25**	**Fri 8/29/25**	**SUMMER 2025 Project - Weekend Work Required**
214		Abatement 10 day posting	10 days	Thu 6/12/25	Wed 6/25/25	
215		Mobilization	1 day	Thu 6/26/25	Thu 6/26/25	
216		Demolition EC - First Floor West Wing	2 days	Fri 6/27/25	Mon 6/30/25	Weekend Work Required
217		Demolition UVS MC - First Floor West Wing	4 days	Sat 6/28/25	Wed 7/2/25	Weekend Work Required
218		Mobilization & Temp Power / Water - First Floor West Wing	1 day	Thu 7/3/25	Thu 7/3/25	
219		Abatement - First Floor West Wing	2 days	Thu 7/3/25	Fri 7/4/25	
220		Clearances - First Floor West Wing	2 days	Sat 7/5/25	Mon 7/7/25	
221		**Breakdown - First Floor West Wing**	1 day	Mon 7/7/25	Mon 7/7/25	
222		Demolition EC - First Floor East Wing	2 days	Tue 7/1/25	Wed 7/2/25	



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Task	Inactive Summary	External Tasks	Path Driving Predecessor Summary Task		
Split	Manual Task	External Milestone	Path Driving Predecessor Normal Task		
Milestone	Duration-only	Deadline	Critical		
Summary	Manual Summary Rollup	Path Predecessor Milestone Task	Critical Split		
Project Summary	Manual Summary	Path Predecessor Summary Task	Progress		
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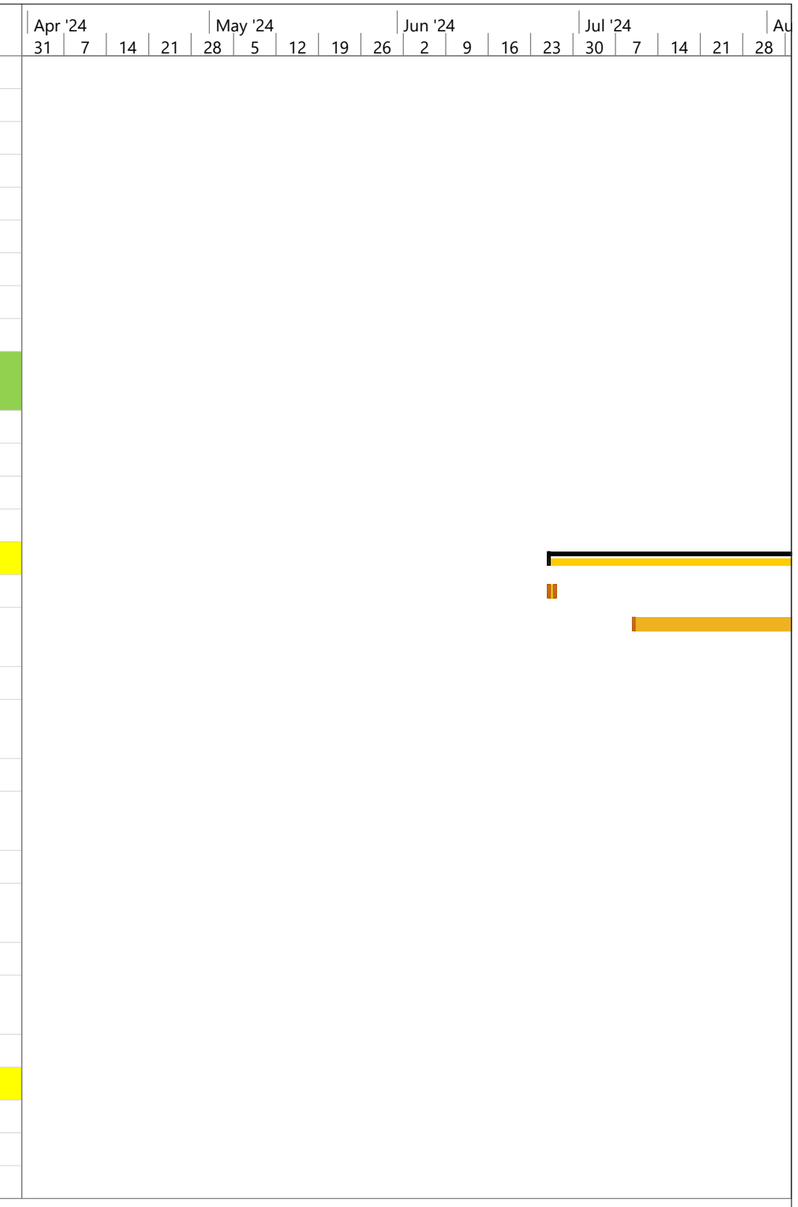
ID	Task Name	Duration	Start	Finish	Notes
223	Demolition UVS MC - First Floor East Wing	5 days	Thu 7/3/25	Wed 7/9/25	
224	Mobilization & Temp Power / Water - First Floor East Wing	1 day	Mon 7/7/25	Mon 7/7/25	Weekend Work Required
225	Abatement - First Floor East Wing	2 days	Mon 7/7/25	Tue 7/8/25	
226	Clearances - First Floor East Wing	2 days	Tue 7/8/25	Wed 7/9/25	
227	**Breakdown - First Floor East Wing**	1 day	Wed 7/9/25	Wed 7/9/25	Milestone
228	Demolition EC - Second Floor East Wing	2 days	Thu 7/3/25	Fri 7/4/25	
229	Demolition UVS MC - Second Floor East Wing	4 days	Thu 7/10/25	Tue 7/15/25	
230	Mobilization & Temp Power / Water - Second Floor East Wing	1 day	Tue 7/8/25	Tue 7/8/25	
231	Abatement - Second Floor East Wing	2 days	Wed 7/9/25	Thu 7/10/25	
232	Clearances - Second Floor East Wing	2 days	Thu 7/10/25	Fri 7/11/25	
233	**Breakdown - SecondFloor East Wing**	1 day	Thu 7/10/25	Thu 7/10/25	Milestone
234	Demolition EC - Second Floor West Wing	2 days	Mon 7/7/25	Tue 7/8/25	
235	Demolition UVS MC - Second Floor East Wing	4 days	Wed 7/16/25	Mon 7/21/25	
236	Mobilization & Temp Power / Water - Second Floor East Wing	1 day	Wed 7/9/25	Wed 7/9/25	
237	Abatement - Second Floor East Wing	2 days	Fri 7/11/25	Mon 7/14/25	
238	Clearances - Second Floor East Wing	2 days	Mon 7/14/25	Tue 7/15/25	
239	**Breakdown - SecondFloor East Wing**	1 day	Fri 7/11/25	Fri 7/11/25	Milestone
240	Removals - Basement & Tunnels - EC & MC	8 days	Fri 6/27/25	Tue 7/8/25	Weekend Work Required
241	Rough in - Basement EC & MC	10 days	Wed 7/9/25	Tue 7/22/25	
242	Removals - Gym - EC	1 day	Wed 7/9/25	Wed 7/9/25	
243	Removals Gym - MC	2 days	Thu 7/10/25	Fri 7/11/25	
244	New Equipment - Gym - MC	2 days	Sat 7/12/25	Mon 7/14/25	Milestone Weekend Work Required
245	Electrical Connections - Gym - EC	2 days	Tue 7/15/25	Wed 7/16/25	
246	New Ductwork - Gym - MC	1 day	Thu 7/17/25	Thu 7/17/25	
247	Controls - MC	3 days	Fri 7/18/25	Tue 7/22/25	
248	Testing & Balancing	2 days	Wed 7/23/25	Thu 7/24/25	
249	SEE FIRST FLOOR ADMIN WING SCHEDULE ABOVE FOR MC/EC SCHEDULE IN THAT AREA				
250	Temp Ceiling Removals - East Wing First Floor	4 days	Tue 7/8/25	Fri 7/11/25	
251	Removals - East Wing First Floor - MC	4 days	Thu 7/10/25	Tue 7/15/25	
252	Rough-in - East Wing First Floor - MC	7 days	Wed 7/16/25	Thu 7/24/25	
253	New Equipment - East Wing First Floor - MC	4 days	Fri 7/25/25	Wed 7/30/25	Milestone
254	Rough In - East Wing First Floor - EC	5 days	Mon 7/28/25	Fri 8/1/25	



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Task
Split
Milestone
Summary
Project Summary
Inactive Task
Inactive Milestone
Inactive Summary
Manual Task
Duration-only
Manual Summary Rollup
Manual Summary
Start-only
Finish-only
External Tasks
External Milestone
Deadline
Path Predecessor Milestone Task
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Critical
Critical Split
Progress
Manual Progress

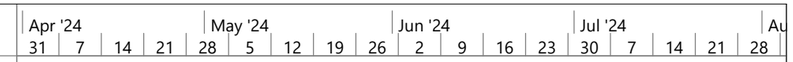
ID	Task Name	Duration	Start	Finish	Notes
255	Reinstall Ceilings / Patching	5 days	Fri 7/25/25	Thu 7/31/25	
256	Controls & FA	10 days	Sat 8/2/25	Thu 8/14/25	
257	Temp Ceiling Removals - East Wing Second Floor	4 days	Sat 7/12/25	Wed 7/16/25	Weekend Work Required
258	Removals - East Wing Second Floor - MC	4 days	Wed 7/16/25	Mon 7/21/25	
259	Rough-in - East Wing Second Floor - MC	7 days	Fri 7/25/25	Mon 8/4/25	Weekend Work Required
260	New Equipment - East Wing Second Floor - MC	4 days	Thu 7/31/25	Tue 8/5/25	Milestone
261	Rough In - East Wing Second Floor - EC	3 days	Mon 8/4/25	Wed 8/6/25	
262	Reinstall Ceilings / Patching	5 days	Fri 8/1/25	Thu 8/7/25	Weekend Work Required
263	Controls & FA	10 days	Fri 8/15/25	Thu 8/28/25	
264	SEE SECOND FLOOR WEST WING SCHEDULE ABOVE FOR MC/EC SCHEDULE IN THAT AREA				
265	Testing and Balancing	10 days	Fri 8/15/25	Thu 8/28/25	Milestone
266	Move In	7 days	Mon 8/25/25	Tue 9/2/25	
267	Cx	10 days	Fri 8/15/25	Thu 8/28/25	Milestone
268	Turnover	1 day	Fri 8/29/25	Fri 8/29/25	
269	**Nanuet HS - Panel Replacements - EC-01**	**34 days**	**Wed 6/26/24**	**Mon 8/12/24**	**School Year 2024 - Into Summer 2025**
270	Mobilization	1 day	Wed 6/26/24	Wed 6/26/24	
271	Removal and Replacement of panels - First Floor Part 1	30 days	Wed 7/10/24	Tue 8/20/24	Late Summer 2024 (lead time dependant)
272	Electrical Inspections	5 days	Tue 8/20/24	Mon 8/26/24	
273	Removal and Replacement of panels - First Floor Part 2	4 days	Thu 12/26/24	Tue 12/31/24	Winter Break
274	Electrical Inspections	1 day	Thu 1/2/25	Thu 1/2/25	
275	Removal and Replacement of panels - First Floor Part 3	5 days	Mon 2/17/25	Fri 2/21/25	Mid- Winder Breal
276	Electrical Inspections	1 day	Fri 2/14/25	Fri 2/14/25	
277	Removal and Replacement of panels - Second Floor Part 1	5 days	Mon 3/31/25	Fri 4/4/25	Spring Break
278	Electrical Inspections	1 day	Mon 4/7/25	Mon 4/7/25	
279	Removal and Replacement of panels -Second Floor Part 2 & Basement	40 days	Thu 6/26/25	Wed 8/20/25	Summer 2025
280	Electrical Inspections	4 days	Thu 8/7/25	Tue 8/12/25	
281	**Nanuet HS - Fume Hood - GC-01, EC-01**	**31 days**	**Thu 6/26/25**	**Thu 8/7/25**	**Summer 2025 Project**
282	Mobilization	1 day	Thu 6/26/25	Thu 6/26/25	
283	Electrical Removals	3 days	Fri 6/27/25	Tue 7/1/25	
284	Ceiling Removal	2 days	Wed 7/2/25	Thu 7/3/25	



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Task	Inactive Summary	External Tasks	Path Driving Predecessor Summary Task
Split	Manual Task	External Milestone	Path Driving Predecessor Normal Task
Milestone	Duration-only	Deadline	Critical
Summary	Manual Summary Rollup	Path Predecessor Milestone Task	Critical Split
Project Summary	Manual Summary	Path Predecessor Summary Task	Progress
Inactive Task	Start-only	Path Predecessor Normal Task	Manual Progress
Inactive Milestone	Finish-only	Path Driving Predecessor Milestone Task	

ID	Task Name	Duration	Start	Finish	Notes
285	Mechanical Removals	2 days	Fri 7/4/25	Mon 7/7/25	
286	Mechanical Rough-in	7 days	Tue 7/8/25	Wed 7/16/25	
287	New Hood Install	3 days	Thu 7/17/25	Mon 7/21/25	
288	Electrical Rough in	3 days	Tue 7/22/25	Thu 7/24/25	
289	Ceiling Reinstall	5 days	Fri 7/25/25	Thu 7/31/25	
290	Testing & Balancing	3 days	Fri 8/1/25	Tue 8/5/25	
291	Cx	1 day	Wed 8/6/25	Wed 8/6/25	
292	Turn Over	1 day	Thu 8/7/25	Thu 8/7/25	



Project: \\nycfil02\PROJ\2021 p
Date: Thu 1/11/24

Task	Inactive Summary	External Tasks	Path Driving Predecessor Summary Task
Split	Manual Task	External Milestone	Path Driving Predecessor Normal Task
Milestone	Duration-only	Deadline	Critical
Summary	Manual Summary Rollup	Path Predecessor Milestone Task	Critical Split
Project Summary	Manual Summary	Path Predecessor Summary Task	Progress
Inactive Task	Start-only	Path Predecessor Normal Task	Manual Progress
Inactive Milestone	Finish-only	Path Driving Predecessor Milestone Task

SECTION 00 43 25 - SUBSTITUTION REQUEST FORM

Should any part or portion of the Work be planned for substitute products, list all substitutes that are proposed for products that have been specified by one or more manufacturers in the specifications. Please print in ink or type in the spaces provided. Attach additional sheets if necessary.

This identification of substitutions is required of Bidder(s) as part of the Supplementary Bid Forms and is in partial fulfillment of requirements of the Instructions to Bidders. Substitutions may affect Owner's acceptance of the Bid and decision to award Contract. Additional data on substitutions may be requested from selected Bidder(s) after the Bid Opening in accordance with Division 01 Section "Product Requirements."

CONTRACTOR NAME _____

CONTRACT NAME/# _____

SPECIFICATION SECTION	SPECIFIED ITEM	SUBSTITUTION

END OF SECTION 004325

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SECTION 00 43 36 - PROPOSED SUBCONTRACTORS FORM

Should any part or portion of the Work be planned for subcontracting, list the name and address of all Subcontractors that Bidder(s) proposes to use on Prime Contract and the assigned Work to each. Please print in ink or type in the spaces provided. Attach additional sheets if necessary.

This identification of subcontractors is required of Bidder(s) as part of the Supplementary Bid Forms and is in partial fulfillment of requirements of the Instructions to Bidders. Additional data on proposed Subcontractors may be requested from selected Bidders after the Bid Opening in accordance with the Instructions to Bidders.

CONTRACTOR NAME _____

CONTRACT NAME/# _____

SUBCONTRACTOR	ADDRESS	ASSIGNED WORK

END OF SECTION 00 43 36

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SECTION 00 45 22 - SEXUALHARASSMENT PREVENTION CERTIFICATION FORM

By submission of this bid, the person signing on behalf of the bidder certifies, under penalty of perjury, that the bidder has and has implemented a written policy addressing sexual harassment prevention in the workplace and provides annual sexual harassment prevention training to all of its employees. Such policy shall, at a minimum, meet the requirements of Section 201-g of the Labor Law.

Bidder Name: _____

Bidder Address: _____

Signature:

_____

Print Name and Title: _____

Date: _____

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SECTION 004543 - CORPORATE RESOLUTIONS

INCLUDE WITH BID FORM(S) IF BIDDER IS AN INDIVIDUAL:

By:_____
(Signature)

_____
(Print or type individual's name and title)

_____
(Business Address)

_____
Business Phone Facsimile

INCLUDE WITH BID FORM(S) IF BIDDER IS A PARTNERSHIP:

_____
(Print or type name of firm)

BY:_____
(Signature of general partner)

_____
(Print or type general partner's name and title)

_____
(Business Address)

_____
Business Phone Facsimile

INCLUDE WITH BID FORM(S) IF BIDDER IS A CORPORATION:

_____
(Print or type name of corporation)

_____
(State of incorporation)

BY:_____
(Signature of president or vice-president)

_____
(Print or type individual's name and title)

_____
(Business Address)

_____
Business Phone Facsimile

ATTEST:

_____
(By corporate secretary or assistant secretary)

_____
(Print name and title)

Corporate Seal

END OF SECTION 004543

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SECTION 00 48 00 - NON-COLLUSIVE CERTIFICATION

PART 1 - GENERAL

1.1 The following provisions of the New York State General Municipal Law form a part of the Bidding Requirements:

A. By submission of this Bid, each Bidder and each person signing on behalf of any Bidder certifies, and in the case of a joint Bid, each party thereto certifies as to its own organization, under penalty of perjury, that, to the best of his or her knowledge and belief:

1. The prices in this Bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor.
2. Unless otherwise required by law, the prices which have been quoted in this Bid have not been knowingly disclosed by the Bidder and will not knowingly be disclosed by the Bidder prior to opening, directly or indirectly, to any other bidder or to any competitor; and
3. No attempt has been made or will be made by the Bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

B. A Bid shall not be considered for award nor shall any award be made where (A) (1), (2) and (3) above have not been complied with; provided, however, that if in any case the Bidder cannot make the foregoing certification, the Bidder shall so state and shall so furnish with the Bid, a signed statement which sets forth in detail the reasons therefore. Where (A) (1), (2) and (3) above have not been complied with, the Bid shall not be considered for award nor shall any award be made unless the head of the purchasing unit of the political subdivision, public department, agency or official thereof to which the Bid is made, or his designee, determines that such disclosure was not made for the purpose of restricting competition.

C. The fact that a bidder:

1. has published price lists, rates, or tariffs covering items being procured
2. has informed prospective customers of proposed or pending publication of new or revised price lists for such items, or
3. has sold the same items to other customers at the same prices being bid, does not constitute, without more, a disclosure within the meaning of subparagraph (A) (1), (2) and

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

E. The person signing this Bid or Proposal certifies that he has fully informed himself regarding the accuracy of the statements contained in this certification, and under the penalties of perjury, affirms the truth thereof, such penalties being applicable to the Bidder as well to the person signing in his behalf.

CLOSING: (SIGNATURE)_____ (PRINT NAME) _____

TITLE: _____ DATE _____

COMPANY NAME: _____

ADDRESS: _____

ADDRESS: _____

TELEPHONE NUMBER: _____

FAX NUMBER: _____

CONTACT PERSON: _____

E-MAIL: _____
:

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 00 48 00

SECTION 00 48 01 – GENERAL MUNICIPAL LAW "IRANIAN ENERGY SECTOR DIVESTMENT"

The below signed bidder affirms the following as true under penalties of perjury:

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief that each bidder is not on the list created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the state finance law.

Corporate or Company Name

BY: _____
Signature

_____
Title

Sworn to before me this

_____ day of _____, 20____

_____
Notary Public

END OF SECTION 00 48 01

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SECTION 00 48 01.1 – DECLARATION OF BIDDER'S INABILITY TO PROVIDE CERTIFICATION OF COMPLIANCE WITH THE IRAN DIVESTMENT ACT

Bidders shall complete this form if they cannot certify that the bidder/contractor or any proposed subcontractor is not identified on the Prohibited Entities List. The District reserves the right to undertake any investigation into the information provided herein or to request additional information from the bidder.

Name of the Bidder: _____

Address of Bidder: _____

Has bidder been involved in investment activities in Iran? _____
Describe the type of activities including but not limited to the amounts and the nature of the investments (e.g. banking, energy, real estate)

_____

_____

_____

If so, when did the first investment activity occur? _____

Have the investment activities ended? _____
If so, what was the date of the last investment activity? _____
If not, have the investment activities increased or expanded since April 12, 2012? _____

Has the bidder adopted, publicized, or implemented a formal plan to cease the investment activities in Iran and to refrain from engaging in any new investments in Iran? _____
If so, provide the date of the adoption of the plan by the bidder and proof of the adopted resolution, if any, and a copy of the formal plan. _____

In detail, state the reasons why the bidder cannot provide the Certification of Compliance with the Iran Divestment Act below (additional pages may be attached):

_____

_____

_____

I,_____, being duly sworn, deposes and says that he/she is the _____of the_____Corporation and the foregoing is true and accurate.

_____

SIGNED

SWORN to before me this
_____day of _____20_____

Notary Public: _____

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SECTION 00 48 06 - WAGE DETERMINATION SCHEDULE

PART 1 - GENERAL

1.1 NEW YORK STATE DEPARTMENT OF EDUCATION INSTRUCTIONS

A. Per instructions from the New York State Education Department in "Office of Facilities Planning Newsletter #106 – May 2011" the PRC number can be used by all prospective bidders to see the appropriate wage rates for the Project by following the website link:

Nanuet Bond Projects Phase 4

https://apps.labor.ny.gov/wpp/publicViewProject.do?method=showIt&id=1559053 or

or PRC# 2023013293

Click on the "Wage Schedule" link near the top of the page.

B. This process may be used for SED approval and for the actual bidding process.

C. Prospective bidders must go to the DOL website with the PRC number provided and make certain their bid price is reflective of the actual wage rates for the particular project.

D. Once the district has identified a low bidder, DOL states that the contract must include the actual wage rates for the project.

E. (Facilities Planning Newsletters can be found online at: http://www.p12.nysed.gov/facplan/NewsLetters.htm)

END OF SECTION 00 48 06

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AIA® Document A132® – 2019

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

AGREEMENT made as of the day of in the year 2023
(In words, indicate day, month and year.)

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

Nanuet School District
101 Church Street
Nanuet, NY 10954
T. 845.343.1481
and the Contractor:
(Name, legal status, address and other information)

for the following Project:
(Name, location and detailed description)
NANUET BOND PROJECTS PHASE 4
Nanuet HS School: 50-01-08-03-0-003-036
Barr Middle School: 50-01-08-03-0-004-021
Miller Elementary School: 50-01-08-03-0-001-025
The Construction Manager:
(Name, legal status, address and other information)
Jacobs
500 7th Ave, 17th Floor
New York, NY 12601
T. 646.908.6550

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

KSQ Architects, PC (dba KSQ Design)
215 West 40th Street, 15th Floor
New York, NY 10018
T. 914.628.3700

The Owner and Contractor agree as follows.

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

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

This document is intended to be used in conjunction with AIA Documents A232™–2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition; B132™–2019, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™–2019, Standard Form of Agreement Between Owner and Construction Manager as Adviser. AIA Document A232™–2019 is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

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TABLE OF ARTICLES

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7 TERMINATION OR SUSPENSION

8 MISCELLANEOUS PROVISIONS

9 ENUMERATION OF CONTRACT DOCUMENTS

(Paragraphs deleted)

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, the Bidding Documents, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than Modifications, appears in Article 9. The Contractor represents that it has fully reviewed the Contract Documents and agrees that the Contract Documents describe, to the best of the Contractor's knowledge, the Work necessary to furnish and provide (and that the Contractor shall furnish and provide) a fully functioning Project consistent with the Contract Documents.

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. It is the intent of the parties to include within the Work any and all labor, materials, equipment and services that, although not expressly indicated in the Contract Documents, are reasonably inferable therefrom to construct complete and workable systems for the satisfactory performance, execution, final completion and use of the Work and Project.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall

(Paragraphs deleted)

be the date of this Agreement unless a different date is stated below or provision is made for the date to be fixed in a notice to proceed issued by the Owner.

(Insert the date of commencement, if it differs from the date of this Agreement or, if applicable, state that the date will be fixed in a notice to proceed.)

If, prior to the commencement of the Work, the Owner requires time to file mortgages, mechanics' liens and other security interests, the Owner's time requirement shall be as follows:

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work. The provisions of this Contract relating to the time for performance and completion of the Work are of the essence of this Contract. Accordingly, time is of the essence respecting the Contract Documents and all obligations thereunder.

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§ 3.3 The Contractor shall achieve Substantial Completion of the entire Work not later than ( ) days from the date of commencement, or as follows:
(Insert number of calendar days. Alternatively, a calendar date may be used when coordinated with the date of commencement. If appropriate, insert requirements for earlier Substantial Completion of certain portions of the Work.)

As per Milestone Schedule Section 011100

Portion of the Work	Substantial Completion Date

, subject to adjustments of this Contract Time as provided in the Contract Documents.
(Insert provisions, if any, for liquidated damages relating to failure to achieve Substantial Completion on time or for bonus payments for early completion of the Work.)

A fine of $1,000 per calendar day past the date of substantial completion if at no fault of the architect or owner

(Table deleted)
(Paragraphs deleted)
§ 3.4 Time is of the essence in the performance of the Contract Documents, including, without limitation, the Substantial Completion dates established herein. The Contractor shall proceed expeditiously with adequate forces and shall use its best efforts to keep its Work and the Project on schedule, and the Contractor shall achieve the completion times established within the Contract Documents. Milestone dates set forth in the Construction Schedule are dates critical to the Owner's operations that establish when the Work or a part thereof is to commence and be complete. All milestone dates are of the essence.

(Paragraph deleted)
(Table deleted)
(Paragraphs deleted)
ARTICLE 4 CONTRACT SUM
§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be one of the following:
(Check the appropriate box.)

[X] Stipulated Sum, in accordance with Section 4.2 below

[ ] Cost of the Work plus the Contractor's Fee, in accordance with Section 4.3 below

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

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

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

§ 4.2.1.1 The Stipulated Sum shall not be adjusted for increased labor or material costs, whether foreseen or unforeseen, which may occur between the date of this Agreement and the Commencement Date, or which may occur between the Commencement Date and the Substantial Completion Date or Dates set forth in this Agreement.

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

Item	Price

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

Item	Price	Conditions for Acceptance

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

Item	Price
Contingency Allowance Contract BE-01	$137,000
Contingency Allowance Contract GC-01	$75,000
Contingency Allowance Contract EC-01	$140,000
Contingency Allowance Contract MC-01	$345,000
Contingency Allowance Contract PC-01	$13,000

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

Item	Units and Limitations	Price per Unit ($0.00)
As per Specification 01 22 00		

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

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Construction Manager by the Contractor, and upon certification of the Project Application and Project Certificate for Payment or Application for Payment and Certificate for Payment by the Construction Manager and Architect and issuance 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 Construction Manager not later than the 7th day of a month, absent any defaults of the Contractor under the Contract Documents, the Owner shall make payment of the certified amount in the Application for Payment to the Contractor not later than the 7th day of the following month. If an Application for Payment is received by the Construction Manager after the application date fixed above, absent any defaults of the Contractor under the Contract Documents, payment shall be made by the Owner not later than thirty (30) days after issuance of a Certificate for Payment.

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

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

§ 5.1.4.2 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment. All progress payments made previous to the last and final payment shall be based on estimates and the right is hereby reserved by the Architect for the Owner to make all due and proper corrections in any payment for any previous error.

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

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

.1 That portion of the Contract Sum properly allocable to completed Work;

.2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and

.3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

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

.1 The aggregate of any amounts previously paid by the Owner;

.2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A232–2019, as modified;

.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 Owner, Construction Manager or Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A232–2019, as modified; and

.5 Retainage withheld pursuant to Section 5.1.7.

(Paragraphs deleted)

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to when the Work of this Contract is substantially complete, the Owner may withhold the following amount, as retainage, from the payment otherwise due:
(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)

Five percent (5%)

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

None.

§ 5.1.7.2 Reduction or limitation of retainage, if any, shall be as follows:
(If the retainage established in Section 5.1.7.1 is to be modified prior to when the entire Work of this Contract is substantially complete, including modifications for completion of portions of the Work as provided in Section 3.4.2, insert provisions for such modifications.)

No retainage reduction prior to Substantial Completion of the entire Work and all closeout paperwork received and approved.

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§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, when the Work of this Contract is substantially complete, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. The Application for Payment submitted when the Work of this Contract is substantially complete shall not include retainage as follows:
(Insert any other conditions for release of retainage when the Work of this Contract is substantially complete, or upon Substantial Completion of the Work of all Contractors on the Project or portions thereof.)

Upon Substantial Completion of the Work, the payment shall be less two times the value of any remaining Work to be completed as the Construction Manager recommends and the Architect determines for incomplete Work and an amount necessary to satisfy any claims, liens or judgments against the Contractor that have not been suitably discharged.

§ 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 Section 12.2 of AIA Document A232–2019, and to satisfy other requirements, if any, which extend beyond final payment;

.2 the Contractor has submitted a final accounting for the Cost of the Work, pursuant to the Table of Contents CSI Format, Determination of the Cost of the Work when payment is on the basis of the Cost of the Work, with or without a Guaranteed Maximum payment; and

.3 a final Certificate for Payment or Project Certificate for Payment has been issued by the Architect; such final payment shall be made by the Owner not more than 30 days after the issuance of the final Certificate for Payment or Project Certificate for Payment, or as follows:

.4 all closeout paperwork per checklist

Refer to Specification Section 01 7701 – Checklist for Project Closeout and Processing of Final Payment.

(Paragraphs deleted)

§ 5.2.2 In addition to other required items, including but not limited to those set forth in Section 5.2.1 above and those required under Section 9.10 of the General Conditions, the final Application for Payment must be accompanied by the following, all in form and substance satisfactory to the Owner and in compliance with applicable law:

.1 permanent certificate(s) of occupancy or use issued by the appropriate governmental authority;

.2 all maintenance and operating manuals;

.3 marked sets of field drawings and specifications reflecting "as-built" conditions;

.4 reproducible Mylar drawings reflecting the location of any concealed utilities, mechanical and electrical systems, and their components;

.5 assignments of all guarantees and warranties to the Contractor from Subcontractors, materialmen, vendors, or manufacturers, together with a list of their names, addresses, telephone numbers, and corresponding guarantees and warranties from each; and

.6 all other information and materials required to comply with the requirements of the Contract Documents or reasonably requested by the Owner, Architect, or Construction Manager.

(Paragraphs deleted)

§ 5.2.3 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the final Certificate for Payment or Project Certificate for Payment.

§ 5.3 Payments due and unpaid under the Contract shall bear interest from the date payment is due
(Paragraphs deleted)
in accordance with Section 106-b(1)(b) of the New York State General Municipal Law.

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as Initial Decision Maker pursuant to Article 15 of AIA Document A232–2019,
(Paragraphs deleted)

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as modified.

§ 6.2 Binding Dispute Resolution

For any Claim, dispute or other matter in controversy arising out of or related to the Contract, the method of binding dispute resolution shall be as follows:
(Check the appropriate box.)

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

[X] Litigation in a court of competent jurisdiction located in **Rockland** County.

[ ] Other: *(Specify)*

(Paragraphs deleted)

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 Where the Contract Sum is a Stipulated Sum

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

(Paragraphs deleted)

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

(Paragraphs deleted)

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A232–2019, as modified, 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)

Mario Spagnuolo, Attorney/ Assistant Superintendent for Business
Rudy Villanyi, Director of Facilities
101 Church Street
Nanuet, N.Y. 10954

§ 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 The Contractor shall purchase and maintain insurance as set forth in Article 11 of AIA Document A232–2009, as modified.

§ 8.5.2 The Contractor shall provide bonds as set forth in Article 11 of AIA Document A232–2009, as modified.

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§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A232–2019, as modified, 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.)

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they will endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

§ 8.7 Intentionally omitted.

§ 8.8 Other provisions:
§ 8.8.1 The Contractor represents and warrants the following to the Owner (in addition to any other representations and warranties contained in the Contract Documents) as an inducement to the Owner to execute this Agreement, which representations and warranties shall survive the execution and delivery of this Agreement, any termination of this Agreement and the final completion of the Work:

.1 that it and its Subcontractors are financially solvent, able to pay all debts as they mature and possessed of sufficient working capital to complete the Work and perform all obligations hereunder;

.2 that it is able to furnish the plant, tools, materials, supplies, equipment, and labor required to complete the Work and perform its obligations hereunder;

.3 that it is authorized to do business in the State of New York and the United States and properly licensed by all necessary governmental and public and quasi-public authorities having jurisdiction over it and over the Work and the Project;

.4 that its execution of this Agreement and its performance thereof is within its duly authorized powers;

.5 that its duly authorized representative has visited the site of the Project, is familiar with the local and special conditions under which the Work is to be performed and has correlated on-site observations with the requirements of the Contact Documents; and

.6 that it possesses a high level of experience and expertise in the business administration, construction, construction management and superintendence or projects of the size, complexity and nature of the particular Project, and that it will perform the Work with the care, skill and diligence of such a contractor.

The foregoing warranties are in addition to, and not in lieu of, any and all other liability imposed upon the Contractor by law with respect to the Contractor's duties, obligations, and performance hereunder. The Contractor's liability hereunder shall survive the Owner's final acceptance of and payment for the Work. All representations and warranties set forth in this Agreement, including without limitation, this Section 8.8.1, shall survive the final completion of the Work or the earlier termination of this Agreement. The Contractor acknowledges that the Owner is relying upon the Contractor's skill and experience in connection with the Work called for hereunder.

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated in the sections below.

§ 9.1.1 The Agreement is this executed AIA Document A132–2009, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition.

§ 9.1.2 The General Conditions are, AIA Document A232–2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition.

§ 9.1.3 The Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

§ 9.1.4 The Specifications:
(Either list the Specifications here or refer to an exhibit attached to this Agreement.)

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Exhibit A – Specifications table of contents

Section	Title	Date	Pages
Refer to Specification Exhibit, Section 00 0110 for complete list of specifications	Table of Contents	February 6, 2023	

§ 9.1.5 The Drawings:
(Either list the Drawings here or refer to an exhibit attached to this Agreement.)
Exhibit B – List of Drawings

Number	Title	Date
Refer to Drawing Exhibit (TS) Drawing List	Title Sheet	February 6, 2023

(Paragraphs deleted)
§ 9.1.6 The Addenda, if any:

Number	Date	Pages
TBD		

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

§ 9.1.7 Additional documents, if any, forming part of the Contract Documents are:
(Paragraph deleted)
.1 AIA Document A132™–2009, Exhibit A, Determination of the Cost of the Work, if applicable.
(Paragraph deleted)
.2 AIA Document E201™–2007, Digital Data Protocol Exhibit, if completed, or the following:

(Paragraph deleted)
.3 AIA Document E202™–2008, Building Information Modeling Protocol Exhibit, if completed, or the following:
(Table deleted)

(Table deleted)
.4 Other documents, if any, listed below:
(List here any additional documents which are intended to form part of the Contract Documents. AIA Document A232–2019 provides that bidding requirements such as advertisement or invitation to bid, Instructions to Bidders, sample forms and the Contractor's bid are not part of the Contract Documents unless enumerated in this Agreement. They should be listed here only if intended to be part of the Contract Documents.)

Exhibit B - Bidding Documents: Specification and Drawings

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

OWNER *(Signature)*	**CONTRACTOR** *(Signature)*
Christine Camilerri Board President *(Printed name and title)*	*(Printed name and title)*

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PAGE 1

AGREEMENT made as of the day of in the year 2023
(In words, indicate day, ~~month,~~ month and year.)

...

(Name, legal status, ~~address,~~ address and other information)

Nanuet School District
101 Church Street
Nanuet, NY 10954
T. 845.343.1481

...

(Name, legal status, ~~address,~~ address and other information)

...

(Name, ~~location,~~ location and detailed description)
NANUET BOND PROJECTS PHASE 4
Nanuet HS School: 50-01-08-03-0-003-036
Barr Middle School: 50-01-08-03-0-004-021
Miller Elementary School: 50-01-08-03-0-001-025

...

(Name, legal status, ~~address,~~ address and other information)
Jacobs
500 7th Ave, 17th Floor
New York, NY 12601
T. 646.908.6550

...

(Name, legal status, ~~address,~~ address and other information)

KSQ Architects, PC (dba KSQ Design)
215 West 40th Street, 15th Floor
New York, NY 10018
T. 914.628.3700

...

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PAGE 2

9 ENUMERATION OF CONTRACT DOCUMENTS

~~**EXHIBIT A INSURANCE AND BONDS**~~
~~**EXHIBIT B DETERMINATION OF THE COST OF THE WORK**~~

...

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, the Bidding Documents, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than Modifications, appears in Article 9. The Contractor represents that it has fully reviewed the Contract Documents and agrees that the Contract Documents describe, to the best of the Contractor's knowledge, the Work necessary to furnish and provide (and that the Contractor shall furnish and provide) a fully functioning Project consistent with the Contract Documents.

...

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. It is the intent of the parties to include within the Work any and all labor, materials, equipment and services that, although not expressly indicated in the Contract Documents, are reasonably inferable therefrom to construct complete and workable systems for the satisfactory performance, execution, final completion and use of the Work and Project.

~~**ARTICLE 3 DATE OF COMMENCEMENT AND DATES OF SUBSTANTIAL COMPLETION**~~
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~~ be the date of this Agreement unless a different date is stated below or provision is made for the date to be fixed 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.~~)the date of commencement, if it differs from the date of this Agreement or, if applicable, state that the date will be fixed in a notice to proceed.)

~~If a date of commencement of the Work is not selected, then the date of commencement shall be the date of this Agreement.~~If, prior to the commencement of the Work, the Owner requires time to file mortgages, mechanics' liens and other security interests, the Owner's time requirement shall be as follows:

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work. The provisions of this Contract relating to the time for performance and completion of the Work are of the essence of this Contract. Accordingly, time is of the essence respecting the Contract Documents and all obligations thereunder.

§ 3.3 ~~Substantial Completion of the Project or Portions Thereof~~The Contractor shall achieve Substantial Completion of the entire Work not later than ( ) days from the date of commencement, or as follows:

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(Insert number of calendar days. Alternatively, a calendar date may be used when coordinated with the date of commencement. If appropriate, insert requirements for earlier Substantial Completion of certain portions of the Work.)

As per Milestone Schedule Section 011100

Portion of the Work	Substantial Completion Date

, subject to adjustments of this Contract Time as provided in the Contract Documents.
(Insert provisions, if any, for liquidated damages relating to failure to achieve Substantial Completion on time or for bonus payments for early completion of the Work.)

A fine of $1,000 per calendar day past the date of substantial completion if at no fault of the architect or owner

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

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

~~Portion of Work~~	~~Substantial Completion Date~~

§ 3.4 ~~When the Work of this Contract, or any Portion Thereof, is Substantially Complete~~Time is of the essence in the performance of the Contract Documents, including, without limitation, the Substantial Completion dates established herein. The Contractor shall proceed expeditiously with adequate forces and shall use its best efforts to keep its Work and the Project on schedule, and the Contractor shall achieve the completion times established within the Contract Documents. Milestone dates set forth in the Construction Schedule are dates critical to the Owner's operations that establish when the Work or a part thereof is to commence and be complete. All milestone dates are of the essence.
~~**§ 3.4.1** Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall substantially complete the entire Work of this Contract:~~
~~*(Check one of the following boxes and complete the necessary information.)*~~

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

~~[–] By the following date:~~

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

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

~~**§ 3.4.3** If the Contractor fails to substantially complete the Work of this Contract, or portions thereof, as provided in this Section 3.4, liquidated damages, if any, shall be assessed as set forth in Section 4.5.~~

[**X**] Stipulated Sum, in accordance with Section 4.2 below

...

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§ 4.2.1.1 The Stipulated Sum shall not be adjusted for increased labor or material costs, whether foreseen or unforeseen, which may occur between the date of this Agreement and the Commencement Date, or which may occur between the Commencement Date and the Substantial Completion Date or Dates set forth in this Agreement.

PAGE 4

Contingency Allowance Contract BE-01	$137,000
Contingency Allowance Contract GC-01	$75,000
Contingency Allowance Contract EC-01	$140,000
Contingency Allowance Contract MC-01	$345,000
Contingency Allowance Contract PC-01	$13,000

...

As per Specification 01 22 00

~~**§ 4.3 Cost of the Work Plus Contractor's Fee without a Guaranteed Maximum Price**~~
~~**§ 4.3.1** The Cost of the Work is as defined in Exhibit B, Determination of the Cost of the Work.~~

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

~~**§ 4.3.3** The method of adjustment of the Contractor's Fee for changes in the Work:~~

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

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

~~**§ 4.3.6** Unit prices, if any:~~
~~*(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)*~~

~~Item~~	~~Units and Limitations~~	~~Price per Unit ($0.00)~~

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

~~**§ 4.4 Cost of the Work Plus Contractor's Fee with a Guaranteed Maximum Price**~~
~~**§ 4.4.1** The Cost of the Work is as defined in Exhibit B, Determination of the Cost of the Work.~~

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

~~**§ 4.4.3** The method of adjustment of the Contractor's Fee for changes in the Work:~~

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

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

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

Item	Units and Limitations	Price per Unit ($0.00)

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

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

Item	Price

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

Item	Price	Conditions for Acceptance

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

Item	Price

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

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

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

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

§ 4.6 Other:

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

...

§ 5.1.1 Based upon Applications for Payment submitted to the Construction Manager by the Contractor, and ~~Certificates for Payment issued by the Construction Manager and~~ upon certification of the Project Application and Project Certificate for Payment or Application for Payment and Certificate for Payment by the Construction Manager and Architect and issuance by the Architect, the Owner shall make progress payments on account of the Contract ~~Sum, to the Contractor,~~ Sum to the Contractor as provided below and elsewhere in the Contract Documents.

...

.

§ 5.1.3 Provided that an Application for Payment is received by the Construction Manager not later than the 7th day of a month, absent any defaults of the Contractor under the Contract Documents, the Owner shall make payment of the ~~amount certified~~ certified amount in the Application for Payment to the Contractor not later than the 7th day of the following month. If an Application for Payment is received by the Construction Manager after the application date fixed above, ~~payment of the amount certified~~ absent any defaults of the Contractor under the Contract Documents, payment shall be made by the Owner not later than ~~( ) days after the Construction Manager receives the Application for Payment.~~
~~(Federal, state or local laws may require payment within a certain period of time.)~~thirty (30) days after issuance of a Certificate for Payment.

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

§ 5.1.4.2 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment. All progress payments made previous to the last and final payment shall be based on estimates and the right is hereby reserved by the Architect for the Owner to make all due and proper corrections in any payment for any previous error.

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

...

.2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document ~~A232–2019;~~A232–2019, as modified;

...

.4 For Work performed or defects discovered since the last payment application, any amount for which the Owner, Construction Manager or Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document ~~A232–2019;~~ A232–2019, as modified; and

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...

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

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

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

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

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

.1 The Cost of the Work as described in Exhibit B, Determination of the Cost of the Work;

.2 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified; and

.3 The Contractor's Fee computed upon the Cost of the Work described in the preceding Section 5.1.5.3.1.1 at the rate stated in Section 4.3.2; or if the Contractor's Fee is stated as a fixed sum in Section 4.3.2 an amount which bears the same ratio to that fixed-sum Fee as the Cost of the Work included in Section 5.1.5.3.1.1 bears to a reasonable estimate of the probable Cost of the Work upon its completion.

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

.1 The aggregate of any amounts previously paid by the Owner;

.2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A232–2019;

.3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;

.4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A232–2019;

.5 The shortfall, if any, indicated by the Contractor in the documentation required by Section 5.1.5.1 to substantiate prior Applications for Payment, or resulting from errors subsequently discovered by the Owner's auditors in such documentation; and

.6 Retainage withheld pursuant to Section 5.1.7.

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

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

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

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

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

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

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

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

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

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

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

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

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

.1 That portion of the Guaranteed Maximum Price properly allocable to completed Work as determined by multiplying the percentage of completion of each portion of the Work by the share of the Guaranteed Maximum Price allocated to that portion of the Work in the most recent schedule of values;

.2 That portion of the Guaranteed Maximum Price properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction or, if approved in writing in advance by the Owner, suitably stored off the site at a location agreed upon in writing;

.3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified; and

.4 The Contractor's Fee, computed upon the Cost of the Work described in the preceding Sections 5.1.6.4.1.1 and 5.1.6.4.1.2 at the rate stated in Section 4.4.2 or, if the Contractor's Fee is stated as a fixed sum in that Section, an amount that bears the same ratio to that fixed-sum fee as the Cost of the Work included in Sections 5.1.6.4.1.1 and 5.1.6.4.1.2 bears to a reasonable estimate of the probable Cost of the Work upon its completion.

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

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~~.1 The aggregate of any amounts previously paid by the Owner;~~
~~.2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A232–2019;~~
~~.3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;~~
~~.4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A232–2019;~~
~~.5 The shortfall, if any, indicated by the Contractor in the documentation required by Section 5.1.6.1 to substantiate prior Applications for Payment, or resulting from errors subsequently discovered by the Owner's auditors in such documentation; and~~
~~.6 Retainage withheld pursuant to Section 5.1.7.~~

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

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

~~**§ 5.1.6.7** Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.~~

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

...

Five percent (5%)

...

None.

...

No retainage reduction prior to Substantial Completion of the entire Work and all closeout paperwork received and approved.

PAGE 6

Upon Substantial Completion of the Work, the payment shall be less two times the value of any remaining Work to be completed as the Construction Manager recommends and the Architect determines for incomplete Work and an amount necessary to satisfy any claims, liens or judgments against the Contractor that have not been suitably discharged.

...

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§ 5.2.1 ~~Final Payment Where the Contract Sum is Based on a Stipulated Sum~~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 Section 12.2 of AIA Document A232–2019, and to satisfy other requirements, if any, which extend beyond final payment;

.2 the Contractor has submitted a final accounting for the Cost of the Work, pursuant to the Table of Contents CSI Format, Determination of the Cost of the Work when payment is on the basis of the Cost of the Work, with or without a Guaranteed Maximum payment; and

.3 a final Certificate for Payment or Project Certificate for Payment has been issued by the Architect; such final payment shall be made by the Owner not more than 30 days after the issuance of the final Certificate for Payment or Project Certificate for Payment, or as follows:

.4 all closeout paperwork per checklist

Refer to Specification Section 01 7701 – Checklist for Project Closeout and Processing of Final Payment.

~~**§ 5.2.1.1** Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when~~

~~**.1** the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A232–2019, and to satisfy other requirements, if any, which extend beyond final payment; and~~

~~**.2** a final Certificate for Payment or Project Certificate for Payment has been issued by the Architect.~~

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

§ 5.2.2 ~~Final Payment Where the Contract Sum is Based on the Cost of the Work with or without a Guaranteed Maximum Price~~In addition to other required items, including but not limited to those set forth in Section 5.2.1 above and those required under Section 9.10 of the General Conditions, the final Application for Payment must be accompanied by the following, all in form and substance satisfactory to the Owner and in compliance with applicable law:

.1 permanent certificate(s) of occupancy or use issued by the appropriate governmental authority;

.2 all maintenance and operating manuals;

.3 marked sets of field drawings and specifications reflecting "as-built" conditions;

.4 reproducible Mylar drawings reflecting the location of any concealed utilities, mechanical and electrical systems, and their components;

.5 assignments of all guarantees and warranties to the Contractor from Subcontractors, materialmen, vendors, or manufacturers, together with a list of their names, addresses, telephone numbers, and corresponding guarantees and warranties from each; and

.6 all other information and materials required to comply with the requirements of the Contract Documents or reasonably requested by the Owner, Architect, or Construction Manager.

~~**§ 5.2.2.1** Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when~~

~~**.1** the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A232–2019, and to satisfy other requirements, if any, which extend beyond final payment;~~

~~**.2** the Contractor has submitted a final accounting for the Cost of the Work, pursuant to Exhibit B, Determination of the Cost of the Work and a final Application for Payment; and~~

~~**.3** a final Certificate for Payment or Project Certificate for Payment has been issued by the Architect in accordance with Exhibit B, Determination of the Cost of the Work.~~

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

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§ 5.2.3 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the final Certificate for Payment or Project Certificate for Payment.

§ 5.3 Payments due and unpaid under the Contract shall bear interest from the date payment is due ~~at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.~~ ~~*(Insert rate of interest agreed upon, if any.)*~~

~~—%—~~in accordance with Section 106-b(1)(b) of the New York State General Municipal Law.

...

The Architect will serve as Initial Decision Maker pursuant to Article 15 of AIA Document A232–2019, ~~unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker.~~
~~*(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)*~~

as modified.

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For any ~~Claim subject to, but not resolved by, mediation pursuant to Article 15 of AIA Document A232–2019,~~ Claim, dispute or other matter in controversy arising out of or related to the Contract, the method of binding dispute resolution shall be as follows:

...

[**X**] Litigation in a court of competent ~~jurisdiction.~~jurisdiction located in **Rockland** County.

[ ] 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.~~

...

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

~~**§ 7.1.1.1** If the Contract is terminated for the Owner's convenience in accordance with Article 14 of AIA Document A232–2019, then the Owner shall pay the Contractor a termination fee as follows:~~
~~*(Insert the amount of, or method for determining, the fee, if any, payable to the Contractor following a termination for the Owner's convenience.)*~~

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

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~~**§ 7.2 Where the Contract Sum is Based on the Cost of the Work with or without a Guaranteed Maximum Price**~~
~~**§ 7.2.1 Termination**~~
~~**§ 7.2.1.1** The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A232–2019.~~

~~**§ 7.2.1.2 Termination by the Owner for Cause**~~
~~**§ 7.2.1.2.1** If the Owner terminates the Contract for cause as provided in Article 14 of AIA Document A232–2019, the Owner shall then only pay the Contractor an amount as follows:~~

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

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

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

~~**§ 7.2.1.3 Termination by the Owner for Convenience**~~
~~If the Owner terminates the Contract for convenience in accordance with Article 14 of AIA Document A232–2019, then the Owner shall pay the Contractor a termination fee as follows:~~
~~*(Insert the amount of or method for determining the fee, if any, payable to the Contractor following a termination for the Owner's convenience.)*~~

~~**§ 7.3 Suspension**~~
~~The Work may be suspended by the Owner as provided in Article 14 of AIA Document A232–2019; in such case, the Contract Sum and Contract Time shall be increased as provided in Article 14 of AIA Document A232–2019, except that the term "profit" shall be understood to mean the Contractor's Fee as described in Section 4.3.2 or 4.4.2, as applicable, of this Agreement.~~

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document ~~A232–2019~~ A232–2019, as modified, or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

...

Mario Spagnuolo, Attorney/ Assistant Superintendent for Business
Rudy Villanyi, Director of Facilities
101 Church Street
Nanuet, N.Y. 10954

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...

TBD

...

§ 8.5.1 The ~~Owner and the~~ Contractor shall purchase and maintain insurance as set forth in ~~AIA Document A132™–2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.~~Article 11 of AIA Document A232–2009, as modified.

§ 8.5.2 The Contractor shall provide bonds as set forth in ~~AIA Document A132™–2019, Exhibit A, and elsewhere in the Contract Documents.~~Article 11 of AIA Document A232–2009, as modified.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A232–2019, as modified, 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 the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they will endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

§ 8.7 ~~Relationship of the Parties~~

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

...

§ 8.8.1 The Contractor represents and warrants the following to the Owner (in addition to any other representations and warranties contained in the Contract Documents) as an inducement to the Owner to execute this Agreement, which representations and warranties shall survive the execution and delivery of this Agreement, any termination of this Agreement and the final completion of the Work:

.1 that it and its Subcontractors are financially solvent, able to pay all debts as they mature and possessed of sufficient working capital to complete the Work and perform all obligations hereunder;

.2 that it is able to furnish the plant, tools, materials, supplies, equipment, and labor required to complete the Work and perform its obligations hereunder;

.3 that it is authorized to do business in the State of New York and the United States and properly licensed by all necessary governmental and public and quasi-public authorities having jurisdiction over it and over the Work and the Project;

.4 that its execution of this Agreement and its performance thereof is within its duly authorized powers;

.5 that its duly authorized representative has visited the site of the Project, is familiar with the local and special conditions under which the Work is to be performed and has correlated on-site observations with the requirements of the Contact Documents; and

.6 that it possesses a high level of experience and expertise in the business administration, construction, construction management and superintendence or projects of the size, complexity and nature of the particular Project, and that it will perform the Work with the care, skill and diligence of such a contractor.

The foregoing warranties are in addition to, and not in lieu of, any and all other liability imposed upon the Contractor by law with respect to the Contractor's duties, obligations, and performance hereunder. The Contractor's liability

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hereunder shall survive the Owner's final acceptance of and payment for the Work. All representations and warranties set forth in this Agreement, including without limitation, this Section 8.8.1, shall survive the final completion of the Work or the earlier termination of this Agreement. The Contractor acknowledges that the Owner is relying upon the Contractor's skill and experience in connection with the Work called for hereunder.

...

§ 9.1 ~~This Agreement is comprised of the following documents:~~The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated in the sections below.

§ 9.1.1 The Agreement is this executed AIA Document A132–2009, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition.

§ 9.1.2 The General Conditions are, AIA Document A232–2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition.

~~**.1** AIA Document A132™–2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition~~**§ 9.1.3** The Supplementary and other Conditions of the Contract:

~~**.2** AIA Document A132™–2019, Exhibit A, Insurance and Bonds Exhibit.~~**3** ~~AIA Document A232™–2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition~~

Document	Title	Date	Pages

~~**.4** AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:~~**§ 9.1.4** The Specifications:

~~*(Insert the date of the E203-2013 incorporated into this Agreement.)*~~*(Either list the Specifications here or refer to an exhibit attached to this Agreement.)*

Exhibit A – Specifications table of contents

Section	Title	Date	Pages
Refer to Specification Exhibit, Section 00 0110 for complete list of specifications	Table of Contents	February 6, 2023	

§ 9.1.5 The Drawings:

~~**.5** *Drawings*~~*(Either list the Drawings here or refer to an exhibit attached to this Agreement.)*

Exhibit B – List of Drawings

PAGE 9

Refer to Drawing Exhibit (TS) Drawing List	Title Sheet	February 6, 2023	

~~**.6** Specifications~~

~~Section~~	~~Title~~	~~Date~~	~~Pages~~

~~**.7** Addenda, if any:~~**§ 9.1.6** The Addenda, if any:

...

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:~~**§ 9.1.7** Additional documents, if any, forming part of the Contract Documents are:

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

~~[~~] AIA Document A132™–2019, Exhibit B, ~~~~.1~~ AIA Document A132™–2009, Exhibit A, Determination of the Cost of the ~~Work~~Work, if applicable.

~~[~~] AIA Document E235™–2019, Sustainable Projects Exhibit, Construction Manager as Adviser Edition, dated as indicated below:

~~(Insert the date of the E235-2019 incorporated into this Agreement.)~~**.2** AIA Document E201™–2007, Digital Data Protocol Exhibit, if completed, or the following:

...

~~[~~] The Sustainability Plan:

.3 AIA Document E202™–2008, Building Information Modeling Protocol Exhibit, if completed, or the following:

~~Title~~	~~Date~~	~~Pages~~

~~[~~] Supplementary and other Conditions of the Contract:

~~Document~~	~~Title~~	~~Date~~	~~Pages~~

~~**.9**~~ **.4** Other documents, if any, listed below:

(List here any additional documents ~~that~~ which are intended to form part of the Contract Documents. AIA Document A232–2019 provides that ~~the~~ bidding requirements such as 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,~~ forms and the Contractor's bid are not part of the Contract Documents unless enumerated in this Agreement. ~~Any such documents~~ They should be listed here only if intended to be part of the Contract Documents.)

Exhibit B - Bidding Documents: Specification and Drawings

...

Christine Camilerri Board President

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Certification of Document's Authenticity

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I, David Short, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 15:08:07 ET on 02/07/2024 under Order No. 2114442937 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A132™ – 2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition, other than those additions and deletions shown in the associated Additions and Deletions Report.

_____

(Signed)

_____

(Title)

_____

(Dated)

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AIA® Document A232® – 2019

General Conditions of the Contract for Construction, *Construction Manager as Adviser Edition*

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

NANUET BOND PROJECTS PHASE 4
Nanuet HS School: 50-01-08-03-0-003-036
Barr Middle School: 50-01-08-03-0-004-021
Miller Elementary School: 50-01-08-03-0-001-025

THE CONSTRUCTION MANAGER:
(Name, legal status and address)

Jacobs
500 7th Ave, 17th Floor
New York, NY 12601
T. 646.908.6550

THE OWNER:
(Name, legal status and address)

Nanuet School District
101 Church Street
Nanuet, NY 10954
T. 845.343.1481

THE ARCHITECT:
(Name, legal status and address)

KSQ Architects, PC (dba KSQ Design)
215 West 40th Street, 15th Floor
New York, NY 10018
T. 914.628.3700

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.

This document is intended to be used in conjunction with AIA Documents A132™–2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition; B132™–2019, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™–2019, Standard Form of Agreement Between Owner and Construction Manager as Adviser.

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents. The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter, the "Agreement"), and consist of the Bidding Documents (including, but not limited to, Invitations to Bid, Instructions to Bidders, sample forms, the Contractor's bid or portions of the addenda relating to bidding requirements), 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.

§ 1.1.2 The Contract. The Contract Documents form the Contract for Construction (hereinafter, the "Contract"). The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and the Construction Manager or the Construction Manager's consultants, (3) between the Owner and the Architect or the Architect's consultants, (4) between the Contractor and the Construction Manager or the Construction Manager's consultants, (5) between the Owner and a Subcontractor or Sub-subcontractor (6) between the Construction Manager and the Architect, or (7) between any persons or entities other than the Owner and Contractor. The Construction Manager and Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of their duties.

§ 1.1.2.1 Where the term "Agreement," "Contract" or "Prime Contract" is used in these General Conditions, and other Contract Documents, it shall mean the separate Owner-Contractor Agreement between the Owner and each Prime Contractor identified in Conditions of the Contract (General, Supplementary and other conditions).

§ 1.1.2.2 The Contractor acknowledges and warrants that it has closely examined all the Contract Documents, that they are suitable and sufficient to enable the Contractor to complete the Work in a timely manner for the Contract Sum, and that they include all work, whether or not shown or described, which reasonably may be inferred to be required or useful for the completion of the Work in full compliance with all applicable statutes, codes, laws, ordinances and regulations.

§ 1.1.3 The Work. The term "Work" means the construction and services required by the Contract Documents, or as reasonably inferable therefrom, 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. The Work includes all of the Contractor's responsibilities as to all labor, parts, supplies, equipment, skill, supervision, transportation services, storage requirements, and other facilities and things necessary, proper or incidental to the carrying out and completion of the terms of the Contract Documents and all other items of cost or value needed to produce, construct, and fully complete the Contractor's Work identified by the Contract Documents.

§ 1.1.4 The Project. The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by other Contractors, and by the Owner's own forces and Separate Contractors.

§ 1.1.5 Contractors. Contractors are persons or entities, other than the Contractor or Separate Contractors, who perform Work under contracts with the Owner that are administered by the Architect and Construction Manager.

§ 1.1.6 Separate Contractors. Separate Contractors are persons or entities who perform construction under separate contracts with the Owner not administered by the Architect and Construction Manager.

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

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

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

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

§ 1.1.11 Miscellaneous Definitions

§ 1.1.11.1 The terms "knowledge," "recognize" and "discover," their respective derivatives and similar terms in the Contract Documents, as used in reference to the Contractor, shall be interpreted to mean that which the Contractor knows (or should know), recognizes (or should recognize) and discovers (or should discover) in exercising the care, skill, and diligence required by the Contract Documents. The expression "reasonably inferable" and similar terms in the Contract Documents shall be interpreted to mean reasonably inferable by a contractor familiar with the Project and exercising care, skill, and diligence required of the Contractor by the Contract Documents.

§ 1.1.11.2 The term "any" in the Contract Documents shall be interpreted as "any and all" whenever one or more than one item would be applicable for completion of the Work.

§ 1.1.11.3 Except as otherwise explicitly provided, the words "approved" or "approval" shall mean the written approval of the Architect or the Construction Manager, or both.

§ 1.1.11.4 "Accepted," "directed," "permitted," "requested," "required," and "selected" are used herein as term connections and unless specifically noted otherwise are to mean "accepted by the Architect," "directed by the Architect," "permitted by the Architect," "requested by the Architect," "required by the Architect," and "selected by the Architect." However, no such implied meaning will be interpreted to extend the Architect's responsibility into the Contractor's areas of construction supervision.

§ 1.1.11.5 The term "as indicated" or "as shown" shall mean "as indicated in the Contract Documents."

§ 1.1.11.6 The term "include" in any form other than "inclusive" is non-limiting and not intended to mean "all inclusive."

§ 1.1.11.7 The terms "furnish" and "furnish all materials," unless specifically noted otherwise, mean "pay for, supply and deliver to the job site all new materials, systems, equipment, product, and/or other items so specified."

§ 1.1.11.8 The terms "install" and "furnish all labor," unless specifically noted otherwise, mean "pay for, perform all operations connected with installation of Work including unloading new product to be installed, supplying all necessary equipment and rigs to do the Work, test, place in operation and service, and remove all packing material."

§ 1.1.11.9 The term "product" includes materials, systems, equipment, and other items to be incorporated into the Work.

§ 1.1.11.10 The term "provide," unless specifically noted otherwise, means "furnish new, install, connect up, complete, test and place in operation and service."

§ 1.1.11.11 The term "replace" or similar term shall mean "restore," "renew," "make good," "reconstruct," or "as applicable using new product."

§ 1.1.11.12 The term "concealed" as used herein shall mean items hidden from sight in such locations as trenches, chases, shafts, furred spaces, walls, slabs, above ceilings and where in sight in crawl spaces or service tunnels.

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§1.1.11.13 The term "exposed" as used herein shall mean not "concealed" as defined herein and the spaces behind normally closed doors such as interiors of cabinets.

§ 1.1.11.14 The terms "manufacturer" or "supplier" mean any person or entity which contracts to furnish materials to a Contractor, Subcontractor, or any Sub-subcontractor for use at the site of the Project.

§ 1.1.11.15 "Wiring" shall be understood to mean wires or cables with conduit, fittings, boxes, etc., installed complete.

§ 1.1.11.16 "Piping" shall be understood to mean all pipes, fittings, nipples, valves and all accessories connected thereto.

§ 1.1.11.17 The Contract Time is the period of time specified in Article 3 of the Agreement for completion of the Work.

§ 1.1.11.18 Terms not otherwise defined herein shall have the meanings set forth elsewhere in the Contract Documents.

§ 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. It is intended that all plumbing, mechanical, electrical, and other systems will be complete and in proper operation, and that all construction components, whether part of such systems or otherwise, will be complete and in compliance with accepted construction practice upon completion of the Work. Even if items are missing from the Drawings or Specifications, but are normally required for proper operation of plumbing, mechanical, electrical, and other systems, or to complete otherwise incomplete construction, or to meet governing code requirements, they shall be included by the Contractor, unless he sought and received contradictory interpretation or clarification from the Architect.

§ 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 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 shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

§ 1.2.1.2 The Contractor and its Subcontractors shall evaluate and satisfy themselves as to the conditions and limitations under which the Work is to be performed, including without limitation (1) location, layout, and nature of the Project site and surrounding areas, (2) generally prevailing climatic conditions, (3) anticipated labor supply and costs, (4) availability and cost of materials, tools, equipment, (5) Owner occupancy requirements and constraints, (6) site safety logistics plan and any phased construction plan and (7) other similar issues. The Owner assumes no responsibility or liability for the physical condition or safety of the Project site or any improvements located on the Project site. The Contractor shall be solely responsible for providing a safe place for the performance of the Work. No adjustments will be made in either the Contract Sum or Contract Time for any failure by the Contractor or any Subcontractor to comply with the requirements of this Section 1.2.1.2.

§ 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. Instructions and other information furnished in the Specifications including, without limitation, items in connection with prefabricated or prefinished items, are not intended to supersede work agreements between employers and employees. Should the Specifications conflict with such work agreements, the work agreements shall be followed, provided such items are provided and finished as specified in the Contract Documents. If necessary, such work shall be performed on the Project site, instead of at the shop, by appropriate labor and in accordance with the requirements of the Drawings and Specifications.

§ 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.

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§ 1.2.4 In the event of inconsistencies within or between parts of the Contract Documents or between the Contract Documents and applicable standards, codes and ordinances, the Contractor shall (1) provide the better quality or greater quantity of work or (2) comply with the more stringent requirements; either or both in accordance with the Architect's interpretation. Where the Contractor perceives a conflict, it shall inform the Architect and Owner thereof and request a decision from the Architect, which shall be promptly communicated by the Architect to the Contractor so as not to cause any delay in the performance of the Work. Any Work performed after perceiving the conflict and prior to resolution by the Architect shall be at the Contractor's risk. The terms and provisions of this Section 1.2.4, however, shall not relieve the Contractor of any of the obligations set forth elsewhere herein.

.1 The Contractor shall not scale Drawings. Dimensions on large scale drawings take precedence over dimensions on small scale drawings. The Contractor shall notify the Architect if additional dimensions are needed. The Contractor shall field verify all dimensions.

.2 Before ordering any materials or doing any work, the Contractor and each Subcontractor shall verify measurements at the Project Site and shall be responsible for the correctness of such measurements. The Contractor shall confirm all dimensions by field measuring. No extra charge or compensation will be allowed on account of differences between actual dimensions and the dimensions indicated on the Drawings. Any difference that may be found shall be submitted to the Architect for resolution before proceeding with the Work.

.3 If a minor change in the Work is found necessary due to actual field conditions, the Contractor shall submit detailed drawings of such departure for the approval by the Architect before making the change.

.4 Certain portions of the Specifications are written in condensed outline form and omitted words are to be supplied by inference. Naming of an article or operations shall have the effect of stating "Contractor shall furnish, install and complete" said operation or article unless it is further qualified in the context in which it appears.

.5 When reference is made to specifications of a manufacturer, trade association, governmental agency, reference standard or similar source (such as ASTM, ASA, AISC, ACI, etc.) such is made part of these Specifications, having the force and effect as though reproduced herein, and upon entering into the Contract the Contractor acknowledges his familiarity with those pertaining to his work. The date of the reference standard shall be the latest edition at the time of signing the Contract except as specifically indicated otherwise.

.6 The Contract Drawings are intended to show the general arrangement, design, and extent of the Work and are partly diagrammatic. They are not intended to be scaled for any purpose, or to serve as shop drawings. The Contractor and its Subcontractors will cooperate with all other contractors and their respective subcontractors in determining the construction of systems, running of pipe, and locating equipment. The Contractor agrees that the failure to repeat typical details, figures, or notes on all Contract Drawings or other Contract Documents will not be a basis for claims for additional cost or time.

.7 Any necessary variations in routing or installation shall be made to conform to the intent of the Contract Documents without additional costs. Where there are intersections or obstructions involving ducts, piping, or any other equipment requiring offset of materials, the Contractor acknowledges that it gave particular consideration to clearances in advance of submitting its bid, and that no additional costs for these issues will be considered by the Owner.

.8 If conflicting conditions or interferences develop, the Contractor and its Subcontractors will confer with the other contractors and their respective subcontractors whose work is affected to determine a solution acceptable to all interested parties. The suggested solution shall be submitted to the Architect for comment and, if necessary, written approval.

.9 The Contract Documents intend a first class finished product of such character and quality as described in and reasonably inferred from the Contract Documents. The Contractor will perform its Work to be complete and operable, fitting with the work of other contractors and the Owner, and in compliance with best construction practices and the ordinances, codes, and regulations of all bodies or persons having governmental or regulatory authority over the Contractor and its Work.

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§ 1.2.5 Execution of the Contract by the Contractor is a representation that the Contractor has carefully examined the Contract Documents and the Project site, and represents that the Contractor is thoroughly familiar with the nature and location of the Work, the Project site, the specific conditions under which the Work is to be performed, and all matters which may in any way affect the Work or its performance. The Contractor further represents that as a result of such examinations and investigations, the Contractor thoroughly understands the Contract Documents and their intent and purpose, and is familiar with all applicable codes, ordinances, laws, regulations, and rules as they apply to the Work, and that the Contractor will abide by same. Claims for additional time or additional compensation as a result of the Contractor's failure to follow the foregoing procedure and to familiarize itself with all conditions and the Contract Documents will not be permitted.

§ 1.2.5.1 The Contractor certifies that it is experienced and familiar with the requirements and conditions imposed during the construction of similar work in the area. This includes, but is not limited to, "out of sequence" or "come back" work for the removal of plant, equipment, temporary wiring or plumbing, etc. This "out of sequence" work may also include phasing of construction activities to accommodate the installation of the Work at various locations and orderly fashion and the completion of Work at various locations or levels at various times. This "phasing," "out of sequence," or "come back" work shall be done at no cost to other Contractors, the Owner or Architect.

§ 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 do not own and cannot 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.

§ 1.5.3 The Contractor may not reproduce the Contract Documents in whole or in part for use as shop drawing backgrounds without the prior written consent of the Architect. If consent is given, the Architect shall determine the extent that the Contract Documents may be used in the preparation of shop drawings, as well as the fee that the Architect will be paid, if any and in the Architect's sole discretion, by the Contractor for such use of copyrighted documents.

§ 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.

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

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

ARTICLE 2 OWNER
§ 2.1 General
§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Construction Manager and the Architect do not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

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

§ 2.1.3 The Owner, Architect or Construction Manager shall not supervise, direct or have control or authority over, nor be responsible for, the Contractor's means, methods, techniques, sequences or procedures of construction or the safety precautions and programs incident thereto, or for any failure of the Contractor to comply with laws and regulations applicable to the furnishing or performance of the Work. The Owner, Architect and Construction Manager shall not be responsible for the Contractor's failure to perform or furnish the Work in accordance with the Contract Documents.

§ 2.2 Evidence of the Owner's Financial Arrangements – Intentionally Omitted.

(Paragraphs deleted)
§ 2.3 Information and Services Required of the Owner
§ 2.3.1 All permits and fees, approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities are the responsibility of the Contractor under the Contract Documents with the exception of the building permit, which the Owner will obtain from the State Education Department.

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

§ 2.3.3 The Owner shall retain a construction manager adviser lawfully practicing construction management in the jurisdiction where the Project is located. That person or entity is identified as the Construction Manager in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.4 If the employment of the Construction Manager or Architect terminates, the Owner shall employ a successor construction manager or architect whose status under the Contract Documents shall be that of the Construction Manager or Architect, respectively.

§ 2.3.5 The Owner shall make available for inspection, upon request, that field survey or testing information of existing conditions that is known to be available and that is held by the Owner at its offices. Such records and documents are not Contract Documents, and the Owner makes no representation as to their accuracy or completeness. Notwithstanding the

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foregoing, information furnished by the Owner in the form of surveys, subsurface investigation reports, soil borings, and other material of a similar nature, is for general information only and is not a guarantee of the completeness or accuracy of such information, unless specifically noted otherwise herein. The Contractor shall verify all existing grades, conditions, and dimensions of existing physical conditions and structures and shall report any inconsistencies in writing to the Architect. The Contractor shall establish all lines and levels required to execute the Work and shall bear all costs involved, and shall be responsible for their accuracy and maintenance.

§ 2.3.6 Intentionally omitted.

§ 2.3.7 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor five (5) sets of Contract Drawings and Project Manuals for use during construction for their own use and for purposes of making reproductions pursuant to Section 1.5.2. The Owner shall furnish additional sets upon a Contractor's written request. Such additional sets will be provided at the cost of printing, postage and handling. Partial sets will not be provided. Subcontractors and other entities desiring copies of Drawings will be provided sets at the cost of printing, postage and handling.

§ 2.3.8 The Owner shall forward all communications to the Contractor through the Construction Manager. Other communication shall be made as set forth in Section 4.2.6.

§ 2.4 Owner's Right to Stop the Work

If the Contractor (1) fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2, or (2) fails to carry out Work in accordance with the Contract Documents as determined by the Owner, Architect or Construction Manager, or (3) fails or refuses to provide a sufficient amount of properly supervised and coordinated labor, materials, or equipment so as to be able to complete the Work within the Contract Time, or (4) fails to remove and discharge (within seven (7) days) any lien filed upon Owner's property by anyone claiming by, through, or under the Contractor, or (5) fails to perform the Work in a safe manner and in compliance with all applicable health and safety requirements and the Contractor's site specific health and safety plan or (6) disregards the instructions of the Architect, Owner or Construction Manager, as determined by the Owner, Architect or Construction Manager, 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. Such order or stoppage by the Owner shall not constitute grounds for termination by the Contractor under Article 14 and shall not be a basis for an extension of the Contract Time under Section 8.3 or Article 15.

§ 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 (including but not limited to all applicable health and safety requirements) and fails within a three (3) work day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may after such three (3) work day period, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order or Construction Change Directive shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including the Owner's expenses and compensation for the Construction Manager's and Architect's and their respective consultants' additional services and other expenses made necessary by such default, neglect or failure. Such Change Order or Construction Change Directive shall be deemed to have been executed by the Contractor, whether or not actually signed by the Contractor. Such action by the Owner and amounts charged to the Contractor shall be equally binding upon the Contractor's performance and payment bond surety. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

§ 2.6 Extent of Owner's Rights

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

§ 2.6.2 In no event shall the Owner, Architect or Construction Manager have any responsibility for the Contractor's construction means, methods, techniques, sequences or procedures or for safety precautions and programs in connection with the Work notwithstanding any of the rights and authority granted the Owner in the Contract Documents.

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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.

The term "Contractor" used herein shall include:

1. That Contractor normally responsible for that Work referenced.
2. "Prime Contractor" meaning either General Contractor, HVAC Contractor, Plumbing Contractor, Electrical Contractor, or any other Contractor whom the Owner has a direct contractual relationship for the referenced Work.
3. "Trade Contractor" meaning the Prime Contractor as above.

§ 3.1.2 The plural term "Multiple Prime Contractors" refers to persons or entities who perform construction under contracts with the Owner that are administered by the Construction Manager. The term does not include the Owner's own forces, including persons or entities under separate contracts not administered by the Construction Manager.

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

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

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

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

§ 3.2.1.1 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the Contract Documents relative to that portion of the Work, as well as with information furnished by the Owner pursuant to Section 2.3.5, shall take field measurements of any existing conditions related to that portion of the Work, shall observe any conditions at the site affecting it, and shall at once report in writing to the Construction Manager and the Architect errors, inconsistencies or omissions discovered. The Contractor shall not be liable to the Owner, the Construction Manager or the Architect for damage resulting from errors, inconsistencies or omissions in the Contract Documents unless the Contractor knew or reasonably should have known of such error, inconsistency or omission and failed to report it as required by this section to the Construction Manager and the Architect. If the Contractor performs any construction activity knowing it involves, or reasonably should have known it involves, a recognized error, inconsistency or omission in the Contract Documents without such notice to the Construction Manager and the Architect, the Contractor shall assume full responsibility for such performance and shall bear sole responsibility for the costs for correction.

§ 3.2.1.2 The obligations of the Contractor under Section 3.2.1.1 and this Section 3.2.1.2 are for the purpose of facilitating construction by the Contractor and are not for the purpose of imposing an affirmative obligation on the Contractor to discover errors, omissions, or inconsistencies in the design information in the Contract Documents. The Contractor's review of the Contract Documents is made in the Contractor's capacity as a contractor and not as a licensed design professional unless otherwise specifically so provided in the Contract Documents.

§ 3.2.1.3 Failure by the Contractor to promptly report any errors, inconsistencies, or omissions in the Contract Documents discovered by the Contractor, or which the Contractor reasonably should have known or discovered, shall constitute a waiver by the Contractor of any claim that otherwise might result in a change in the Contract Sum or Contract Time.

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§ 3.2.2 The Contractor shall be presumed to have examined the Project site(s) to consider fully all conditions that may have a bearing on the Work and to have accounted for these conditions its proposal. The Contractor is deemed to be a qualified expert in the systems and construction requirements of the Work of its Contract. The Contractor hereby specifically acknowledges and declares that the Contract Documents are full and complete, are sufficient to have enabled it to determine the cost of the Work, and that the Drawings, the Specifications, and all Addenda are sufficient to enable the Contractor to construct the Work outlined therein in accordance with applicable laws, statutes, building codes, and regulations, and otherwise to fulfill all of its obligations under the Contract Documents. The Contractor shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the Contractor with the Contract Documents before commencing activities. Errors, inconsistencies or omissions discovered shall be reported to the Construction Manager and the Architect at once. The exactness of grades, elevations, dimensions, or locations given on any Drawings issued by the Architect, or the work installed by other Contractors, is not guaranteed by the Architect, Construction Manager or the Owner. The Contractor shall, therefore, satisfy itself as to the accuracy of all grades, elevations, dimensions, and locations. In all cases of interconnection of its Work with existing or other work, the Contractor shall verify at the site all dimensions relating to such existing or other work. Any errors due to the Contractor's failure to so verify all such grades, elevations, dimensions, or locations shall be promptly rectified by the Contractor without any additional cost to the Owner. Except as to any reported errors, inconsistencies or omissions, and except as to concealed or unknown conditions, by executing the Agreement, the Contractor represents to the Owner, Construction Manager, and the Architect that the Work required by the Contract Documents, including, without limitation, all construction details, construction means, methods, procedure and techniques necessary to perform the Work, use of materials, selection of equipment and requirements of product manufacturers are consistent with: (1) good and sound practices within the construction industry; (2) generally prevailing and accepted industry standards applicable to Work; (3) the requirements of any warranties applicable to the Work; and (4) all laws, ordinances, regulations, rules and orders which bear upon the Contractor's performance of the Work.

§ 3.2.3 The Contractor shall perform the Work in accordance with the Contract Documents and submittals approved pursuant to Section 3.12.

§ 3.2.4 The Contractor may submit Requests for Information ("RFI") to the Architect to help facilitate the Contractor's performance of the Work. Prior to submitting each RFI, the Contractor shall first carefully study and compare the Contract Documents, field conditions, other Owner provided information, Contractor-prepared Coordination Drawings, and prior Project correspondence and documentation to determine that the information to be requested is not reasonably obtainable from such sources. The Contractor shall submit each RFI sufficiently in advance of the date by which such information is required in order to allow the Architect sufficient time to permit adequate review and response and to permit Contractor compliance with the latest construction schedule. The Contractor shall reimburse the Owner amounts charged by the Architect for RFI responses that in the opinion of the Architect were available from a careful review of the Contract Documents, field conditions, other Owner provided information, Contractor-prepared Coordination Drawings, and prior Project correspondence and documentation.

§ 3.2.5 If the Contractor, during the progress of the Work, discovers any discrepancies between the Drawings and the Specifications, errors and/or omissions on the Drawings, or any discrepancies between physical conditions of the Work and the Drawings, and has notified the Architect and Construction Manager in writing under Section 3.2.1, no deviations from the Contract Documents shall be performed by the Contractor until it receives approval in writing from the Architect through the Construction Manager. Any Work performed after such discovery without the approval of the Architect shall be at the Contractor's sole risk and expense.

§ 3.2.6 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Construction Manager and the Architect any nonconformity discovered by or made known to the Contractor as a RFI submitted to the Architect.

§ 3.2.7 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 RFIs pursuant to Sections 3.2.1, 3.2.2, 3.2.4, 3.2.5 or 3.2.6, the Contractor shall make a Claim as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.1, 3.2.2, 3.2.4, 3.2.5 or 3.2.6, the Contractor shall pay such costs and damages to the Owner 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 the Architect for damages resulting from errors, inconsistencies or

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omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

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

§ 3.2.8.1 The Contractor shall be required to establish centerlines, elevations and location of his work when it is required for the benefit of other Contractors needing the information to coordinate location of their work.

§ 3.2.9 Whenever the Drawings show existing or other construction not required as part of the Contract Work, it is understood that it is so shown as a matter of information and that the Owner, while believing such information to be substantially correct, assumes no responsibility thereof. The Contractor shall make itself familiar with all conditions affecting the nature and manner of conducting the Work.

§ 3.2.10 Claims for additional compensation or extension of time due to the Contractor's failure to familiarize itself with the conditions at the site will not be allowed.

§ 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, and shall complete the Work in a good and workmanlike manner in accordance with the Contract Documents. 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 subject to the coordination of the Construction Manager. Where the Drawings or Project Manual make reference to particular construction means, methods, techniques, sequences or procedures or indicate or imply that such are to be used in connection with the Contractor's Work, such reference is intended only to indicate that the Contractor's Work is to produce at least the quality of the work implied by the operations described, but the actual determination as to whether or not the described operations may be safely or suitably employed in the performance of the Contractor's Work shall be the sole responsibility of the Contractor. All loss, damage, liability, or cost of correcting defective Work arising from the employment of a specific construction means, method, technique, sequence, or procedure shall be borne solely by the Contractor.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors, Suppliers, 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, Suppliers or Sub-subcontractors, and for any damages, losses, costs and expenses resulting from such acts or omissions, including but not limited to reasonable attorneys' fees.

§ 3.3.3 The Contractor shall be responsible for coordinating the work of its own forces and the work of Subcontractors engaged by it to perform the Work of the Project on its behalf. The Contractor shall supply to its own work forces, and Subcontractors engaged by it to perform portions of its Work, copies of the Drawings and Project Manuals for the work to be performed by such individuals/entities on its behalf.

§ 3.3.3.1 The Contractor shall coordinate its operations and cooperate with those of other Contractors performing work on the Project or site thereof to ensure efficient and orderly installation of each part of the Work. Cooperation will be required in the arrangement for the storage of materials and in the detailed execution of the Work. The Contractor shall remain informed of the progress and the detail work of other Contractors and shall notify the Construction Manager immediately of lack of progress or defective workmanship on the part of other Contractors, where such delay or such defective workmanship will interfere with Contractor's own operations. Failure of the Contractor to keep informed of the work progressing on the site or to give notice of lack of progress or defective workmanship by others shall be construed as acceptance of the progress of work and coordination with Contractor's own Work.

§ 3.3.3.2 The Contractor's obligations under the Contract Documents shall include, without limitation, the following:

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.1 Review of all specified construction and installation procedures with its employees and/or Subcontractors, including, without limitation, those recommended by manufacturers, prior to the commencement of the relevant portion of the Work to be performed.

.2 Advising the Construction Manager and the Architect:

.1 if a specified procedure deviates from best construction practice;

.2 if following a procedure will affect any warranties, including the Contractor's general warranty; or

.3 of any objections the Contractor may have to a procedure.

.3 Proposing alternative procedures, as appropriate, which procedures shall be covered by the Contractor's warranty as described in Section 3.5 hereof.

.4 The Contractor shall be responsible for organizing and conducting pre-installation conferences and must coordinate such conferences with the Architect and the Construction Manager.

§ 3.3.3.3 The Contractor and its Subcontractors working on the Project shall attend a preconstruction conference(s) or meeting(s) as deemed necessary by the Construction Manager to coordinate all Work (e.g., demolition, installation, etc.), and as required by the Project Manual.

§ 3.3.4 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Construction Manager or the Architect in their administration of the Contract, or by tests, inspections or approvals required or performed by persons other than the Contractor. The Contractor shall maintain complete inspection records and test date to ensure the quality of the Work is in strict compliance with the requirements of the Contract Documents.

§ 3.3.5 Where equipment lines, piping, ductwork, and/or conduit are shown diagrammatically, the Contractor shall be responsible for the coordination and orderly arrangement of the various lines of piping and conduit included in the Work of its Contract. The Contractor shall coordinate the work of its Subcontractors and prevent all interferences between or among equipment, lines of piping, and architectural features, and avoid any unsightly arrangements in exposed areas. This Section shall not be construed as limiting any obligation of the Contractor under any other provision of the Contract Documents.

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

§ 3.3.7 The Contractor, its employees and Subcontractors, shall be subject to such rules and regulations for the conduct of Work as the Owner may establish, including but not limited to, the Construction Rules and Regulations set forth in Section 3.13.4. The Contractor shall be responsible for the enforcement among its employees of the Owner's instructions.

§ 3.3.8 The Contractor shall inspect all materials as delivered to the Project site and shall reject any materials that will not conform with the requirements of the Contract Documents when properly installed.

§ 3.3.9 The Contractor shall be responsible for and coordinate any and all inspections required by any governmental body having jurisdiction over the Project. Failure to obtain any permits, licenses or other approvals because of the failure of the Contractor to conform to this requirement shall not extend the Contract time, and the Contractor shall not be entitled to any increase in the Contract Sum therefore. In addition, any additional costs and expenses of any nature incurred by the Owner as a result of the Contractor's failure to conform to this requirement shall constitute a charge against the Contractor's Contract.

§ 3.3.10 Shutdowns: Such work as connections to existing sewers, plumbing, heating, and electrical systems shall be coordinated at a time agreeable to the Owner, the Architect, and the Construction Manager, and shall be determined and agreed to well in advance of the actual performance of such work so as to interfere as little as possible with the operation and use of the Owner's existing facilities. Shutdowns must be coordinated through the Construction Manager. The continued uninterrupted operation of all facilities of the Owner's buildings is essential. If any existing facilities must be interrupted, the Contractor for the Work shall provide all necessary temporary facilities and connections necessary for maintaining these existing facilities at no increase in the Contract Sum except as otherwise specified. No mechanical, heating, plumbing, sprinkler, or electric service shall be interrupted at any time except as approved in advance by the Owner or when the buildings are not occupied and shall be coordinated with the Owner, as

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well as the Construction Manager. All communication systems must be maintained without interruption. As much related work as possible shall be performed prior to shutdowns, so as to minimize the period of shut down. All material, equipment, and manpower necessary in the performance of a shutdown shall be on site prior to interruption of service.

§ 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor (at applicable prevailing wage rates), 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. All materials provided by Contractor shall be new. The Contractor shall work continuously and expeditiously through completion of the Work. Time is of the essence.

§ 3.4.1.1 Notwithstanding any other provision of the Contract Documents, Contractor shall perform at least twenty five (25%) percent of the field work with its own full-time employees. For the purpose of the preceding sentence any part of the work performed by supervisory personnel (persons above level of foreman) or by office personnel shall not be considered part of the Work performed by Contractor's employees. Such items as bonds, certificates, shop drawings and similar items are not to be counted as satisfying the twenty five (25%) percent requirement**.**

§ 3.4.1.1 A shortage of labor in the industry shall not be accepted as an excuse for not properly manning the Project at each site.

§ 3.4.1.2 The Contractor shall be responsible for the care and protection of all equipment and materials for its Work on the Project, including equipment and material furnished by the Owner.

§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect, in consultation with the Construction Manager, and in accordance with a resulting 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, or persons who within the last five (5) days (a) having been exposed to someone having been diagnosed with a COVID-19 infection; or (b) having had a persistent cough, shortness of breath, or a fever of 100.4 or higher. The Owner reserves the right to have any persons removed from the Project upon reasonable objection.

§ 3.4.3.1 In addition to all other safety requirements, the Contractor shall provide suitable and a sufficient number of safety related facilities and personal protective equipment (PPE) at the site related to protection against the spread of COVID-19, including but not limited to handwashing stations, hand sanitizer, gloves, masks, faceshields, and other equipment as the Owner may reasonably request. Notwithstanding the foregoing, nothing herein shall be construed to delegate or relieve Contractor from having sole and exclusive responsibility for all worksite safety.

§ 3.4.4 All mechanics employed on the Project shall be persons skilled in that work which they are to perform. Work will not be approved if it does not meet the quality of workmanship as called for in the Contract Documents. If this quality of workmanship is not exactly defined herein, it shall be assumed to be the best standards of workmanship for the trade.

§ 3.4.5 Employees of the Contractor or its Subcontractors whose work is unsatisfactory to the Owner, Construction Manager or Architect, or considered by them to be unskilled or otherwise objectionable, will be immediately dismissed from the Project upon notice from the Construction Manager. Those dismissed employees shall be immediately replaced by the Contractor so as not to delay progress of the Work and at no additional cost to the Owner. **All employees of the Contractor or Subcontractor shall be processed through the Owner's database which excludes sex offenders and other people not deemed safe for presence on a school site. Any person who is flagged by that system shall not be employed on site. Further, the Contractor or its Subcontractor shall not employ any person onsite who is known to them to be a sex offender as defined by New York State.**

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§ 3.4.6 On receipt of the signed Contract, the Contractor will be expected to place firm orders with vendors for needed materials, including Subcontractors and major material suppliers. If deemed necessary to assure delivery of materials at times needed, the Contractor may accept delivery of such materials at any time, and may include the cost of such materials in its next monthly Application for Payment, provided such materials have actually been delivered to Contractor and properly stored by it with approval or under direction of the Architect and the Construction Manager either at the Project site or in an approved storage shed or warehouse, as provided elsewhere in these General Conditions.

§ 3.4.6.1 To the fullest extent possible, the Contractor shall provide products of the same kind, from a single source. When two or more items of same material or equipment are required (pumps, valves, air conditioning units, etc.) they shall be of the same manufacturer. Product manufacturer uniformity does not apply to raw materials, bulk materials, pipe, tube, fittings (except flanged and grooved types), sheet metal, wire, steel bar stock, welding rods, solder, fasteners, motors for dissimilar equipment units, and similar items used in the work, except as otherwise indicated. The Contractor shall provide products which are compatible within systems and other connected items. If Contractor is given option of selecting between two or more products for use on the Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

§ 3.4.6.2 The Contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors. If a dispute arises between the Contractor and other contractors over concurrently selectable but incompatible products, the Architect will determine which products shall be used.

§ 3.4.6.3 With respect to sitework materials, all products submitted for use and incorporated into the Project shall be on the Approved List of Materials and Equipment published by the NYSDOT Materials Bureau, most recent edition.

§ 3.4.6.4 When required, off-site storage shall be the responsibility of the Contractor. If materials are stored off site, the Contractor shall furnish proof of title by Owner and provide a certificate of insurance demonstrating adequate insurance coverage.

§ 3.4.6.5 The Contractor shall deliver all materials at such times as will ensure speedy and uninterrupted progress of the Work.

§ 3.4.6.6 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. The Owner reserves the right to object to Contractor's use of persons who appear unfit or not skilled in the tasks assigned to them. Should any disorderly, incompetent, unfit, unskilled or objectionable person be hired or employed by the Contractor, upon or about the Premises of the Owner, for any purpose or in any capacity, they shall, upon request of the Owner, be removed from the Project and not again be assigned thereon without the written permission of the Owner.

§ 3.4.6.7 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, within 10 days of receipt of the signed Contract, shall furnish in writing the Owner through the Construction Manager and Architect a list showing the name of the manufacturer proposed to be used for each of the products identified in the Specifications, and where applicable, the name of the installing Subcontractor. The Architect will promptly reply to the Contractor in writing stating whether or not the Owner or Architect, after due investigation, has reasonable objection to any such proposed manufacturer or installer. If adequate data on a proposed manufacturer or installer is not available, the Architect may state that action will be deferred until the Contractor provides additional data. Failure of the Owner or Architect to promptly reply shall constitute notice of no reasonable objection. Failure to object to a manufacturer or installer shall not constitute a waiver of the requirements of the Contract Documents, and products furnished by the listed manufacturer shall conform to such requirements**.**

§ 3.4.7 The Contractor warrants that it has good title to all materials used by it in, on or in connection with the Work. No materials or supplies shall be purchased by the Contractor or any of its Subcontractors that are subject to any chattel mortgage, conditional sale, or other agreement by which an interest is retained by the seller.

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§ 3.4.8 The Contractor shall make every reasonable effort to avoid labor disputes and to insulate the Owner, Architect and Construction Manager from the effects of labor disputes should any arise. There shall be no strikes, picketing, work stoppages, slowdowns, or other disruptive activity at the Project for any reason by anyone employed or engaged by the Contractor to perform its portion of the Work. There shall be no lockout at the Project by the Contractor. The Contractor shall be responsible for providing the manpower required to proceed with the Work under any circumstance. For the purposes of this Section, every reasonable effort shall include, but not necessarily be limited to:

.1 make all necessary arrangements to reconcile, without delay, damage or cost to the Owner and without recourse to the Architect, the Construction Manager or the Owner, any conflict between its Agreement with the Owner and any agreements or regulations of any kind at any time in force among members or councils which regulate or distinguish what activities shall not be included in the work of any particular trade;

.2 requiring employees, Subcontractors, suppliers and others to use reserve gates which shall be established for the Project;

.3 rearranging work schedules for the Contractor's Work or the work of its Subcontractors; and

.4 including in Contractor's agreements with its Subcontractors the right to fully implement all provisions of this Section.

§ 3.4.8.5 In case the progress of the Work is effected by any undue delay in furnishing or installing any items or materials or equipment required pursuant to the Contract because of a conflict involving any such labor agreement or regulation, the Owner may require that other material or equipment of equal kind and quality be provided pursuant to a Change Order or Construction Change Directive but in no case shall the amount of such change be charged by the Contractor to the Owner as an additional cost to perform the Work.

§ 3.4.8.5.1 No extension of time shall be granted for delays caused by labor or material disputes.

§ 3.4.8.5.2 Should it become necessary to create a separate entrance for a Contractor involved in a dispute, all costs associated with creating that entrance shall be borne by the Contractor involved in the dispute. Such costs shall include, but not limited to signage, fencing, temporary roads and security personnel as deemed necessary by the Owner for the safety of the occupants of the site.

§ 3.4.8.6 The Contractor shall ensure that its Work continues uninterrupted during the pendency of a labor dispute.

§ 3.4.8.7 The Contractor shall be liable to the Owner for all damages suffered by the Owner occurring as a result of work stoppages, slowdowns, disputes or strikes arising from the labor practices of the Contractor or its Subcontractors, Suppliers or Sub-subcontractors.

§ 3.4.9 The Contractor and its Subcontractors employed upon the Work shall abide by and conform with all labor laws and to all other laws, ordinances, and legal requirements now or hereafter applicable to the Work and the construction area.

§ 3.4.10 The Contractor and its Subcontractors shall be responsible for protection of the Work, the work of Separate or other Contractors, and existing construction, both on and off the site, and in the event of damage, shall restore the same to the original condition at no additional cost to the Owner.

§ 3.4.11 If the Work is to be performed by trade unions, the Contractor shall, with the consent of the Owner and the Architect, which shall not be unreasonably withheld, make all necessary arrangements to reconcile, without delay, damage, or cost to the Owner, any conflict between the Contract Documents and any agreements or regulations of any kind, at any time in force among members or councils that regulate or distinguish what activities are included in the work of any particular trade.

§ 3.4.12 No new asbestos containing building materials shall be used in construction. No materials containing asbestos in any form shall be used in, on, or around the Owner's buildings**.**

§ 3.4.13 Equivalents and Substitutions

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§ 3.4.13.1 Equivalents. In the Specifications, one or more kinds, types, brands, or manufacturers or materials are regarded as the required standard of quality and are presumed to be equal. The Contractor may select one of these items or, if the Contractor desires to use any kind type, brand, or manufacturer or material other than those named in the Specifications, it shall indicate in writing, and prior to award of the Contract, what kind, type, brand or manufacturer is included in the base bid for the specified item. The Contractor shall follow the submission requirements for equivalents as provided in the Project Manual. Any proposed equivalent shall not be purchased or installed by the Contractor without the Architect's review process having been completed and the product accepted by written notification.

§ 3.4.13.2 Substitutions. After the Contract has been executed, the Owner, Construction Manager and Architect will consider a formal request for the substitution of products in place of those specified only under conditions set forth in the Specifications.

§ 3.4.13.3 By making said requests in conformance with procedures established herein and elsewhere in the Project Manual, the Contractor: (1) represents that it has personally investigated the proposed substitute product and has determined that it is equal to or superior in all respects to that specified; (2) represents that the warranty for the substitution will be the same, or greater than, that applicable to the specified product; (3) certifies that the cost data is complete and includes all related costs under the Contract, including professional services necessary and/or required for the Architect or its consultants to implement said substitution and waives any and all claims for additional costs related to the substitution which subsequently become apparent; (4) represents that it will coordinate the installation of the accepted substitute, making all such changes to the Drawings effected by the change, including but not limited to the electrical, plumbing, site work and heating and ventilating Specifications as may be required for the Work to be complete in all respects; and (5) represents that it will reimburse the Owner for all additional costs billed by the Architect or its consultants for the review of the substitution request(s), any redesign of the Work of this Contractor or associated contractors, additional site visits related to the substitution request and for the work to prepare Change Orders or Construction Change Directives.

§ 3.4.13.4 Substitutions and alternates may be rejected without explanation and will be considered only under one or more of the following conditions:

1. required for compliance with interpretation of code requirements or insurance regulations then existing;
2. unavailability of specified products, through no fault of the Contractor;
3. subsequent information discloses inability of specified products to perform properly or to fit in designated space;
4. manufacturer/fabricator refuses to certify or guarantee performance of specified products as required;
5. when in the judgment of the Owner, a substitution would be substantially in the Owner's best interests, in terms of costs, time or other considerations; and
6. where the Contractor establishes that the substituted product is equal or better than the specified product in all respects.

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner, Construction Manager and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants good title to all materials, supplies, and equipment installed or incorporated in the Work. 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. All warranties and guarantees specifically called for by the Contract Documents shall expressly run to the benefit of the Owner. If required by the Architect, the Contractor shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with instructions of the applicable supplier, except as otherwise provided in the Contract Documents. The Contractor shall perform the Work in strict accordance with the Contract Documents and best industry practices. The Contractor, at its expense, shall upon demand by the Owner, Construction Manager or Architect remove and replace materials not meeting specifications or materials failing to perform as represented or warranted by the manufacturer, regardless of whether incorporated into the Work. The Contractor shall promptly replace or correct any Work or materials that the Owner, Construction

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Manager or Architect rejects as failing to conform to the requirements of the Contract Documents. The foregoing warranty obligations shall survive completion or termination of the Contract, are not limited by the provisions of Article 12, and are in addition to and not in limitation of any other warranty, right or remedy set forth in the Contract Documents or otherwise prescribed by law.

§ 3.5.2 The Contractor warrants the Work and its performance to the Owner unconditionally. The Contractor shall perform all warranty obligations and responsibilities for the Work under the Contract Documents. The Contractor, at its own expense, shall remedy defects due to improper and/or defective workmanship or materials appearing within **two (2) years** of the Contractor completing the Work or such longer period as may be set forth in the Contract Documents ("Correction Period"), as further described in Article 12 of this Agreement. Upon completion of the Work, the Contractor shall assign and provide to the Owner all written warranties and guarantees from Subcontractors, suppliers, and material or equipment manufacturers. The Contractor shall fully cooperate with the Owner in the event the Owner pursues remedies under any warranties or guarantees assigned to the Owner. The Contractor acknowledges that its obligations to the Owner under this Section 3.5.2 and under Section 12.2 are joint and several with its Subcontractors, suppliers, vendors and manufacturers of all materials and equipment supplied on account of the Work. The Contractor is responsible for all harm caused by its failure to maintain equipment and materials installed through the Contractor's completion of its Work. The requirements of this Section 3.5 will continue notwithstanding termination of the Contractor for any reason. The foregoing warranty obligations are not limited by the provisions of Article 12, do not limit the Owner's assertion of a breach of warranty obligations following the three-year Correction Period, and are in addition to and not in limitation of any other warranty set forth in the Contract Documents or required by law.

§ 3.5.3 No warranties or guarantees by the Contractor will deprive the Owner of any cause of action, right, or remedy otherwise available for breach of any of the provisions of the Contract Documents. The Correction Period does not limit the time in which the Owner may pursue any such action, right, or remedy.

§ 3.5.3.1 The Contractor shall deliver to the Owner upon completion of all work under its Contract, its written guarantee made out to the Owner in a form acceptable to the Owner, guaranteeing (and he does so guarantee) all of the Work under the Contract to be free from faulty materials, and free from improper workmanship, and guarantees against injury from proper and usual wear and aging. This guarantee shall be made to cover (and does cover) a period of two (2) years from the date of Substantial Completion all work under the Contract, or for a longer period where so stipulated in the Contract Documents.

§ 3.5.4 All required maintenance shall be the Contractor's responsibility until the Owner has accepted the Project as complete, all required maintenance and user's manuals have been turned over to the Owner, and the Owner's designated personnel have been instructed in the maintenance and operation of all applicable materials. This maintenance shall include a complete turnover procedure at the time of completion, including complete cleaning, testing and adjustment. The Contractor shall keep records of all such maintenance performed as required by this Section, including work performed and times and dates on which it was performed. These records shall be turned over to the Owner at closeout.

§ 3.5.5 Neither final payment nor provision in the Contract Documents nor partial or entire occupancy of premises by Owner shall constitute an acceptance of Work not done in accordance with the Contract Documents or relieve the Contractor of liability in respect to any express warranties or responsibilities for faulty or defective materials or workmanship.

§ 3.6 Taxes

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

§ 3.6.1 The Owner is exempt from payment of federal, state, and local sales and compensation use taxes on all supplies and materials incorporated into and becoming an integral component part of the structures, buildings, or real property pursuant to this Contract. Such taxes are therefore not to be included in the Contractor's bid or the Contract Sum. The Owner shall deliver to the Contractor the appropriate exemption certificate required to be supplied by the Owner, and the Contractor and its Subcontractors and materialmen shall be solely responsible for obtaining and delivering any and all exemption or other certificates and for furnishing a Contractor Exempt Purchase Certificate or other appropriate certificates to all persons, firms, or corporations from whom they purchase supplies, materials, and equipment for the performance of the Work.

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§ 3.6.1.1 The Contractor's attention is called to fact that materials not actually incorporated into Work will not be exempt from payment of sales or compensating use taxes, and the Contractor and its Subcontractor shall be responsible for and shall pay any and all applicable taxes. This will apply to such things as:

.1 construction machinery and equipment including rentals or repair parts;
.2 The Contractor's office supplies;
.3 The Contractor's supplies, tools and miscellaneous equipment including forms, materials, and scaffolding (whether purchased or rented);
.4 temporary heat;
.5 telephone or electric services; and
.6 any other items purchased or rented by the Contractor for the Contractor's use in performing its Work and not incorporated into realty.

§ 3.6.2 The Contractor accepts full and exclusive liability for payment of any and all contributions, assessments or taxes for unemployment insurance or old age insurance, or annuities now or hereafter imposed by the government of the United States, or by the government of any city, county or state of United States, which are measured by salaries or other remuneration paid to persons employed by the Contractor or any Subcontractor for Work performed under this Contract.

§ 3.7 Permits, Fees, Notices, and Compliance with Laws

§ 3.7.1 The Contractor shall, as soon as practicable, furnish the Owner, Architect, and Construction Manager with copies or certificates of all permits, fees, licenses, and inspections necessary for the proper execution and completion of the Work, including, without limitation, all applicable building permits other than those required of the Owner under Sections 2.3.1. All inspection fees and other costs of such permits and licenses required to be obtained by the Contractor as may be imposed by any municipal or other entity shall be paid by the Contractor and shall not serve as the basis for any increase in the Contract Sum.

§ 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. If the Contractor fails to give such notices, it shall be liable for and shall indemnify and hold harmless (a) the Owner, its consultants, employees, officers and agents and (b) the Architect, Construction Manager and their consultants, employees, officers and agents against any resulting fines, penalties, judgments, or damages, including reasonable attorney's fees, imposed on or incurred by the parties indemnified hereunder.

§ 3.7.2.1 In accordance with New York State Labor Law Article 8, Section 220, subd. 3-a(a), the Contractor shall submit to the Owner within 30 days after issuance of Contractor's first payroll, and every 30 days thereafter, a transcript of the original payroll record, subscribed and affirmed as true under the penalties of perjury.

§ 3.7.2.2 The Contractor shall comply with all applicable New York State Department of Labor requirements, including the provision that every worker employed in performance of a public work contract shall be certified as having completed an OSHA 10-hour safety training course. The Contractor and its Subcontractors shall be solely responsible for compliance with this requirement with respect to their employees. The Contractor's or Subcontractor's failure to comply with this requirement shall not transfer or in any way impose the responsibility for worker safety upon the Owner or the Architect.

§ 3.7.3 If the Contractor performs Work 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 all costs attributable to the correction thereof or related thereto, including reimbursement to the Owner for any additional services required of the Construction Manager or Architect, or both, as well as all fines and penalties, if any.

§ 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 give prompt written notice to the Owner, Construction Manager, and the Architect of such conditions before they are disturbed or affected work is performed and in no event later than three (3) business days after first observance of the conditions. The Architect or Construction Manager will promptly investigate such conditions and, if

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the Architect, in consultation with the Construction Manager, determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect, in consultation with the Construction Manager, determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner, Construction Manager, and Contractor in writing, stating the reasons. If the Contractor disputes the Architect's determination or recommendation, it may proceed as provided in Article 15. No adjustment in the Contract Time or Contract Sum will be permitted, however, in connection with a concealed or unknown condition that does not differ materially from those conditions disclosed or that reasonably should have been disclosed by the Contractor's (1) prior inspections, tests, and reviews, or (2) inspections, tests, and reviews the Contractor had the opportunity to make or should have performed in connection with the Project.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner, Construction Manager, and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 Allowances

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents:

.1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;

.2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit, ,including the costs for bonds 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. The Contractor is not entitled to overhead and profit on unexpended allowance amounts or any portions thereof.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 Superintendent

§ 3.9.1 Prior to starting the Work, the Contractor shall designate the Project Manager, Superintendent and other key individuals who shall be assigned to the Project through and including Final Completion. Such designations shall be in writing and provided to the Construction Manager, Architect and Owner and shall include the qualifications of such individuals. The Superintendent shall be in attendance at the Project site throughout the work, remain on the Project site not less than eight hours per day, five days per week, until termination of the Contract, unless the job is suspended, work is stopped by the Owner, or no work is scheduled. The Superintendent shall be approved by the Owner in its sole discretion. Said representatives shall be qualified in the type of work to be undertaken and shall not be changed during the course of construction without the prior written consent of the Owner. Should a representative leave the Contractor's employ, the Contractor shall promptly designate a new representative. The Owner shall have the right, at any time and in its sole discretion, to direct a change in the Contractor's representatives if their performance is unsatisfactory. In the event of such a demand, the Contractor shall within seven (7) days after notification thereof, replace said individual(s) with an individual(s) satisfactory to the Owner, in the Owner's sole discretion. If said replacement is disapproved, the Contractor may, at the Owner's option, be terminated for cause. The Superintendent shall represent the Contractor, and communications given to the Superintendent shall be as binding as if given to the Contractor. The Owner shall have no obligation to direct or monitor the Contractor's employees. All references herein to the Superintendent shall be taken to mean the Contractor's superintending staff. Each Subcontractor shall designate

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the Project Manager, Superintendent and other key individuals who shall be assigned to the Project. Important communications shall be confirmed in writing. Other communications shall be similarly confirmed on written request in each case. The Contractor's Superintendent shall attend all Project meetings, regardless of whether held prior to or following Substantial Completion of the Work.

§ 3.9.2 The Contractor shall provide, or otherwise see that, the Project Manager, or Superintendents or responsible workers of the Contractor and its major Subcontractors are equipped with cellular phones and radios. The Contractor shall provide the Owner, the Construction Manager, and the Architect with the number for each phone and worker.

§ 3.9.3 The Contractor's supervisory personnel, including Superintendents and their assistants, shall be versed in the English language. In the event the Contractor's supervisory personnel, Superintendents and their assistants are not versed in the English language, the Contractor shall employ the services of a full-time on-site interpreter to facilitate communications with such supervisory personnel.

§3.9.4 The Contractor shall not reduce or terminate supervision of the Work, nor change the superintendent without the prior written approval of the Owner.

§3.9.5 If, for any reason, the Contractor takes an action resulting in any of the changes noted in Subsection 3.9.4, the Owner may take remedial action to **ensure** continued progress of the Work, including the hiring of suitable supervisory personnel, and charge the Contractor all costs associated with these remedial actions including the costs of legal and additional construction management and architectural services.

§3.9.6 The Contractor shall furnish the Construction Manager, in writing the names, addresses and telephone number of the members of his organization who can be contacted in the event of an off-hours emergency at the building.

§3.9.6 The Contractor shall attend progress meetings with the Construction Manager and such other persons the owner may require. The progress meetings shall include all key personnel on the job, including the contractor and subcontractors, or other persons in charge of various phases of the work.

§3.9.7 Prior to the commencement of Work, the Contractor shall provide the Construction Manager and the Architect with:

.1 A written list of subcontractors, sub-subcontractors, suppliers and vendors with names, addresses, telephone numbers, and descriptions of the work they shall perform or furnish;

.2 The name, address and telephone number of the bonding company, banking and insurance company for the Contractor including the name, address and telephone number of each bonding company's primary contact representative for the Project;

.3 Detailed Subcontractor schedules indicating the approximate quantity of shop drawings, sequence, timing and man loading; and

.4 A cash flow projection for the life of the Project, including a schedule and graph showing the amount of Work projected to be completed each month or billing period and a dollar value for the anticipated billings each month or billing period. This shall be completed after an agreed upon schedule of values has been approved by the Construction Manage

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly, but in no event later than 14 days, after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information and the Construction Manager's approval a Contractor's construction schedule for the Work in electronic format with predecessor logic. The construction 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 Contractor's construction schedule shall provide for the orderly progression of the Work to completion, and shall not exceed time limits current under the Contract Documents. The Contractor's construction schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project.

(Paragraph deleted)

§ 3.10.1.1 Time is of the essence for this Project. The Work shall be performed continuously and without interruption, so that all Work can be completed in the time set forth in the Contract Documents.

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§ 3.10.1.2 The sequence of the Work shall be scheduled with the Owner so as to minimize interference with the Owner's use of existing structures, and the Owner's approval shall be obtained prior to starting of the Work.

§ 3.10.1.3 The Contractor shall conform to the most recent Project Schedule, and all Work shall be completed on or before the dates established in the Contract Documents. The Contractor shall monitor the progress of the Work for conformance with the requirements of the Project Schedule and shall promptly advise the Owner and Construction Manager of any delays or potential delays.

§ 3.10.2.1 The Construction Manager shall prepare, publish, and, from time-to-time, revise a master integrated Project Schedule based upon the construction schedules submitted by the various Prime Contractors. Failure by the Contractor to furnish any required schedule or schedule revision in a timely manner shall entitle the Construction Manager to prepare a schedule for the Contractor's Work, to which the Contractor shall be bound.

§ 3.10.2.2 The Contractor shall cooperate with the Construction Manager in scheduling and performing the Contractor's Work to avoid conflict, delay in or interference with the Work of other Contractors or the construction or operations of the Owner's own forces. The Owner shall have the right, without penalty, to direct the Contractor to delay, postpone or reschedule any portion of the Work that may interfere with or disrupt the operations of the Owner.

§ 3.10.3 The Contractor shall conform to the most recent Project Schedule.

§ 3.10.4 In the event the Owner determines that the performance of the Work has not progressed to the level of completion required of the Contract Documents or that the Contractor has failed to maintain its construction schedule or the Project Schedule, the Owner shall have the right to order the Contractor to take corrective measures necessary to expedite the progress of construction including without limitations, additional shifts, overtime, additional manpower or equipment as well as other similar measures (hereinafter referred to collectively as "extraordinary measures"). Such extraordinary measures shall continue until the progress of Work complies with milestone and critical path dates set forth in the Contract Documents and the Project Schedule. The Contractor shall not be entitled to an adjustment in Contract Sum or Contract Time in connection with extraordinary measures required by the Owner.

§ 3.10.5 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter update it as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Construction Manager's and Architect's approval. The Architect and Construction Manager's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Construction Manager and Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, 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.

§ 3.10.6 The Contractor shall participate with other Contractors, the Construction Manager and Owner in reviewing and coordinating all schedules for incorporation into the Project Schedule that is prepared by the Construction Manager. The Contractor shall revise the construction schedule and submittal schedule as deemed necessary by the Construction Manager to conform to the Project Schedule and the Contract Documents.

§ 3.10.7 The Contractor shall perform the Work in general accordance with the most recent construction schedules submitted to the Owner, Construction Manager and Architect and incorporated into the approved Project Schedule. The Contractor shall monitor the progress of the Work for conformance with the requirements of its construction schedule and Project Schedule and shall promptly advise the Owner of any delays or potential delays affecting the critical path.

§ 3.10.8 If the Contractor fails to maintain the approved construction schedule or Project Schedule and meet all critical path dates for the Work, the Owner may request a recovery plan from the Contractor and reserves the right to withhold payment until such time as the Contractor submits a recovery plan. The recovery plan must show how the Work may plausibly be brought on schedule, including, as necessary, acceleration of the Work by means of overtime, additional crews, additional shifts, additional equipment or re-sequencing of the Work to achieve completion of the remaining critical path dates in the construction schedule or Project Schedule. The Contractor shall submit as part of its recovery plan: (i) a "resource loaded" schedule showing the Contractor's plan to deploy manpower per trade, per work area, per day, together with essential materials and equipment, and other resources necessary to timely accomplish the Work;

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and (ii) a two-week "look ahead" schedule identifying tasks to be accomplished within the coming two week period, the work areas and categories of work, and necessary manpower resources, together with other data necessary to demonstrate to the Owner the viability of the Contractor's recovery plan ("2 Week Plans"). The Contractor shall continue to submit 2 Week Plans until either the Contractor demonstrates that the Project Schedule has recovered from the unexcused delay, or the Owner notifies the Contractor in writing that further 2 Week Plans are no longer required. The cost of preparing and performing the recovery plan shall be borne solely by the Contractor. No approval or consent by the Owner of any plan for resequencing or acceleration of the Work submitted by Contractor shall constitute a waiver by Owner of any damages or losses which the Owner may suffer by reason of such resequencing or the failure of Contractor to meet the Substantial Completion Date or the final completion date.

§ 3.10.9 The Contractor specifically represents and warrants to the Owner that that the Contract Sum and the Contract Time contemplate compliance with all current, and reasonable foreseeable future, federal, state and local "Stay at Home," "Social Distancing" and related orders, regulations and guidance related to limiting the spread of COVID-19 disease (the "COVID Requirements"). Accordingly, the Contractor hereby waives any claim for an increase in the Contract Sum or an extension of the Contract Time on account of the COVID Requirements. The Contractor shall promptly notify the Owner of any COVID Requirements that would impact the Project.

§ 3.10.10 Due to the ongoing COVID-19 pandemic and the resulting uncertainty with regard to, among other things, (a) what restrictions, if any, will be applicable to construction activities due to federal, state or local orders, laws, regulations or rules related to the COVID-19 pandemic (including, without limitation, social distancing, PPE, cleaning and disinfection requirements) and (b) the duration of any restrictions imposed on construction activities, the Owner may modify the schedule set forth in the Contract Documents and the Project Schedule. Similarly, restrictions, if any, that will be or are applicable to construction activities due to federal, state or local orders, laws, regulations or rules related to the COVID-19 pandemic (including, without limitation, social distancing, PPE, cleaning and disinfection requirements) may cause the Owner to have the Work or the Project commence later than the date specified in the Contract Documents. The Contractor acknowledges and agrees that there should be no additional compensation paid for schedule modifications caused directly or indirectly by the COVID-19 pandemic. The Contractor further acknowledges and agrees that its sole remedy for any schedule modifications or delays caused directly or indirectly by the COVID-19 pandemic shall be an extension of the Contract Time, if warranted. The Contractor further acknowledges and agrees that it shall have on file and provide a copy to the Owner of its written COVID-19 business reopening plan, and it shall comply in all respects with such plan for the duration of the Project. The Contractor, not the Owner, shall be responsible for compliance with its COVID-19 business reopening plan and all safety requirements associated with COVID-19 protections for workers and the general public.

§ 3.11 Documents and Samples at the Site

§ 3.11.1 The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These documents shall be available to the Architect and delivered to the Construction Manager for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.11.2 The Contractor shall maintain at the site, and shall make available to the Owner, Construction Manager and Architect, one record copy of the Drawings (the "Record Drawings") in good order. The Record Drawings shall be prepared and updated during the prosecution of the Contractor's Work. The prints for Record Drawing use will be a set of black line prints provided by the Architect to the Contractor at the start of construction. The Contractor shall maintain said set in good condition and shall use colored pencils to mark up said set with "record information" in a legible manner to show: (i) deviations from the Drawings made during construction; (ii) details in the Work not previously shown; (iii) changes to existing conditions or existing conditions found to differ from those shown on any existing drawings; (iv) the actual installed position of equipment, piping, conduits, light switches, electric fixtures, circuiting, ducts, dampers, access panels, control valves, drains, openings, and stub-outs, etc.; (v) architectural and structural changes in the design; and (vi) such other information as either the Owner or Architect may reasonably request. At the completion of the work, the Contractor shall transfer all information on record drawings to reproducible drawings with new information clouded and noted. Such drawings shall be stamped with the Contractor's name and "AS-BUILT" in the lower righthand corner. The colored record drawing and the as-built reproducible drawing shall be forwarded to the Construction Manager for delivery to the Owner. Final payment and any retainage shall not be due and owing to Contractor until the Record and As-Built drawings receive the approval from the Architect and the Owner (and all other closeout requirements are met).

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§ 3.11.3 The Contractor shall maintain all approved permit drawings in a manner so as to make them accessible to government inspectors and other authorized agencies having jurisdiction over the Project. All approved drawings shall be wrapped, marked and delivered to the Owner within 60 days of final completion of the Contractor's Work.

§ 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. Each submittal shall bear written confirmation that the Contractor has satisfied its obligations under the Contract Documents with respect to the Contractor's review and approval of the submittal. The Contractor shall comply with the provisions and procedures for Shop Drawings, Product Data, and Samples set forth in Specifications Section 01 33 00, "Submittal Procedures."

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, operating and maintenance procedures, 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 (1) demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents, and (2) show a system or product's ability to meet applicable criteria for those portions of the Work for which the Contract Documents require submittals. Review by the Architect and Construction Manager is subject to the limitations of Sections 4.2.10 through 4.2.12. Informational submittals upon which the Construction Manager and Architect are not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Construction Manager or Architect without action.

§ 3.12.4.1 Shop drawings and product submittals for all site improvement, architectural, structural, mechanical, electrical and signal work shall be submitted to the Architect for its review. Refer to Contract (General, Supplementary and other conditions) Section on "SUBMITTALS" for more complete information.

§ 3.12.4.2 The Contractor represents and warrants that all shop drawings shall be prepared by a person or entity possessing expertise and experience in the trade for which the shop drawing has been prepared and, if required by the Contract Documents or law, by a licensed professional engineer.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Architect, with copies to the Construction Manager, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the Project submittal schedule approved by the Construction Manager and Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of other Contractors, Separate Contractors, or the Owner's own forces. The Contractor shall cooperate with the Construction Manager in the coordination of the Contractor's Shop Drawings, Product Data, Samples, and similar submittals with related documents submitted by other Contractors.

§ 3.12.5.1 No extension of time will be granted to the Contractor because of failure to have shop drawings, product data, and samples submitted in ample time to allow for review by the Architect or its consultants.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner, Construction Manager, and Architect, that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been

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reviewed and approved by the Architect. Resubmission of rejected documents shall be performed within 10 calendar days, or sooner if required by the progress of construction. No claim for delay or cost shall be accepted as a result of rejected submittal documents. If the Architect is required to review the Contractor's submittal more than twice, the Contractor shall bear the cost and expense associated with such additional review as set forth in the Project Manual.

§ 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 requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Construction Manager and Architect in writing 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 Construction Manager and Architect on previous submittals. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions. Resubmission of rejected documents shall be performed within ten (10) calendar days. No claim for delay or cost shall be accepted as a result of rejected documents.

§ 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 Construction Manager and Architect at the time and in the form specified by the Architect.

§ 3.12.11 The Architect's review of the Contractor's submittals will be limited to examination of an initial submittal and one resubmittal. The Owner is entitled to obtain reimbursement from the Contractor for amounts paid to the Architect for evaluation of additional resubmittals.

§ 3.13 Use of Site

§ 3.13.1 The Owner shall not be liable to the Contractor, subcontractors of any tier, suppliers, their employees or anyone else with respect to the condition of the Project site. The Owner shall have the right to refuse admittance to the site to any agent or employee of the Contractor, its subcontractors of any tier, or its suppliers whose presence the Owner deems hostile to the Owner's interests. The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment. The use of the Owner's assets and property are extremely limited. The Contractor shall fully comprehend the intent of the Contract

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Documents pertaining to site and building limitations including, without limitation, Division 1 Specifications sections, the phased construction plan, and the site safety and logistics plan(s).

§ 3.13.2 The Contractor shall coordinate the Contractor's operations with, and secure the approval of, the Construction Manager before using any portion of the site.

§ 3.13.3 The Contractor shall perform and shall ensure that all Subcontractors and suppliers perform all Work in a manner that permits reasonable access to the Project site and to all adjacent premises. The Contractor shall not, and shall not permit any Subcontractor or supplier to, conduct the Work in a manner that disturbs or that could be reasonably anticipated to disturb operations and persons located in or on portions of the site not affected by the Work. The occupied portion of any of the Owner's buildings shall always comply with the minimum requirements necessary to maintain a certificate of occupancy.

§ 3.13.4 Construction Rules and Regulations. The following rules and regulations shall be observed and enforced by all Contractors in connection with all phases of the Work:

.1 In accordance with New York State law, smoking is prohibited anywhere on school property. Violators will be subject to arrest and/or fine of $1,000 per occurrence. No alcoholic beverages or controlled substances are permitted on school property, and persons under the influence of alcoholic beverages or controlled substances may not enter in or remain on school property.

.2 In accordance with the United States Gun-Free School Zones Act of 1994, no firearms are permitted within 1,000 feet of any school building, with certain limited exceptions as set forth therein. In addition to such limitations, no firearms shall be brought on school property without the Owner's express prior consent.

.3 Appropriate protective gear (hard hats, safety shoes, goggles, etc.) are to be worn as required by OSHA standards, the New York State Department of Labor, and prudent practice. Shirts are to be worn at all times. No short pants are permitted.

.4 Any person who uses inappropriate language, or who is disruptive to the school environment, will be banned from the site.

.5 The Contractor's personnel shall not converse with school employees, students and or local residents.

.6 All persons on the Project site will comply with all reasonable instructions regarding conduct and safety which are given by the Architect, the Construction Manager or the Owner's school administrators.

.7 All construction materials shall be stored in a safe and secure manner. No deliveries will be allowed during school bus drop off or pick up hours as determined by the Owner. All deliveries shall be scheduled and coordinated with the Construction Manager and the Owner's security department. Unexpected or uncoordinated deliveries may be turned away by the Owner or the Construction Manager at the discretion or necessity of the Owner. The Owner's enforcement of this provision shall not be construed by the Contractor or Subcontractor as the basis for a claim of delay in time or monetary damages alleged to have been incurred as a result of refusal of delivery.

.8 Use of the existing building facilities during construction is prohibited, specifically including toilet rooms, telephones and water fountains.

.9 The Contractor's schedule shall allow for blackout dates during which no noisy Work will be allowed, as determined by the Construction Manager. The Contractor may consult the Owner's school calendar for all test and examination dates, but these dates are subject to change.

.10 To gain access to the Work, entrances and parking areas will be designated by the Owner for the Contractor's use. Any vehicles or trucks in non-designated areas may be towed at the Contractor's expense. Gates shall always be locked unless a worker is in attendance to prevent unauthorized entry.

.11 Should it become necessary to obtain access to the existing building during construction hours for measurements or other non-disruptive work, the Contractor shall be escorted by the Construction Manager.

.12 All persons must wear photo identification badges at all times while working at the site. Identification badges must be provided by the Contractor for its personnel, including subcontractors, consultants, visitors and others.

.13 No asbestos containing products are to be used anywhere on this Project.

.14 No lead containing products are to be used anywhere on this Project.

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.15 Asbestos manifests showing the locations of all known asbestos bearing materials are available in each building, and should be consulted prior to the commencement of any work, including but not limited to demolition.

.16 Demolition is to occur only when the building is unoccupied. Dust partitions and negative air are to be installed prior to commencing demolition. The Contractor must obtain Construction Manager approval on dust partitions and negative air prior to commencing demolition work. Debris shall be removed by using an enclosed chute or similar sealed system.

.17 (a) Prior to the commencement of Work, the Contractor must submit construction plans, which show the location of dust particles, exhaust & fresh air fans and describe in detail the operation procedures during demolition and construction which may generate dust.

(b) All entrances to classrooms shall be sealed with at least 6 mil. polyethylene sheeting to prevent dust created by demolition and construction work from entering the classrooms. Entrances and egress to the work zone shall be covered with a triple flap 6 mil. polyethylene doorway to allow access to the area without the release of dust. The Contractor is, additionally, responsible for all debris and dust infiltrating adjacent and undisturbed areas of the building.

(c) Shut down and lock out all electrical and HVAC in the work area. Cut, cap, and seal all duct work where it enters the work area from another space. All duct work and conduit within the space shall be removed during demolition work.

(d) The Contractor shall install dust protection barriers and poly sheeting. There shall be no or minimum damage to adjacent surfaces. The Contractor is responsible to repair any damage to existing surfaces.

.18 Painting or other chemical applications shall be done in the Owner's existing building only when it is unoccupied. Storage of chemicals and painting shall be outside the Owner's existing or new structures, and shall follow manufacturer's storage guidelines.

.19 Oxygen or other gas containers shall be properly stored and secured per OSHA requirements, to the satisfaction of the Construction Manager. Failure to do so will result in a $250 back-charge, per occurrence.

.20 The Contractor is responsible for cleaning its own materials and debris. Failure to maintain a clean work site daily will result in others performing the work at the Owner's request, and the Contractor will be backcharged for the cleaning cost plus construction administration fees. This may be done without the typical 3-day notice to the Contractor.

.21 The Contractor must send a qualified representative, knowledgeable in the Project and authorized to make decisions on behalf of the Contractor, to every Project meeting.

.22 The Contractor shall cooperate with the Owner's school principal and custodial staff; however, if any additional work is requested the Contractor shall not proceed unless written approval is received from the Owner. The Contractor will not be compensated for any additional work performed without the Owner's prior written approval.

.23 Deliveries sent to the Project site will not be signed for or unloaded by the Owner. They will be directed to the construction site and if no employee is on site, the delivery will be rejected, at the Contractor's expense.

.24 The General Construction Contractor shall be responsible for managing dust and dirt. On the exterior, site shall be watered down frequently to prevent dust clouds from rising. Streets shall be maintained clean per the Construction Manager's request.

.25 All hot tar roofing shall be installed after school hours or on weekends/holidays only. Kettles shall not be lit until all students have left the Owner's building.

.26 The Contractor shall submit a weekly work schedule indicating workdays, work hours and manpower allocation.

.27 No storage of materials will be permitted within the Owner's buildings at any time during construction. The Contractor must provide exterior storage containers when required. The Contractor shall be responsible for securing appropriate space for its material with the Construction Manager prior to delivery. Final location of storage containers shall be determined by the Owner and/or Construction Manager. If insufficient space is available on the site, the Contractor shall provide local off-site storage, storage containers, etc. at its own cost and expense. Should any of the material stored on-site obstruct the progress of any portion of the Work or the Project, this material shall be removed by the Contractor without reimbursement of cost, from place to place or from the premises, as the Construction Manager may direct.

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.28 The General Construction Contractor shall be responsible for maintaining all appropriate site safety signage.

.29 The Contractor shall be responsible for protecting the Owner's property. All existing shrubs, trees, lawn fixtures, sculptures and miscellaneous equipment shall be protected at all times. Any removals or relocation of said objects, if allowed shall be as directed by the Owner in writing.

.30 The General Construction Contractor shall provide and service portable lavatories for the duration of construction as provided in the Contract Documents. Lavatories shall be serviced by the General Construction Contractor on a regular basis to maintain sanitary conditions.

.31 The General Construction Contractor shall protect all existing roofs during construction and shall be responsible for any damage to roofs during construction. The General Construction Contractor shall make all repairs to any damaged areas, as required by the manufacturer of the roof system.

.32 The General Construction Contractor shall be responsible for providing weather-proof protection over all rough openings, including windows.

.33 The Contractor shall be responsible for conducting pre-construction walk-throughs and videotaping existing conditions. The Contractor shall schedule a representative of both the Owner and the Construction Manager to be present at this taping. In the absence of this record, the Contractor shall be responsible for paying the costs associated with any and all repairs in an area where the Contractor is working or has worked, as may be deemed necessary by the Owner or the Construction Manager.

.34 Manufacturers Material Safety Data Sheets (MSDS) shall be available at the site for all products used in the Project.

.35 No weapons are permitted on the Owner's property by law.

.36 Neither the Contractor nor any person on its behalf shall, in any manner, engage in discrimination, intimidation or harassment of any person on the Project site.

.37 Proper attire is required for personal safety and clothing must not sexually explicit or contain messages of a vulgar nature, disrespectful of ethnic or religious groups **or any group covered under the Dignity for All Students Act**, or which promote the use of tobacco, alcohol or drugs.

.38 Only materials and equipment that are to be used directly in the Work shall be brought to and stored on the Project site by the Contractor. After equipment is no longer required for the Work, it shall be promptly removed from the Project site. Protection of construction materials and equipment stored at the Project site from weather, theft, damage, and all other adversity is solely the responsibility of the Contractor.

.39 The Contractor will ensure that the Work, at all times, is performed in a manner that affords reasonable access, both vehicular and pedestrian, to the site of the Work and all adjacent areas. The Work will be performed in such a manner that public areas adjacent to the site of the Work will be free from all debris, building materials and equipment likely to cause hazardous conditions. Without limitation of any other provision of the Contract Documents, the Contractor will use its best efforts to minimize any interference with the occupancy or beneficial use of (1) any areas and buildings adjacent to the site of the Work; or (2) the Owner's building in the event of partial occupancy, as more specifically described in Section 9.9.

.40 The Contractor is required to protect its own Work and work areas, preconstruction, during construction and post construction.

.41 During exterior renovation work, overhead protection shall be provided for any sidewalks or areas immediately beneath the work site or such areas shall be fenced off and provided with warning signs to prevent entry.

.42 The Contractor shall exert utmost care and diligence when working in or near any existing buildings or site work. The absence of protection around such items shall not excuse the Contractor from its liability to provide protection. Any damage to existing buildings, sitework or facilities due to the actions or inactions of the Contractor shall be repaired by and charged to the Contractor.

.43 The Contractor shall be responsible for the removal and replacement of existing ceiling tiles and grid in areas of the existing building where its Work is required and new ceilings are not scheduled for installation. In the event that the existing ceilings are damaged and cannot be replaced to the satisfaction of the Owner, the responsible contractor shall be liable for the costs of replacing in kind, the existing ceilings with new tile and grid.

.44 The General Construction Contractor shall provide necessary and required security measures to adequately safeguard the construction site from vandalism and intrusion of unauthorized persons. The General Construction Contractor shall submit its means and methods of security to the Construction Manager for review and comment. The Project site must be secured 24 hours a day, 7 days a week

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including holidays. The General Construction Contractor's failure to secure the site as required by this paragraph will result in the Owner engaging the services of such necessary personnel so as to provide such security. No notice will be given the General Construction Contractor of the Owner's intention to engage such security services and all costs and expenses associated with the Owner's security of the site in this regard will be back charged to the General Construction Contractor. While the Owner may have security guards patrolling the project areas, the function of such security guards is not for the purpose of specifically guarding the Contractor's property or operations of work.

.45 The Contractor and any entity for which the Contractor is responsible shall not erect any sign on the Project site without the written consent of the Owner, which may be withheld in the sole discretion of the Owner.

.46 Without limitation of any other provision of the Contract Documents, the Contractor will comply with all reasonable rules and regulations promulgated by the Owner or Construction Manager in connection with the use and occupancy of the Project site and the buildings, as amended from time to time by the Owner or the Construction Manager.

§ 3.13.5 Only materials and equipment that are to be used directly in the Work shall be brought to and stored on the Project site by the Contractor. After equipment is no longer required for the Work, it shall be promptly removed from the Project site. Protection of construction materials and equipment stored at the Project site from weather, theft, damage, and all other adversity is solely the responsibility of the Contractor.

§ 3.13.6 The Contractor shall ensure that the Work, at all times, is performed in a manner that affords reasonable access, both vehicular and pedestrian, to the site of the Work and all adjacent areas. The Work will be performed in such a manner that public areas adjacent to the site of the Work will be free from all debris, building materials and equipment likely to cause hazardous conditions. Without limitation of any other provision of the Contract Documents, the Contractor shall use its best efforts to minimize any interference with the occupancy or beneficial use of (1) any areas and buildings adjacent to the site of the Work; or (2) the building in the event of partial occupancy, as more specifically described in Paragraph 9.9.

§ 3.13.7 The Contractor shall not permit any workers to use any existing facilities at the Project site, including without limitation, lavatories and toilets. To gain access to the Work, entrances and parking areas will be designated by the Owner for the Contractor's use. Without limitation of any other provision of the Contract Documents, the Contractor will comply with all reasonable rules and regulations promulgated by the Owner in connection with the use and occupancy of the Project site and the Owner's building(s), as amended from time to time by the Owner.

§ 3.13.8 Construction areas that are under the control of the Contractor and therefore not occupied by the Owner's staff or students shall be separated from occupied areas. Provisions shall be made to prevent the passage of dust and contaminants into occupied parts of the Owner's building(s). Periodic inspection and repairs of the containment barriers must be made to prevent exposure to dust or contaminants. Gypsum board must be used in exit ways or other areas that require fire rated separation. Heavy duty plastic sheeting may be used only for a vapor, fine dust or air infiltration barrier, and shall not be used to separate occupied spaces from construction areas.

§ 3.13.9 Prior to starting Work, the Contractor shall submit a written report to the Owner, Construction Manager and Architect identifying existing damage to roads, walks, lawns, buildings and other property to be affected by this Contract. Failure to submit the report shall render the Contractor responsible for existing damage. The Contractor may request and schedule an inspection with the Owner, Construction Manager and Architect prior to submittal of the report. The Contractor shall obtain the consent of adjoining property owners regarding temporary easements of any other manner of physical encroachment.

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner, Separate Contractors, or of other Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner, Separate Contractors, or by other Contractors except with written consent of the Construction Manager, Owner, and

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such other Contractors or Separate Contractors. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Separate Contractors, other Contractors, or the Owner, its consent to cutting or otherwise altering the Work.

§ 3.14.3 The word "new" used herein shall mean Work which has been or is to be installed under the terms of the Contract for this Project. The word "existing" used herein shall mean existing conditions previous to the award of a Contract for this Project. In order to eliminate cutting and patching as much as possible, the Contractor shall, during the progress of its Work, provide and set proper sleeves, inserts, and other fixtures as required for its new Work and shall give proper and detailed instructions to others where the Work may be affected by their work, with adequate notice prior to the erection of new Work. Cutting and patching work as required to install new Work or remove existing work shall be done carefully and neatly with as little damage as possible. The Contractor shall refer to the Specifications for proper cutting and patching requirements. Any costs caused by defective or ill-timed Work of the Contractor shall be borne by the Contractor. Cutting and patching of any Work shall be made in such a manner as to not breach any provisions of any guaranty or warranty on existing work left in place or any guaranty or warranty required for the Contractor's new Work. Patching of work shall match existing adjacent surfaces and patchwork shall be disguised completely to hide any trace of patching. All new Work on existing roofs must be provided by a company specializing in performing the Work and approved by the existing roofing material manufacturer. It shall be the responsibility of the Contractor performing the cutting and patching to maintain any existing roofing warranty.

§ 3.14.4 Only trades persons skilled and experienced in cutting and patching shall perform such 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. On a daily basis, the Contractor shall clean the areas in which it has performed work and shall remove all waste, materials, rubbish, its tools, construction equipment, machinery and surplus materials. 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. The Contractor shall completely clean the site of the Work, removing and disposing of all construction-related debris and rubbish, and cleaning all Work-related stains, spots, marks, dirt, mortar smears, plaster smears, paint smears, caulking smears, and other foreign materials from exposed surfaces inside and outside the Owner's buildings and within the Project limit lines.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner, or Construction Manager with the Owner's approval, may do so and the Owner shall be entitled to reimbursement from the Contractor. At its option, the Owner may deduct the cost of clean-up pursuant to this Section 3.15.2 from any payments otherwise due to the Contractor pursuant to this Contract.

§ 3.16 Access to Work

The Contractor shall provide the Owner, Construction Manager, and Architect with access to the Work in preparation and progress wherever located. Federal, state, and local agencies with jurisdiction over the Project shall at all times have access to the Work wherever it is in preparation or progress. The Contractor shall provide for such access so that such agencies may perform their functions. The Contactor shall also allow access for all required tests and inspections.

§ 3.17 Royalties, Patents and Copyrights

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

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall, and cause its Subcontractors to, defend, indemnify and hold harmless the Owner, Construction Manager, Architect, and their consultants, officers, directors, board members, agents and employees of any of them (collectively, "Indemnitees," individually, "Indemnitee") from and

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against all losses, damages, liabilities, actions, causes of action, claims, demands, fines, penalties, judgments, costs (including but not limited to attorneys' fees and expenses incurred in connection therewith and in the enforcement of this indemnification), charges, expenses and demands of whatever kind in connection with or arising from or out of (a) any negligent, willful or wrongful act or omission resulting in bodily injury (including death), personal injury or property damage (including loss of use) by the Contractor, its Subcontractors, Suppliers, their respective officers, employees, servants, agents, suppliers, invitees, successors and assigns (collectively, "Contractor Parties," and individually, "Contractor Party"), (b) performance of or failure to perform the Work or any breach of this Contract or infringement of any patent right by any Contractor Party, or (c) any statutorily imposed liability for injury to employees or failure to comply with any laws or regulations affecting the Work, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Nothing contained herein shall be construed to obligate the Contractor to indemnify, defend, and hold an Indemnitee harmless for claims caused solely by the Indemnitee's negligent acts or omissions.

The Contractor agrees to include the following indemnity provision in each and every contract it enters into with a Subcontractor, and to require that Subcontractor to include such provision in each contract it enters into with any lower tier Sub-subcontractor: "To the fullest extent permitted by law, sub-contractor shall defend, indemnify and hold harmless the Contractor, Owner, Owner's Consultants, Construction Manager's and Architect's consultants, and each of their respective representatives, board members, employees, directors, officers, and agents, from and against any and all claims, suits, actions, damages, losses, fines, penalties, costs, charges and expenses, including but not limited to attorneys' fees and the costs of any proceeding, arising out of or resulting from any performance of or failure to perform the Work, acts or omissions of the Subcontractor, its lower-tier Sub-subcontractors, and others for whom the Subcontractor is responsible, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or economic losses or damages, damage to or destruction of property, and for environmental damage, or to injury to or destruction of tangible property and nuisance, but only to the extent caused by the acts or omissions or a breach of contract of the a Subcontractor, a Sub-Subcontractor to Subcontractor, and any person or entity directly or indirectly employed by them or any person or entity for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder."

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

§ 3.18.3 The Contractor's defense and indemnity obligations under this Section 3.18 shall specifically include all claims and judgments that may be made against the Indemnitees under the Labor Law of the State of New York, and similar laws of other state or governmental bodies having jurisdiction; and further, against claims and judgments arising from violation of public ordinances and requirements of governing execution of the Work.

§ 3.18.4 Claims by Governmental Authorities. To the fullest extent permitted by law, the Contractor shall defend, indemnify, and hold harmless the Indemnitees from and against claims, damages, losses, and expenses arising out of any claims made against the Indemnitees under the laws of federal, state, or other governmental bodies having jurisdiction over the Work, including but not limited to claims arising from violation of public ordinances and other requirements of governing authorities, due to the Contractor's method of execution of the Work or implementation of any of the Contractor's other obligations under the Contract Documents.

§ 3.18.5 Liens and Security Interests. To the fullest extent permitted by law, the Contractor shall defend, indemnify, and hold harmless the Indemnitees from and against any actions, law suits, or other proceedings brought against Indemnitees as a result of liens or security interests of any type arising from the Work and filed against the Work, the site of any of the Work, the Project site and any improvements thereon, payments due the Contractor, or any portion of the property of any of the Indemnitees.

§ 3.18.6 Intellectual Property. The Contractor shall defend, indemnify, and hold harmless the Indemnitees from and against any claim or demand for patent fees, royalties, or otherwise on account of any invention, machine, article, process, copyright, or arrangement that may be used by the Contractor in performing the Work, other than as to any of the foregoing expressly called for in the Contract Documents to be so used. In the event of any injunction or legal action regarding such claim or demand that results in stopping the Work in whole or part, the Owner shall have the

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right to direct the Contractor to change the manner of performance of the Work to avoid such stoppage, all cost and expense occasioned thereby to be borne solely by the Contractor.

§ 3.18.7 The Contractor shall further indemnify and hold harmless the Indemnitees from and against any costs and expenses (including reasonable attorneys' fees) incurred by any of the Indemnitees in enforcing any of the Contractor's defense, indemnity, and hold harmless obligations under this Section 3.18 or as may otherwise be provided elsewhere in the Contract.

§ 3.18.8 Subject to Section 3.18.9, all obligations of the Contractor under this Section 3.18 to defend the Indemnitees are obligations to provide full defenses at the sole cost and expense of the Contractor, regardless of any alleged culpability on the part of any Indemnitee or any ultimate determination of relative shares of liability of any Indemnitee or limitation of the Contractor's indemnity obligations in light of such determination.

§ 3.18.9 To the extent any defense, indemnity, or hold harmless obligations under this Section 3.18 are made void or otherwise impaired by any law controlling their construction (including but not limited to laws limiting such obligations to the extent of the portion of damages caused by an indemnitor), such obligations shall be deemed to conform to the greatest rights to defense and indemnity permitted by such law (including but not limited to New York State General Obligations Law Section 5-322.1).

§ 3.18.10 All provisions of this Section 3.18 shall survive termination of the Agreement or final completion. No obligations under this Section 3.18 shall be construed to negate, abridge, or reduce other rights or obligations to defense and indemnity, including but not limited to common law indemnity, which would otherwise exist as to a party or person described in this Section 3.18.

§ 3.19 Existing Features and Underground Data

§ 3.19.1 The location of existing features shown on plans is intended for general information only. The Contractor, alone, is responsible for accurate determination of the location of all structures, and shall not be entitled to any increase in the Contract Sum or Contract Time due to difficulties or distances encountered in the Work, which should have been foreseeable thereby.

§ 3.19.2 The locations, depths and data as to underground conditions have been obtained from records, surface indications and data furnished by others. Information furnished is solely for the convenience of the Contractor without any warranty, expressed or implied as to its accuracy or completeness. The Contractor shall make no claim against the Owner, Construction Manager or Architect with respect to the accuracy or completeness of such information if it is erroneous, or if the conditions found at the time of construction are different from those as indicated.

§ 3.20 Construction Stresses

§ 3.20.1 The Contractor shall be solely responsible for the conditions which develop during construction and in the event any structure is dislocated, over strained, or damaged so as to affect its usefulness, the Contractor shall be solely responsible. The Contractor shall, at its own expense, take whatever steps necessary to strengthen, relocate, or rebuild the structure to meet all applicable requirements.

§ 3.20.2 The Contractor is responsible for restoration or repair of utilities, private property, buildings, pavement, walkways, roads, or other property damaged by its activities under this Agreement.

§ 3.21 Training and Instructions

§ 3.21.1 Upon Substantial Completion of the Work, the Contractor shall orient and instruct personnel of the Owner designated by it in the operation and maintenance of all equipment furnished by the Contractor and shall turn over all pertinent literature and operational manuals relating to the equipment. The format for organizing, binding, and delivering such manuals shall be as described in the Specifications.

ARTICLE 4 ARCHITECT AND CONSTRUCTION MANAGER

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

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§ 4.1.1.1 Architect's Consultants: All firms listed on the title sheet of the Specifications, except for the Owner and Construction Manager, are Consultants employed by the Architect, and are agents of the Architect and will make observation of their respective branches of the Work. All changes in the Work must be processed through the Architect. Consultants shall not order extra Work or make changes in the Work.

§ 4.1.2 The Construction Manager is the person or entity retained by the Owner pursuant to Section 2.3.3 and identified as such in the Agreement.

§ 4.1.3 The Architect is the interpreter of the technical requirements of the Drawings and Specifications with regard to questions the Contractor may have concerning its obligations under either. The Architect shall render such interpretations with such promptness as necessary to maintain progress of the Work.

§ 4.2 Administration of the Contract

§ 4.2.1 The Construction Manager and Architect will provide administration of the Contract as described in the Contract Documents and will be the Owner's representatives during construction until the date the Architect issues the final Certificate for Payment and during the correction period described in Article 12. The Construction Manager and Architect have the authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. On the basis of the site visits, the Architect will keep the Owner and the Construction Manager reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner and Construction Manager known deviations from the Contract Documents and defects and deficiencies observed in the Work.

§ 4.2.3 The Construction Manager shall provide one or more representatives who shall be in attendance at the Project site whenever the Work is being performed. The Construction Manager will determine in general if the Work observed is being performed in accordance with the Contract Documents, will keep the Owner and Architect reasonably informed of the progress of the Work, and will promptly report to the Owner and Architect known deviations from the Contract Documents and the most recent Project schedule, and defects and deficiencies observed in the Work.

§ 4.2.4 The Construction Manager will schedule and coordinate the activities of the Contractor and other Multiple Prime Contractors in accordance with the latest approved Project Schedule. The Contractor shall participate with other Contractors and the Construction Manager, the Architect and Owner in reviewing their construction schedules when directed to do so. The Contractor shall make any revisions to the construction schedule deemed necessary by the Owner or Construction Manager. The approved construction schedules shall be integrated into the Project Schedule and constitute the schedules to be used by the Contractor, other Contractors, the Architect, the Construction Manager and the Owner until subsequently revised.

§ 4.2.4.1 The Contractor shall assume full responsibility for the execution of its Work in the allotted duration times set forth in the Project Schedule.

§ 4.2.5 The Construction Manager, except to the extent required by Section 4.2.4, and Architect will not have control over, or charge of, 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, except as provided in Section 3.3.1, and neither will be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. Neither the Construction Manager nor the Architect will have control over or charge of or be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or of any other persons or entities performing portions of the Work.

§ 4.2.6 Communications Facilitating Contract Administration. Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Construction Manager, and shall contemporaneously provide the same communications to the Architect about matters arising out of or relating to the Contract Documents. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors

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and material suppliers shall be through the Contractor. Communications by and with other Multiple Prime Contractors shall be through the Construction Manager and shall be contemporaneously provided to the Architect if those communications are about matters arising out of or related to the Contract Documents. Communications by and with the Owner's own forces shall be through the Owner.

§ 4.2.7 The Construction Manager and Architect will review and certify all Applications for Payment by the Contractor, in accordance with the provisions of Article 9. The Construction Manager will assemble each of the Contractor's Applications for Payment with similar applications from other Prime Contractors into a Project Application and Certificate for Payment, all of which will be submitted to the Architect with the Construction Manager's recommendations as to certifications in whole or part by the Architect.

§ 4.2.8 The Architect and Construction Manager have authority to reject Work that does not conform to the Contract Documents and will notify each other about the rejection. The Construction Manager shall determine in general whether the Work of the Contractor is being performed in accordance with the requirements of the Contract Documents and notify the Owner, Contractor and Architect of defects and deficiencies in the Work. Whenever the Construction Manager considers it necessary or advisable, the Construction Manager will have authority to require additional inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, upon written authorization of the Owner, whether or not such Work is fabricated, installed or completed. The foregoing authority of the Construction Manager will be subject to the provisions of Sections 4.2.18 through 4.2.20 inclusive, with respect to interpretations and decisions of the Architect. However, neither the Architect's nor the Construction Manager's authority to act under this Section 4.2.8 nor a decision made by either of them in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect or the Construction Manager to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons performing any of the Work.

§ 4.2.9 The Construction Manager will receive and promptly transmit to the Architect all submittals from the Contractor such as Shop Drawings, Product Data and Samples. The Construction Manager's actions will be taken in accordance with the Project submittal schedule approved by the Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness while allowing sufficient time to permit adequate review by the Architect.

§ 4.2.10 The Architect will review and approve or take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Upon the Architect's completed review, the Architect shall transmit its submittal review to the Construction Manager.

§ 4.2.11 Review of the Contractor's submittals by the Architect is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The 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, unless otherwise specifically stated by the Architect, 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.

§ 4.2.11.1 The Architect's review of Contractor's submittals shall be limited to an initial submittal and one (1) resubmittal. If the Architect is required to review additional submittals because the initial submittal and resubmittal failed to conform to the information given and the design concept expressed in the Contract Documents, the amount of compensation paid to the Architect by the Owner for additional services shall be deducted from the payments to the Contractor.

§ 4.2.11.2 The review will not be considered complete until an "ACTION" stamp or other written notice to that effect has been received by the Contractor.

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§ 4.2.12 The Construction Manager will prepare Change Orders and Construction Change Directives.

§ 4.2.13 The Construction Manager and the Architect will take appropriate action on Change Orders or Construction Change Directives in accordance with Article 7 and the Architect will have authority to order minor changes in the Work as provided in Section 7.4. The Architect, in consultation with the Construction Manager, will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.14 Utilizing the documents provided by the Contractor, the Construction Manager will maintain at the site for the Owner one copy of all Contract Documents, approved Shop Drawings, Product Data, Samples and similar required submittals, in good order and marked currently to record all changes and selections made during construction. These will be available to the Architect and the Contractor, and will be delivered to the Owner upon completion of the Project.

§ 4.2.15 The Construction Manager will assist the Architect in conducting inspections to determine the dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion in conjunction with the Architect pursuant to Section 9.8; and receive and forward to the Owner written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10. The Construction Manager will forward to the Architect a final Application and Certificate for Payment or final Project Application and Project Certificate for Payment upon the Contractor's compliance with the requirements of the Contract Documents.

§ 4.2.16 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 duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

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

§ 4.2.18 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.

§ 4.2.18.1 If Work is described or indicated in a manner which makes it impossible to carry out the requirements of the Contract Documents, or should discrepancies appear among the Contract Documents, the Contractor shall request interpretation before proceeding with the Work. If the Contractor fails to make such a request, no excuse will be entertained for failure to carry out the Work of the Contract Documents. Should a conflict occur in or between Contract Documents, the Contractor is deemed to have included in the Contract Sum the more expensive manner of doing the Work.

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

§ 4.2.20 The Construction Manager will receive and review requests for information from the Contractor, and forward each request for information to the Architect, with the Construction Manager's recommendation. The Architect will review and respond in writing to the Construction Manager to requests for information about the Contract Documents. The Construction Manager's recommendation and the Architect's response to each request will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

(Paragraph deleted)

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

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

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§ 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 the bidding requirements, the Contractor, within ten (10) days after award of the Contract, shall furnish in writing to the Construction Manager for review by the Owner, Construction Manager and Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Construction Manager may reply within 14 days to the Contractor in writing stating (1) whether the Owner, the Construction Manager or the Architect has reasonable objection to any such proposed person or entity or, (2) that the Construction Manager, Architect or Owner requires additional time for review. Failure of the Construction Manager, Owner, or Architect to reply within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.1.1 In no case shall payments be made on the Contract until a complete list of Subcontractors has been submitted by the Contractor to the Construction Manager for review by the Owner, Construction Manager, and Architect. Such list shall not be considered complete if the Owner, Construction Manager or Architect has any reasonable objection to any name listed thereon. Such list shall be submitted and resubmitted if necessary until it is considered complete.

§ 5.2.1.2 Subcontractors will not be acceptable unless, when requested by the Owner, Architect or Construction Manager, evidence is furnished by the Contractor that the proposed Subcontractor has satisfactorily completed similar subcontracts as contemplated under this Contract, and has the necessary experience, personnel, equipment, plant and financial ability to complete the proposed subcontract in accordance with the intent of the Contract Documents and the Project Schedule. As verification of financial ability, the Owner reserves the right to request and receive up to five (5) years of financial statements, bank references, bond/insurance company references and all other information required to assess financial ability.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner, Construction Manager or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner, Construction Manager or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner, Construction Manager and Architect have no objection.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner, Construction Manager or Architect makes reasonable objection to such substitution.

§ 5.2.5 The Maintenance of the Project Schedule is critical. The Contractor shall award subcontracts to entities capable of performing in a manner that will maintain the Project Schedule and require its subcontractors to complete their work in accordance with the Project Schedule.

§ 5.2.6 Upon written request from or on behalf of the Owner, the Contractor shall provide to the Owner executed, unredacted copies of all subcontracts, purchase orders or other agreements relating to the Work.

§ 5.3 Subcontractual Relations

§ 5.3.1 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 responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner, Construction Manager and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner, Construction Manager and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed

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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. Each subcontract shall contain provision for execution of lien waivers in form and substance acceptable to the Owner as a condition of payment by the Contractor. The Contractor shall require each Subcontractor to (1) inspect the Project site, including all relevant surfaces and job conditions, before beginning the Work and (2) accept or cite necessary corrections in the Project site, including surfaces or job conditions, before beginning the Work.

§ 5.3.2 The Contractor shall promptly notify the Owner and Architect of any material defaults by any Subcontractor or whether it has terminated its agreement with any of its Subcontractors for any reason.

§ 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 pursuant to Article 14 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 60 days, through no fault of the Subcontractor, 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.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction with Own Forces and to Award Other Contracts

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, which include persons or entities under separate contracts not administered by the Construction Manager, and to award other contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation.

§ 6.1.2 When the Owner performs construction or operations with the Owner's own forces or Separate Contractors, the Owner shall provide for coordination of such forces and Separate Contractors with the Work of the Contractor, who shall cooperate with them.

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

§ 6.1.4 The Contractor accepts assignment of, and liability for, all purchase orders and other agreements for procurement of materials and equipment that are identified as part of the Contract Documents. The Contractor shall be responsible for such pre-purchased items, if any, as if the Contractor were the original purchaser. The Contract Sum includes, without limitation, all costs and expenses in connection with delivery, storage, insurance, installation and testing of items covered in any assigned purchase orders or agreements. All warranty and correction of the Work obligations under the Contract Documents shall also apply to any pre-purchased items, unless the Contract Documents specifically provide otherwise.

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§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor recognizes and acknowledges that the Project is governed by and subject to the provisions of New York State General Municipal Law §101, et seq., governing the award of contracts on public improvement projects. As such, the Contractor recognizes and acknowledges that other Contractors or Separate Contractors will be performing work on the project in conjunction with it. As such, the Contractor shall afford the Owner's own forces and other Contractors or 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.

§ 6.2.1.1 The Contractor shall not commit or permit any act which will interfere with the performance of the work of any other Contractor or Separate Contractor performing work on the Project. If the Contractor sustains any damage through any act or omission of Separate or other Contractors having a contract with the Owner for the performance of work upon the site or of work which may be necessary to be performed for the proper execution of the work to be performed hereunder, or through any act or omission of a subcontractor of such Separate or other Contractor, the Contractor shall promptly notify the Owner and the Construction Manager of such damage

§ 6.2.1.2 The Contractor agrees to defend and indemnify Owner, Architect, Construction Manager, Consultants and Sub-consultants, from all claims made against any of them arising out of the Contractor's acts or omissions or the acts or omissions of any Subcontractor of the Contractor which have caused damage to the Owner, Architect, Construction Manager, Separate Contractor or other Contractor on the Project. The Owner's right to indemnification hereunder shall in no way be diminished, waived or discharged, or by the exercise of any other remedy provided for by the contract or by law. Further, the Owner shall withhold from the Contractor's Contract Sum an amount sufficient to cover such damage and all expenses and costs associated with the damage sustained.

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

§ 6.2.2.1 The Contractor shall promptly correct discrepancies or defects in its Work identified by Separate Contractors as affecting proper execution and results of the work of the Separate Contractors.

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

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

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

§ 6.2.6 Should the Contractor or its Subcontractors cause damage to the work or property of any Separate Contractor or other Multiple Prime Contractor, the Contractor shall, upon due notice, promptly attempt to settle by agreement or otherwise resolve the dispute with the Separate Contractor or other Multiple Prime Contractor. If such separate trade contractor or other Multiple Prime Contractor sues or makes any other claim against the Owner, Construction Manager, or Architect on account of any damage alleged to have been caused by the Contractor or its Subcontractors, the Contractor shall defend, indemnify, and hold harmless the Owner, Construction Manager, and Architect against such claim or proceedings at the Contractor's own expense. The Owner's right to indemnification hereunder shall in no way be diminished, waived or discharged, or by the exercise of any other remedy provided for by the Contract

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Documents or by law. Further, the Owner shall be entitled to withhold from the Contractor's Contract Sum an amount sufficient to cover such damage and all expenses and costs associated with the damage sustained.

§ 6.2.7 When the Work of the Contractor or its Subcontractors overlap or dovetail with that of other Contractors, materials shall be delivered and operations conducted to carry on the Work continuously, in an efficient, workmanlike manner.

§ 6.2.8 In case of interference between the operations of the Contractor and other Contractors, the Construction Manager will be the sole judge of the rights of each contractor and shall have the authority to decide in what manner the Work may proceed, and in all cases its decision shall be final. Any decision as to the method and times of conducting the Work or the use of space as required in this paragraph shall not be basis of any claim for delay or damages by the Contractor.

§ 6.2.9 The Contractor, including its Subcontractors, shall keep itself informed of the progress of other Contractors and shall notify the Architect or the Construction Manager immediately in writing of lack of progress on the part of other Contractors where such delay will interfere with its own operations. Failure of the Contractor to keep informed of the work progressing on the Project and failure to give notice of lack of progress by others shall be construed as acceptance by the Contractor of the status of the work as being satisfactory for proper coordination with the Contractor's Work.

§ 6.2.10 Delays or oversights on the part of the Contractor or its Subcontractors in getting any or all of the Work done in the proper way, thereby causing cutting, removing and replacing Work already in place, shall not be the basis for a claim for extra compensation or additional time.

§ 6.2.11 The Contractor shall promptly correct discrepancies or defects in its Work which have been identified by Separate Contractor(s) or other Contractor(s) as affecting proper execution and results of the work of such other Contractor(s).

§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, Separate Contractors, other Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Construction Manager, with notice to the Architect, will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, only by Change Order, Construction Change Directive or field order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents. The Owner may in its sole discretion reduce the scope of the Contractor's Contract with or without any specific reasons therefor.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Construction Manager, Architect and Contractor; a Construction Change Directive requires agreement by the Owner, Construction Manager and Architect and may or may not be agreed to by the Contractor; a field order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.2.1 Field orders are an interpretation of the Drawings or Specifications which order minor changes in the Contractor's work which will not result in an increase or decrease in the Contract Sum. From time to time, the Architect may issue field orders to the Contractor. The work included in such field order shall be performed by the Contractor at no additional cost to the Owner and shall not form the basis for a claim for an extension of the Contract Time. Hence, the Contractor shall perform the work included in field orders so as to cause no delay to its Work and/or the work of other Contractors or Separate Contractors engaged by the Owner in connection with the Project. All field orders shall be given to the Contractor and the Construction Manager by the Architect in writing.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or field order for a minor change in the Work. Additional work performed without authorization of a Change Order will

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not entitle the Contractor to an increase in the Contract Sum or an extension of the Contract Time. No course of conduct or prior dealings between the parties, nor express or implied acceptance of alterations or additions to the Work, and no claim that the Owner has been unjustly enriched by any alteration or addition to the Work, whether or not there is, in fact, any unjust enrichment of the Owner, shall be the basis for any claim to an increase in any amounts due under the Contract Documents or a change in any time period provided for in the Contract Documents. **No amount shall be payable by the Owner to the Contractor for performance of work without a written and fully executed Change Order.**

§ 7.1.4 Costs for changes in the Work shall not be allowed in excess of usual rentals charged in the area where the Project is located for similar equipment of like size and condition, including costs of necessary supplies and repairs for operating equipment on site in connection with other work unless its use incurs actual and additional costs to Contractor. If equipment not on Site is required for change in work only, cost of transporting equipment to and from Site will be allowed.

§ 7.1.5 When the Owner or Architect (in association with the Construction Manager) request that the Contractor perform work which is not included in the Contract Drawings or Specifications and which will result in additional cost to the Owner, the Architect shall request that the Contractor submit its proposal for performing such additional work. The Contractor shall submit its proposal to the Construction Manager and Architect for review. The Contractor's proposal shall include a complete itemization of the costs associated with performing its work including labor and materials. All proposals for any work that a Contractor, its Subcontractor(s) or Sub-subcontractor(s) perform in connection with additional work shall be properly itemized and supported by sufficient substantiating data, including but not limited to material descriptions, material quantities, material unit prices, labor trade listings, labor hour quantities, labor trade rates, equipment descriptions and equipment rates with a percentage allowance for overhead and profit as set forth in Section 7.3.11.

§ 7.1.6 Overtime, when specifically authorized by the Owner in writing, and not as a corrective measure by the Contractor to expedite the progress of construction as ordered by the Owner based on its determination that the performance of the Work has not progressed to the level of completion required by the approved Schedule, shall be paid for by the Owner on the basis of premium payment only, plus the cost of insurance and taxes based on the premium payment period. Overhead and profit will not be paid by the Owner for overtime.

§ 7.1.7 Costs to which overhead and profit is to be applied shall be determined in accordance with Section 7.3.4. The allowable overhead and profit mark-up shall include, but not be limited to, the following:

.1 home office expense;
.2 field office expense;
.3 supervision;
.4 project management & estimation; and
.5 small tools & equipment.

§ 7.1.8 Unit prices shall be submitted in the Bid Form for various items as set forth therein, and are subject to approval and acceptance by the Owner. The Owner reserves the right to reject any unit price which is unreasonable or unbalanced, as compared with prevailing costs, or as compared with the unit prices submitted by other bidders for the Project. Approved unit prices quoted shall include all profit, overhead, bonds, insurance, labor, materials, equipment, tools, applicable taxes necessary to complete the work item and shall apply to all work added or work deducted.

§ 7.2 Change Orders

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

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

§ 7.2.1.4 Changes in the Work involving additional Work or deletion of Work effecting an addition to or subtraction from the Contract Sum shall not be made until the Contractor submits to the Architect and Construction Manager the cost of the added or deleted Work with a complete and detailed listing of all Subcontractors involved, all materials, labor, overhead and profit and an appropriate Change Order has been issued. If requested, the Contractor shall submit detailed quotations for Subcontractors and material suppliers. Changes in the Work when not involving additions or

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deletions from the Contract Sum shall not be made until the Architect has issued an appropriate Change Order. All Change Orders must have the approval of the Owner, Construction Manager and Architect in writing.

§ 7.2.2 Methods used in determining adjustments to the Contract Sum may include those listed in Section 7.3.3.

§ 7.2.3 Agreement on any Change Order shall constitute a final settlement of all Claims and other matters related to the change in Work that is the subject of the Change Order, including, but not limited to, all direct and indirect costs associated with such change (including, without limitation, all costs of associated delay, interference, acceleration, inefficiency, overhead, as well as costs of material, labor and supervision), and any and all adjustments to the Contract Sum and the Contract Time. Payment of a Change Order shall constitute accord and satisfaction of all Claims of the Contractor in connection with the change or changes to the Contract addressed by the Change Order and it is understood and agreed that a signed Change Order shall be the complete and fully integrated agreement for all related costs and there are no oral or written understandings, reservations, representations or agreements, directly or indirectly, connected with the Change Order and not affirmatively stated on the signed Change Order. In the event a Change Order increases the Contract Sum, the Contractor shall include the Work covered by such Change Orders in Applications for Payments as if such Work were originally part of the Contract Documents.

§ 7.2.4 Upon the Contractor's completion of the Change Order work, and prior to payment being made to the Contractor for such work, the Contractor shall provide the Owner with the following information:

.1 Certified payrolls itemizing the labor actually utilized in connection with the Change Order work; and

.2 Copies of invoices from its Subcontractors supplying work in connection with the Change Order work.

§ 7.2.5 Additional work performed without authorization of a Change Order will not entitle the Contractor to an increase in the Contract Sum or an extension of the Contract Time, except at provided in Section 7.3, and except in the case of an emergency as provided in Section 10.4.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Construction Manager and signed by the Owner, Construction Manager and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order. In the event the Contractor and the Owner cannot agree on the sum by which the Contract Sum or the amount of time by which the Contract Time is to be increased or reduced based upon changes to the scope of the Work as described in Article 7, the Architect or Construction Manager shall issue a Construction Change Directive reflecting the addition to or reduction of the scope of the Contractor's Contract.

§ 7.3.2.1 If the Owner and the Contractor cannot agree that the requested Work properly forms the basis for a Change Order or on the sum by which the Contract is to be increased or reduced based upon changes to the scope of Work, the Architect or Construction Manager shall issue a Construction Change Directive signed by the Owner, Construction Manager and Architect reflecting the addition to, or removal of, the scope of Work and the Contractor shall (a) in the case of additional work to be performed by the Contractor, perform such additional work in an expeditious manner so as not to delay the Work of the Contractor or other Contractors working at the site an keep records of its performance of such additional work, and (b) in the case of work to be removed from the scope of the Contractor's Work, refrain from taking any steps in connection with the work associated with the deduction of the Contractor's Work. The Construction Change Directive shall include: (a) a description of the work being added or removed from the Contractor's scope of Work; (b) the amount the Owner has determined to be the cost associated with the additional work (as those costs are identified and limited in Section 7.3.4) or removal of the scope of the Contractor's Contract until the Owner and the Contractor agree upon the increase or decrease in the Contractor's Contract Sum, or until a claim filed by the Contractor has been determined; and (c) the extent to which the Contract Time will be adjusted as a result of the change in the scope of Work. Any claims must be filed in accordance with the requirements set forth in Article 15 of these General Conditions. Failure to timely file any claim in accordance with requirements set forth therein shall constitute a waiver of such claim.

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§ 7.3.3 If the Construction Change Directive provides for a method 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 (unit prices shall be deemed to include all costs and expenses for the Contractor's changed Work, including costs of general conditions, insurance/bonds and overhead and profit attributable to the change);

.3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee subject to the limitations of Section 7.3.11; or

.4 As provided in Section 7.3.4 subject to the limitations of Section 7.3.11.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Construction Manager shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in Section 7.3.11. In such case, and also under Section 7.3.11, the Contractor shall keep and present, in such form as the Construction Manager may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

.1 Actual costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers compensation insurance;

.2 Actual costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;

.3 Actual rental costs of machinery and equipment, exclusive of hand tools, rented from third parties; and

.4 Actual costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the additional work.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Construction Manager of the Contractor's agreement or disagreement with (1) the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time or (2) the amount of the increase or decrease in the Contract Sum and Contract Time as provided in Section 7.3.2.1. Any claims must be filed in accordance with the requirements set forth in Article 15 of these General Conditions. Failure to timely file any claim in accordance with requirements set forth therein shall constitute a waiver of such claim.

§ 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 When the Owner or Architect request that portions of the Contractor's Work originally included in the Drawings or Specifications be deleted and which will result in a reduction of the Contract Sum, the Architect shall request that the Contractor submit its proposal for deleting the scope of such Work from the Contract. The Contractor's proposal shall include a complete itemization of the costs associated with deducting such Work including labor, materials, overhead and profit. The Contractor shall not be entitled to retain its overhead or profit for such work nor shall any of its Subcontractors which were to perform the work being deducted from the Contractor's scope of Work. Additionally, the Contractor shall reflect the reduced cost of premiums on bonds which are to be supplied herein as a result of such change. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Construction Manager and Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Construction Manager and Architect determine to

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be reasonably justified. The interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

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

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

.1 For the Contractor, for Work performed by the Contractor's own forces, fifteen percent (15%) of the direct cost for labor and materials.

.2 For the Contractor, for Work performed by the Contractor's Subcontractor, maximum of five percent (5%) of the amount due the Subcontractor for the Contractor's overhead and profit. For the Subcontractor, for Work performed by the Subcontractor's own forces, ten percent (10%) of the direct cost for labor and materials. The total combined overhead and profit for a change order shall be limited to 15% of the direct cost regardless if the Work is performed by the Contractor or the Subcontractor.

.3 The markup on any part of the Work a Subcontractor subcontracts will be limited to one overhead and profit figure, in addition to the Contractor's overhead and profit markup. The Subcontractor and Sub-subcontractor may divide the overhead and profit amount as they agree upon.

.4 Cost to which overhead and profit is to be applied shall be determined in accordance with Section 7.3.7.

.5 In order to facilitate checking of quotations for extras and credits, all proposals, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs including labor, materials, and subcontracts. Labor and material shall be itemized in the manner prescribed above. Where major cost items are subcontracts, they shall be itemized also.

.6 Overhead and profit mark-up shall include, but not be limited to, the following:

- **.1** home office expense;
- **.2** field office expense;
- **.3** supervision;
- **.4** project management & estimation;
- **.5** small tools & equipment;
- **.6** research & layout;
- **.7** inspections & permits;
- **.8** material handing;
- **.9** record drawings: and
- **.10** safety and cleanup

§ 7.4 Minor Changes in the Work

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

ARTICLE 8 TIME

§ 8.1 Definitions

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

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement. The date shall not be postponed or extended by the failure to act of the Contractor or persons or entities for whom the Contractor is responsible to act.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8. The date of final completion is the date certified by the Architect and Owner in accordance with Section 9.10. Unless

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otherwise agreed in writing by the Owner, the Contractor agrees that Final Completion shall occur not more than 30 calendar days after the date of Substantial Completion.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.1.5 Work remaining to be completed after Substantial Completion, shall be limited to items which can ordinarily be completed within a thirty (30) day period (one month) before final payment is made.

§ 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 and the Owner's approval of such insurance. The date of commencement of the Work shall not be changed by the effective date of such insurance. The Work can not start until the required insurance and bonds are provided and the Contract has been executed.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion and final completion within the Contract Time. The Contractor agrees that the Work shall be prosecuted regularly, diligently and uninterruptedly at such rate of progress as will **ensure** full completion thereof within the Contract Time specified and, further, to provide such protections as may be necessary. It is expressly understood and agreed by the Contractor that the time for the substantial and final completion of the Work is a reasonable time for its completion, taking into consideration, among other things, the average climatic range and usual weather conditions prevailing in the Project's locality.

§ 8.2.4 In no case shall the Contractor delay the progress of the Work, or any part thereof, on account of changes in the Work or disputes caused by proposed or ordered changes in the Work (including the equitable value of the changes), or any disputes or disagreements as to the Work or extra work.

§ 8.2.5 If the Contractor does not achieve the completion date and milestone date for each work item in the Contract, a milestone or critical path date reflected on the Project Schedule, or the date of Substantial Completion for the Work or any part thereof, the Contractor shall be responsible for all direct and consequential damages to Owner arising from any delay of the Contractor, its Sub-Contractors, Sub-subcontractors, and suppliers, in performing or completing the Work in accordance with the time requirements of the Contract, by way of example but not as a limitation: (i) additional architectural and construction management fees related to extended services; (ii) additional project management costs; (iii) financing costs (including delayed or lost State Building Aid); (vi) temporary storage and dislocation costs; and (v) costs related to the disruption or relocation of the Owner's personnel, academic and other departments, including equipment and machinery, affected by the Owner's inability to timely occupy the Project facilities. The Owner shall have the right to deduct the amount of the foregoing damages from any payment then due or thereafter becoming due from the Owner to the Contractor. If the Contract Sum is exhausted, the Contractor shall pay such amounts to the Owner on demand.

§ 8.2.6 In the event the Contractor fails to complete all Work under this Contract by said scheduled dates, the Contractor will not be permitted to perform any work during normal school hours without the express written authorization of the Owner. Such Work shall only be performed after school hours, Saturdays, Sundays, holidays or periods when school is unoccupied at no additional cost of any kind to the Owner. In addition to damages incurred by the Owner in connection with the Contractor's delay, the Contractor shall be liable for all costs incurred by the Owner to provide staff, Architect and Construction Manager personnel as required to make facility accessible by Contractor and perform inspections during such off hours.

§ 8.2.7 The Contractor understands that in order to meet the requirements of the Project schedule, including intermittent milestone and critical path dates set forth in the Contract Documents, it may be required to work its personnel and equipment overtime on regular work days and on Saturdays and holidays, the cost of which is included in the Contract Sum. If the Owner specifically approves in writing reimbursement for overtime, the Contractor shall be paid by the Owner on the basis of the premium payment.

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§ 8.2.8 The Owner shall have the right at any time to modify the Project Schedule; to suspend, delay or accelerate, in whole or in part, the commencement or execution of the Work or any potion thereof or to vary the sequence thereof; and to prescribe the time, order and priority of the various portions of the Work, and all other matters relating to the scheduling of the Work. The Contractor shall not be entitled to additional compensation for any such decisions made by the Owner.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed in the commencement or progress of the Work as a result of: Acts of God (such as tornado, flood, hurricane, pandemics [see exception below], epidemics, etc. making performance temporarily impossible); the negligent acts or omissions of the Owner, Architect, Construction Manager, other Contractors, or their agents or employees; strikes, lockouts or other labor disturbances (not arising from the labor practices of Contractor or its Subcontractors, Suppliers, or Sub-subcontractors to comply with their obligations arising under the Contract); unusually adverse weather conditions; freight embargoes (provided that delays by the Contractor, its Subcontractors, Sub-subcontractors or Suppliers do not constitute an excusable cause of delay); changes in the work to be performed by the Contractor (not caused or resulting from the failure of the Contractor or its Subcontractors, Suppliers or Sub-subcontractors); or changes to laws or regulations after the effective date of the Contract, provided the Contractor has used all reasonable efforts to mitigate the foregoing causes; then the Contractor shall be entitled to a day for day extension of the Contract Time for the established delay to the critical path of the Work subject to the provisions of this Article 8 and Article 15. All other delays of the Project, including but not limited to, Architect review and/or approval of shop drawings or other submittals, requests for information, clarifications, samples, and change orders; Owner schedule; Architect certification of payment; payment by Owner of Contractor's Application for Payment; coordination among the Multiple Prime Contractors; unavailability of materials and/or equipment; surveying/testing; closeout, etc. are deemed to be foreseeable and contemplated and, therefore, shall not form the basis for a claim for an extension of time or additional compensation by the Contractor. **Conditions caused by the COVID-19 pandemic or epidemic, or any variants of the disease, shall not form the basis of an excuse under this section. No additional time or compensation shall be provided to the Contractor for COVID-19 or any variant.**

§ 8.3.1.1 The Contractor further acknowledges and agrees that adjustments in the Contract Time will be permitted for a delay only to the extent such delay (1) is not caused or could not have been anticipated by the Contractor, (2) could not be limited or avoided by the Contractor's timely notice to the Owner of the delay or reasonable likelihood that a delay will occur, and (3) is of a duration of more than one (1) day.

§ 8.3.1.2 The Contractor's inability to secure sufficient personnel for the performance of the Work shall not constitute a basis for an extension of time. The Contractor shall not be entitled to an extension of time if the Architect or Construction Manager stops the Work due to the existence of or reasonable suspicion of a deficiency in the Work.

§ 8.3.1.3 An extension of the Contract Time, if requested by the Contractor, shall only be considered after the Contractor has made reasonable effort to recover the lost time. An extension, or extensions, of time may be granted subject to the provisions of this Article 8, but only after written application therefore by the Contractor. An extension of time shall be only for the number of days of delay which the Architect may determine to be due solely to the causes set forth in the application for extension of time. The Contractor shall not be entitled to receive a separate extension of time for each one of several causes of delay operating concurrently; but if at all, only the actual period of delay as determined by the Construction Manager or Architect.

§ 8.3.1.4 All requests for additional time shall be made in writing, delivered to the Construction Manager within five (5) days from the time when the circumstance with potential for delay becomes reasonably known to the Contractor, supported by documentation which demonstrates to the Architect and Construction Manager's satisfaction that the critical path of the Work has been significantly altered by the delays to the activities in question, and that the Project schedule cannot be maintained by re-ordering other activities within the Project at no cost. This request shall also contain, at a minimum, the following information: (1) date of start of delay; (2) specific cause of delay; (3) effect of delay on construction progress; and (4) date of termination of delay. Upon receipt of the Contractor's request for an extension of time, the Owner will ascertain the facts and extent of the delay, and may, in its sole discretion, extend the time for completion of the Contractor's Work when in its judgment such an extension is justified. The Owner's determination will be final and binding in any litigation commenced by the Contractor against the Owner which arises out of the Owner's denial of an extension of time to the Contractor. Any approval of an extension of the Contractor's

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time to complete its Work shall be memorialized by written change order, signed by the Owner, Contractor, Architect and Construction Manager. When the Owner determines that the Contractor will be granted an extension of time, such extension shall be computed in accordance with the following: for each day of delay in the completion of its Work, the Contractor shall be allowed one day of additional time to complete its Contract. The Contractor shall not be entitled to receive a separate extension of time for each one of several causes of delay operating concurrently; rather, only the actual period of delay as determined by the Owner or its Architect may be allowed.

§ 8.3.1.5 Failure of the Contractor to give written notice as required by Section 8.3.1.4 or to strictly comply with the requirements of Article 8 shall be deemed conclusively to be a waiver and release of such claim, and such notice shall be a condition precedent to the Contractor's right to make a claim for any claim arising out of, under or in connection with the Contractor or the performance of the Work.

§ 8.3.2 Notwithstanding anything to the contrary in the Contract Documents, an extension in the Contract Time, to the extent permitted and justified under Section 8.3.1, shall be the sole remedy of the Contractor for, and the Contractor waives its right to any claim for damages to the extent arising from, any (1) delay in the commencement, prosecution, or completion of the Work; (2) hindrance or obstruction in the performance of the Work; (3) loss of productivity or acceleration; or (4) other claims for disruption, interference, inefficiencies, impedance, hindrance, acceleration, resequencing, schedule impacts, lack of timeliness by the Owner or its consultants, and lack of coordination, errors or omissions in the design of the Project, cumulative impact of multiple change orders, delay and other impacts (collective referred to herein as "Delay(s)"). In no event shall the Contractor be entitled to any compensation or recovery of any damages in connection with any Delay, including, but not limited to, delay costs, loss of productivity or efficiency, lost profits, extended jobsite general conditions and home office overhead, consequential damages, lost opportunity costs, impact damages, or other similar remuneration. The Owner's exercise of any of its rights or remedies under the Contract Documents (including, but not limited to, ordering changes in the Work, or directing suspension, rescheduling or correction of the Work), regardless of the extent or frequency of the Owner's exercise of such rights or remedies, shall not be construed as interference, hindrance or obstruction with the Contractor's performance of the Work and shall not entitle the Contractor to any additional compensation. The Contractor shall include a no-damages-for-delay clause in all subcontracts for the performance of the Work.

§ 8.3.3 Delays that affect the scheduled completion of the Work and are attributable to interference between Multiple Prime Contractors, Separate Contractors, Subcontractors, suppliers, utility companies or municipalities, shall be compensated solely by the granting of an extension of time to the Contractor by the Owner to complete the Work without charges to the Owner. The parties acknowledge that the Contract Time takes into account the time necessary for review of shop drawings, design errors or omissions, coordination amongst Contractors, change orders, delays incurred by seasonal limitations and other administrative processing by all parties involved and are not compensatory. The Contractor agrees that it has included in its Bid prices the additional cost of doing work under this Contract caused by interference of other Prime Contractors, Separate Contractors, Subcontractors, etc. and the other non-compensatory Delays described above.

§ 8.3.4 When the Contract Time has been extended, as provided under Section 8.3, such extension of time shall not be considered as justifying extra compensation to the Contractor for administrative costs, home office, estimating, extended general conditions or other similar impact costs. The Contractor acknowledges that in agreeing to the Contract Sum it assessed the potential impact of the limitations in Section 8.3.2 on its ability to recover additional compensation in connection with a Work delay, interference, impact or hindrance and agrees that those limitations shall apply regardless of the accuracy of the Contractor's assessment or actual costs incurred by the Contractor.

§ 8.3.5 If the Contractor submits a progress report indicating, or otherwise expresses an intention to achieve, completion of the Work prior to any completion date required by the Contract Documents or expiration of the Contract Time, no liability of the Owner to the Contractor for any failure of the Contractor to so complete the Work shall be created or implied.

§ 8.3.6 The intent of the Contract is for Work to follow a logical sequence. The Contractor, however, may be required by the Owner, Construction Manager or Architect to temporarily omit or leave out any section of Work or perform Work out of sequence. Out of sequence work and come back time to these areas shall be performed at no additional cost to the Owner.

§ 8.3.7 Claims relating to Contract Time shall be made in accordance with applicable provisions of Article 15.

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§ 8.4 LIQUIDATED DAMAGES

§ 8.4.1 Contractor realizes that time is of the essence on this Contract and the Construction Schedule shall be submitted per Sections included herein. In the event the Contractor fails to submit a Construction Schedule by said date, the sum per calendar day of ($1000) ONE THOUSAND DOLLARS will be subtracted from the Contract Sum due the Contractor in the form of a change order.

§ 8.4.2 Contractor realizes that time is of the essence on this Contract and the completion date for any work or the date of Substantial Completion shall be no later than the date indicated in these Contract Documents. The Contractor understands that the substantial disruption of the School District's educational process will occur if the project is not completed by the dates outlined in Division 1 of the specifications. In the event that the Contractor fails to complete any work or substantially complete the work under the Contract by said schedule, the sum per calendar day of ($1,000) ONE THOUSAND DOLLARS will be deducted from the Contract Sum due the Contractor in the form of a change order, except in cases where a delay is due to unforeseeable causes beyond the control and without the fault or negligence of the Contractor, including acts of God, or of the Public enemy, acts of the government, in either sovereign or contractual capacity, fires, floods, epidemics, **(except COVID-19 or its variants)** quarantine restrictions **(except from COVID-19 or its variants),** freight embargos, or delays of Subcontractors or suppliers due to such causes. Delays in acquisition of materials other than by reason of freight embargoes will not constitute a delay excusable under this provisions unless approved by the Owner in writing.

Within five (5) calendar days from the occurrence of any such delay, the Contractor shall notify the Owner in writing the cause of delay. The Owner will ascertain the facts and extent of the delay, and extend the time for completing the Work when in his judgment the findings of fact justify such an extension. Owner's findings of fact will be final and binding on any litigation.

The said sum per calendar day shall constitute the Liquidated Damages incurred by the Owner for each day of the delay beyond the agreed upon dates. Such Liquidated Damages shall be in addition to any other damages (other than by reason of delay) Owner may incur as a result of Contractor's breach of Contract.

In the event the Contractor fails to complete all work under this Contract by said scheduled dates, the Contractor will not be permitted to perform any work during the normal school hours. Such work shall only be performed after school hours, Saturdays, Sundays, holidays or periods when school is unoccupied at no additional cost of any kind to the Owner. In addition to Liquidated Damages, the Contractor shall be liable for all additional costs incurred by the Owner to provide staff, Architect, and Owner's Representative personnel as required to make facility accessible by Contractor and perform inspections during such off hours. In the event that the completion dates are not met, inspections will be performed once each week unless, the Owner or the Architect determine, at their sole discretion, that additional inspections are needed.

All costs incurred by the Owner, Owner's Representative, Architect, Architect's consultants, for the cost of additional inspections, at the rate of ($800) EIGHT HUNDRED DOLLARS per inspection or more due to time requirements, will be subtracted from payment due the Contractor. If the amount due the Contractor for payment is insufficient, any deficiency shall be paid by the Contractor to the Owner. Additionally, a cost of $750 per day for extended Construction Management time will be charged to the Contractor causing the delay.

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. Notwithstanding anything to the contrary contained in the Contract Documents, the Owner may withhold or offset any payment to the Contractor if and for so long as the Contractor fails to perform any of its obligations under any of the Contract Documents; provided, however, that any such holdbacks shall be limited to an amount sufficient in the reasonable opinion of the Owner to cure any default or failure of performance by the Contractor.

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§ 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

§ 9.2.1 Within 30 days of Contract Award, the Contractor shall submit to the Construction Manager a schedule of values allocated to various portions of the Work for each building, prepared in the currently authorized form of AIA Document G703 – Continuation Sheet and supported by such data to substantiate its accuracy as the Construction Manager and Architect may require. This schedule, unless objected to by the Construction Manager or Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. The schedule of values shall state the names of all Subcontractors, Sub-subcontractors and material suppliers and the amounts to become due to each breakdown by specification section. The schedule of values shall contain, along with individual work items, separate line items for (1) mobilization, bonds, insurance, etc., (2) value of administrative close out submittals, (3) Allowance(s) if required elsewhere in the Project Manual, (4) separate subtotals by building, and (5) buildings further separated between "Additions/New Construction" and "Renovations/Reconstruction" as applicable. At the direction of the Architect, it shall include quantities, if applicable. The total for all items shall aggregate the Contract Sum.

§ 9.2.2 Any schedule of values that fails to include sufficient detail, is unbalanced or exhibits "front loading" of the value of the Contractor's Work will be rejected. Furthermore, if the schedule of values has been approved by the Construction Manager and the Architect and is subsequently used, but later is found by the Construction Manager or Architect to be improper for any reason, sufficient funds shall be withheld from the Contractor's future applications for payment to ensure an adequate reserve (exclusive of normal retainage) to complete the Contractor's Work.

§ 9.2.3 The schedule of values shall be drafted so as to reflect multiple construction sites, multiple locations within each site, additions versus renovations of work, and the like so as to satisfy any New York State Education Department requirements for the Project.

§ 9.3 Applications for Payment

§ 9.3.1 In accordance with Article 5 of the Agreement and the Payment Procedures in the Specifications, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, notarized and reflecting retainage as provided elsewhere in the Contract Documents. Applications for Payment will be in the currently authorized form of AIA Document G732 - 2019, "Application and Certificate for Payment," accompanied by AIA Document G703-1992, "Continuation Sheet," and must include (add and/or deduct) adjustments to the Contract Sum resulting from Work performed under approved Change Orders (specified under Article 7) and shall be shown separately on the application for previous and current periods. Each Application and Certificate of Payment shall be accompanied by two (2) copies of the Pay Application Lien Waiver and Release in the form set forth in the Payment Procedures in the Specifications. Each Application for Payment shall be prepared in such form and supported by such data to substantiate the Contractor's right to payments as the Owner, Construction Manager or Architect may require such as copies of requisitions from Subcontractor and material suppliers. Each Application for Payment forwarded to the Owner by the Construction Manager or Architect shall be subject to audit and approval by the Owner in accordance with the Owner's normal audit.

§ 9.3.1.1 The Construction Manager and Architect shall review the application for payment submitted by the Contractor and shall advise the Contractor of any adjustments to be made thereto. The Construction Manager and/or the Architect may make such adjustments under the circumstances set forth in Section 9.5.1. If any such adjustments are made by the Architect or Construction Manager, the Contractor shall submit an original itemized revised application with all documentation required by Section 9.3.1.

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

§ 9.3.1.3 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 material supplier unless such Work has been performed by others whom the Contractor intends to pay.

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§ 9.3.1.4 Until Substantial Completion, the Owner shall pay ninety-five percent (95%) of the amount due the Contractor on account of progress payments, less an amount necessary to satisfy any claims, liens, or judgments against Contractor, which have not been suitably discharged. In accordance with Section 9.8.5, the Owner shall pay the entire amount retained from previous progress payments less two (2) times the amount required to complete items identified in a list prepared in accordance with Section 9.8.2 and the amount required to satisfy any outstanding claims, liens, or judgments against the Contractor.

§ 9.3.1.5 The Contractor and its Subcontractors are required to submit certified payroll information to the Owner in accordance with New York State Law.

§ 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 Project site for subsequent incorporation in the Work. If approved in advance in writing 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. The costs of applicable insurance, storage, and transportation to the site for such materials and equipment stored off the site shall not increase the Contract Sum.

§ 9.3.2.1 Payment may be made for materials and equipment delivered and suitably stored on-site for future incorporation in the Work, subject to the following conditions:

.1 Request for payment shall be considered for material or equipment, which is in short or critical supply, which has been specially fabricated for the Project or, at the discretion of the Construction Manager and Architect, for other materials or equipment.

.2 A request for payment of material stored on-site must be made by the Contractor ten (10) days prior to actual, monthly cut-off date for Payment Applications.

.3 Procedures required by the Owner shall include, but not necessarily limited to, submission by the Contractor to the Construction Manager and Architect of bills of sale and bills of lading for such materials and equipment, provisions of opportunity for the Construction Manager's and Architect's visual verification that such materials and equipment are in fact in storage; and, if stored off-site, submission by the Contractor of verification that such materials and equipment are stored in a bonded warehouse.

.4 All such materials and equipment, including materials and equipment stored on-site but not yet incorporated into the Work, upon which partial payments have been made shall become the property of the Owner, but the care and protection of such materials and equipment shall remain the responsibility of the Contractor until incorporation into the Work and accepted by the Owner at substantial completion, including maintaining insurance coverage on a replacement cost basis without voluntary deductible.

§ 9.3.2.2 Payment may be made for materials and equipment delivered and suitably stored off-site for future incorporation in the Work, subject to the following conditions:

.1 The Contractor shall submit: a written validation by the Owner, Construction Manager or Architect that such materials are stored safely off site, in the quantities and condition stated by the Contractor; a copy of an invoice for the material and equipment; a bill of sale or equivalent indication of the quantity and value of the material or equipment; a written statement indicating the location and method of storage; and property insurance certificate or rider covering the specific material or equipment, which shall name the Owner as an additional insured party.

.2 The Contractor shall submit a verification that such materials and equipment are stored in a bonded warehouse.

.3 A request for payment of material stored off-site must be made by the Contractor 10 days prior to actual, monthly cut-off date for Payment Applications.

.4 All such materials and equipment upon which partial payments have been made shall become the property of the Owner, but the care and protection of such materials and equipment shall remain the responsibility of the contractor until incorporation into the Work and accepted by the Owner at substantial completion, including maintaining insurance coverage on a replacement cost basis without voluntary deductible.

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§ 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, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

§ 9.3.4 The Contractor further expressly undertakes to defend the Indemnitees (as defined previously in Section 3.18), at the Contractor's sole expense, against any actions, lawsuits or proceedings brought against Indemnitees as a result of liens filed against the Owner, the Work, the site of any of the Work, the Project site and any improvements thereon, payments due the Contractor or any portion of the property of any of the Indemnities (referred to collectively as liens in this Section 9.3.4). The Contractor hereby agrees to defend, indemnify, and hold Indemnitees harmless against any such liens or claims of lien and agrees to pay any judgment or lien resulting from any such actions, lawsuits, or proceedings.

§ 9.3.5 The Owner shall release any payments withheld due to a lien or a claim of lien if the Contractor obtains security acceptable to the Owner or a lien bond which is: (1) issued by a surety acceptable to the Owner, (2) in form and substance satisfactory to the Owner, and (3) in an amount not less than One Hundred Fifty percent (150%) of such lien claim. By posting a lien bond or other acceptable security, however, the Contractor shall not be relieved of any responsibilities or obligations under this Section 9.3, including, without limitation, the duty to defend and indemnify the Indemnities in an action on the lien, lien discharge bond or underlying debt. The cost of any premiums incurred in connection with such bonds and security shall be the responsibility of the Contractor and shall not be part of, or cause any adjustment to, the Contract Sum.

§ 9.4 Certificates for Payment

§ 9.4.1 The Construction Manager will, within seven (7) days after the Construction Manager's receipt of the Contractor's Application for Payment, review the Application, certify the amount the Construction Manager determines is due the Contractor, and forward the Contractor's Application and Certificate for Payment to the Architect. Within seven (7) days after the Architect receives the Contractor's Application for Payment from the Construction Manager, the Architect will either issue to the Owner a Certificate for Payment, with a copy to the Construction Manager, for such amount as the Architect determines is properly due, or notify the Construction Manager and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1. The Construction Manager will promptly forward to the Contractor the Architect's notice of withholding certification.

§ 9.4.2 Where there is more than one Contractor performing portions of the Project, the Construction Manager will, within seven (7) days after the Construction Manager receives all of the Contractors' Applications for Payment: (1) review the Applications and certify the amount the Construction Manager determines is due each of the Contractors; (2) prepare a Summary of Contractors' Applications for Payment by combining information from each Contractor's application with information from similar applications for progress payments from the other Contractors; (3) prepare a Project Application and Certificate for Payment; (4) certify the amount the Construction Manager determines is due all Contractors; and (5) forward the Summary of Contractors' Applications for Payment and Project Application and Certificate for Payment to the Architect.

§ 9.4.2.1 Within seven (7) days after the Architect receives the Project Application and Project Certificate for Payment and the Summary of Contractors' Applications for Payment from the Construction Manager, the Architect will either (1) issue to the Owner a Project Certificate for Payment, with a copy to the Construction Manager; or (2) issue to the Owner a Project Certificate for Payment for such amount as the Architect determines is properly due, and notify the Construction Manager and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Project Application for Payment, and notify the Construction Manager and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1. The Construction Manager will promptly forward the Architect's notice of withholding certification to the Contractors.

§ 9.4.3 The Construction Manager's certification of an Application for Payment shall be based upon the Construction Manager's evaluation of the Work and the information provided as part of the Application for Payment. The Construction Manager's certification will constitute a representation that, to the best of the Construction Manager's knowledge, information and belief, the Work has progressed to the point indicated and the quality of the Work is in

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accordance with the Contract Documents. The certification will also constitute a recommendation to the Architect and Owner that the Contractor be paid the amount certified.

§ 9.4.4 The Architect's issuance of a Certificate for Payment shall be based upon the Architect's evaluation of the Work, the recommendation of the Construction Manager, and information provided as part of the Application for Payment. The Architect's certification will constitute a representation that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated, that the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified.

§ 9.4.5 The representations made pursuant to Sections 9.4.3 and 9.4.4 are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Construction Manager or Architect.

§ 9.4.6 The issuance of a separate Certificate for Payment or a Project Certificate for Payment will not be a representation that the Construction Manager or Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed the Contractor's construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Construction Manager or Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Construction Manager's or Architect's opinion the representations to the Owner required by Section 9.4.4 and 9.4.5 cannot be made. If the Construction Manager or Architect is unable to certify payment in the amount of the Application, the Construction Manager will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor, Construction Manager 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 Construction Manager or Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence or subsequent observations, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Construction Manager's or Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from the acts and omissions described in Section 3.3.2 because of

.1 defective Work not remedied;
.2 third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
.3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
.4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
.5 damage to the Owner, another Prime Contractor 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;
.7 failure to carry out the Work in accordance with the Contract Documents;
.8 receipt by the Owner of a notice of withholding from the New York State Department of Labor or other administrative agencies having jurisdiction over the Project;
.9 failure to comply with applicable federal, state or local statutes, regulations, and/or laws, including, without limitation, laws and regulations applicable to the provision of certified payrolls;
.10 failure of the Contractor to provide executed performance and payment bonds and a current certificate of insurance and endorsements;
.11 reasonable evidence that the Work has not progressed as indicated on the Application for Payment;
.12 damages caused to the Owner, Construction Manager, the Architect or another Contractor as a result the Contractor's performance of its Work;
.13 the Architect's and/or the Construction Manager's discovery or observation of work which has been previously paid for by the Owner which is defective and/or incomplete;
.14 The amount requested exceeds the percent completion of Work on the site; or
.15 breach of this Agreement.

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Notwithstanding the extent to which the Construction Manager and/or Architect certify an Application for Payment, the Owner shall have the right to withhold payment, in whole or in part, should the Owner determine that any of the grounds for withholding certification set forth in this Section 9.5.1 do in fact exist. If the Owner withholds payment, in whole or in part, the Owner shall promptly provide to the Contractor, Architect and Construction Manager a written explanation of the reason(s) for which payment is withheld and shall promptly pay, in accordance with the Contract Documents, all amounts which are not in dispute.

§ 9.5.2 If the Contractor disputes any determination by the Owner, Construction Manager or Architect with regard to any Certificate for Payment or in the event of a bona fide dispute between the Contractor and Owner, the Contractor nevertheless shall expeditiously continue to prosecute the Work and may submit a Claim in accordance with Article 15.

§ 9.5.3 When the above reasons for withholding certification or the Owner's withholding of payment are removed, certification will be made for amounts previously withheld.

§ 9.5.4 If the Architect or Construction Manager withholds certification for payment under Section 9.5.1, or if the Owner otherwise deems it necessary to protect its interests or the interests of the Project, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Construction Manager and both will reflect such payment on the next Certificate for Payment.

§ 9.5.5 Notwithstanding anything above to the contrary, the Owner has the right to withhold payment to the Contractor to protect itself against damages incurred or which may be incurred as a result of the Contractor's breach or negligence, including, but not limited to, the items set forth in Section 9.5.1. With respect to any liens, claims, or other circumstances for which the Owner is entitled to withhold payments pursuant to decisions by the Architect pursuant to Section 9.5.1, the Owner shall be entitled to withhold a sum equal to twice the stated amounts of such liens or claims, or, where there is no stated amount, twice the amount determined by the Architect to be necessary to protect the interests of the Owner. The Owner will release payments withheld due to liens provided that the Contractor obtains a discharge of record of such lien, by bonding or otherwise. By posting a lien discharge bond, however, the Contractor shall not be relieved of any responsibilities or obligations under the Agreement, including, without limitation, the duty to defend, indemnify, and hold harmless the Indemnitees (as defined previously in Section 3.18). The cost of any premiums or other expenses incurred in connection with such bonds or other means of discharge of record shall be the sole responsibility of the Contractor and shall not be part of, or cause any adjustment to, the Contract Sum.

§ 9.5.6 If the Owner is entitled to reimbursement or payment from the Contractor under or pursuant to the Contract, including but not limited to these General Conditions, such payment shall be made promptly upon demand by the Owner. Notwithstanding anything contained herein to the contrary, if the Contractor fails to promptly make any payment due the Owner, or the Owner incurs any costs and expenses to cure any default of the Contractor or to correct defective work, the Owner shall have an absolute right to offset such amount against the Contract Sum and may, in the Owner's sole discretion, elect either to: (1) deduct an amount equal to that which the Owner is entitled from any payment then or thereafter due the Contractor from the Owner, or (2) issue a written notice to the Contractor reducing the Contract Sum by an amount equal to that which the Owner is entitled.

§ 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 unless such requisition is not in accordance with the terms of the Contract Documents, and shall so notify the Construction Manager and Architect.

§ 9.6.2 Payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held in trust by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contracts with the Contractor for which payment was made by the Owner. The Contractor shall strictly comply with any common law, statutory, or decisional law trust fund requirements in the State of New York (including, without limitation, the requirements of New York Lien Law Article 3-A), and hereby agrees that the Owner has the same rights as any beneficiary of such trusts to examine the books and records of the Contractor to determine such compliance, from time to time at the Owner's sole discretion. The Contractor shall promptly pay each Subcontractor, upon receipt of payment from the Owner, out of the amount paid to the Contractor on account of such

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Subcontractor's portion of the Work, the amount to which said Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of such 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 similar manner.

§ 9.6.2.1 Within seven (7) days of receipt of a payment from the Owner, the Contractor shall pay each of its Subcontractors and suppliers for work performed and materials furnished by them as reflected in the payment from the Owner, less an amount necessary to satisfy any outstanding claims, liens, or judgments and less a retained amount of not more than 5%, except that the Contractor may retain not more than 10% provided that prior to entering into a Subcontract with the Contractor, the Subcontractor is unable or unwilling to provide a performance bond and labor and material payment bond both in the full amount of the subcontract at the request of the Contractor. The Contractor shall not retain portions of the proceeds owed any Subcontractor or supplier from the Owner's payment to the Contractor for the "contract balance." Similar provisions apply to the Subcontractor and/or supplier paying each of its Subcontractors and suppliers. Nothing in this Section shall create in the Owner any obligation to pay, or to ensure that the Contractor pays, any Subcontractor or supplier, or any relationship in contract or otherwise, implied or expressed, between any Subcontractor or supplier and the Owner. The Contractor agrees that it shall comply with the payment requirements of Section 106-b(2) of the New York General Municipal Law, as amended, and that to the extent there is any conflict between that statutory section and the provisions of this Section 9.6.2.1, the provisions of the statute shall prevail.

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

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven (7) days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner nor Construction Manager nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to its 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 Payments received by the Contractor for Work properly performed by Subcontractors and 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, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

(Paragraph deleted)

§ 9.7 Failure of Payment

§ 9.7.1 If, through no fault of the Contractor, the Construction Manager and Architect do not issue a Certificate for Payment within 20 days of the Construction Manager's receipt of the Contractor's Application for Payment or if, through no fault of the Contractor, the Owner does not pay the Contractor the amount certified by the Construction Manager and Architect, subject to the Owner's right to withhold payment under the terms of the Contract Documents, within 30 days of the date established for such payment in the Contract Documents, then the Contractor may, upon seven (7) additional days' written notice and opportunity to cure to the Owner, Construction Manager and Architect, stop the Work until payment of the amount owing has been received. To the extent it is determined that payment to the Contractor was improperly held through no fault of the Contractor and the Contractor elected to stop its Work consistent with the procedure set forth in this Section, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up as provided for in the Contract Documents. However, if the Contractor stops its Work and it is determined that the

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Owner had the right to withhold payment under the terms of the Contract Documents, then the Contractor shall be responsible to the Owner for all costs and damages (including attorneys' fees) arising from such stoppage of Work and the Contractor shall not be entitled to any adjustment in the Contract Sum or the Contract Time. This Section shall not apply: (a) to the extent that the Contractor owes to the Owner any amount pursuant to the provisions of this Contract, or (b) to the extent the Owner is required to expend amounts to purchase additional insurance on behalf of the Contractor to meet the insurance requirements of this Agreement.

§ 9.7.2 If the Owner is entitled to payment from the Contractor under or pursuant to the Contract Documents, such payment shall be made promptly upon demand by the Owner. Notwithstanding anything contained in the Contract Documents to the contrary, if the Contractor fails to promptly make any payment due the Owner, or the Owner incurs any costs or expenses to cure any default of the Contractor or to correct defective work, the Owner shall have an absolute right to offset such amount against the Contract Sum and may, in the Owner's sole discretion, elect either to (1) deduct an amount equal to that which the Owner is entitled from any payment then or thereafter due the Contractor from the Owner, or (2) issue a written notice to the Contractor reducing the Contract Sum by an amount equal to that which the Owner is entitled.

§ 9.8 Substantial Completion

§ 9.8.1 The date of Substantial Completion of the Project or a designated portion thereof is the date when construction is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the entire Project (or such portion thereof as Owner earlier elects to occupy or utilize) for the use for which it is intended. Minor items of completion or correction ("Punch List Work") may be performed after Substantial Completion, provided that such items can and shall be performed at such times and in such manner that such Work does not unreasonably interfere with the Owner's occupancy and use of the Project. Substantial Completion shall not be deemed to exist until (a) the Owner receives a Certificate of Occupancy for the Project (or such portion as elected by Owner) if such Certificate of Occupancy is required, and any other permits, approvals, licenses and any other documents from governmental authorities having jurisdiction therefore necessary for the beneficial occupancy of the Project and (b) the Contractor, Construction Manager, Architect and Owner have agreed upon a schedule for final completion and to provide the Owner with all as-built drawings, operating manuals, warranties and other required closeout documents. Warranties called for by the Agreement or by the Drawings and Specifications shall commence on the date of Substantial Completion of the Project or designated portion thereof, or any later date that the parties agree. This date shall be established by a Certificate of Substantial Completion signed by the Owner, Contractor, Architect and Construction Manager.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall notify the Construction Manager, and the Contractor and Construction Manager shall jointly prepare and submit to the Architect a comprehensive list which shall identify all non-conforming, defective and incomplete Work and establish the date of commencement of warranties in connection with any such Work. 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 list, the Architect, assisted by the Construction Manager, will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the list, which is not sufficiently complete in accordance with the requirements of 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 Construction Manager or Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect, assisted by the Construction Manager, to determine Substantial Completion. If the Architect and the Construction Manager are required to perform additional substantial completion inspections because the Work fails to be substantially complete, the amount of compensation paid to the Architect and the Construction Manager by the Owner for additional services shall be deducted from the final payment to the Contractor.

§ 9.8.4 When the Architect, assisted by the Construction Manager, determines that the Work or designated portion thereof is substantially complete, the Construction Manager will prepare, and the Construction Manager and Architect shall execute a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all Punch List Work, which timeframe

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shall not exceed 30 days. 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 such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such 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.

§ 9.8.5.1 In conformance with New York General Municipal Law Section 106-b(1)(a), upon proper execution of Certificate of Substantial Completion of Work, the Contractor shall submit a requisition for payment of the remaining amount of the Contract Sum. Upon certification of payment by the Architect, the Owner will approve and promptly pay the remaining amount of the Contract Sum less two times value of any remaining items to be completed or corrected and less an amount necessary to satisfy any claims, liens or judgments against Contractor which have not been suitably discharged. Such payment shall be made under terms and conditions governing final payment except that the Owner's making of such payment shall not constitute the Owner's waiver of any objection to all or any portion of the Work performed by the Contractor or any claims the Owner may then have against the Contractor.

§ 9.8.5.2 Neither the requisition for payment stipulated in Section 9.8.5.1 nor any portion of retained percentage shall become due until the Contractor submits to the Construction Manager:

.1 an affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the work for which the Owner or the Owner's property might in any way be responsible, have been paid or otherwise satisfied, the form of which will be the currently authorized AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims";

.2 consent of all sureties, if any, to such payment, the form of which will be the currently authorized AIA Document G707A, "Consent of Surety to Reduction in or Partial Release of Retainage," but which will not be required if the amount withheld under Section 9.8.3.1 exceeds the amount of retainage; and

.3 if required by the Owner, other data establishing payment or satisfaction of all such obligations, such as receipts, releases, and waivers of liens arising out of contract to such extent and in such form as may be designated by the Owner.

§ 9.8.5.3 As the Punch List Work is satisfactorily completed or corrected, the Contractor may submit a requisition for payment of these items. The Contractor shall submit with each such requisition for payment affidavits, consents of surety, and other data as described in Section 9.8.5.2 covering work for which payment is requested. Upon certification of such requisitions by the Architect and Construction Manager, the Owner will approve and promptly pay the requisition less an amount two times that which is necessary to satisfy any claims, liens or judgments against the Contractor which have not been suitably discharged.

§ 9.8.5.4 Where the Project includes heating, air conditioning, electrical, communication, data or other systems which are not put into operation at the time of occupancy, a sum shall be withheld until these systems have operated to the general satisfaction of the Architect. The Contractor shall provide complete start up and commissioning of the systems with a detailed check list as recommended by the equipment or system manufacturer. The retained amount shall approximate five percent (5%) of the cost of the systems as determined by the cost breakdown submitted. The guaranty/warranty period for such systems will not commence until after such Architect approval.

§ 9.8.5.5 The Contractor shall complete the Punch List Work for the Project no later than 30 days after Substantial Completion of the Project. The Contractor shall be fully liable to the Owner for all damages suffered by the Owner as a result of delay in achieving final completion of the Work, including without limitation, additional architectural and construction management fees related to extended services.

§ 9.8.6 If the Architect or the Construction Manager is required to inspect the Work more than two (2) times prior to certifying the Work as being substantially complete on account of the discovery of one or more items that are not sufficiently complete, the Contractor shall be liable to the Owner for the amount of any costs, additional fees or compensation due from or paid by the Owner to the Architect and/or the Construction Manager for the additional inspections.

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§ 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 as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor and Construction Manager shall jointly prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect after consultation with the Construction Manager.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Construction Manager, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.9.4 The Contractor shall cooperate with the Owner in order to make portions of the Project available as soon as possible.

§ 9.9.4.1 The Project site and buildings, whether work of the Contractor is partially or fully completed or not, are property of the Owner who shall have certain rights and privileges in connection with use of same.

§ 9.9.4.2 Should there be, in the opinion of the Architect or Construction Manager, unwarranted delay on part of any Contractor in completion of incomplete or defective work or other Contract requirements, and the Architect so certifies, the Owner may have full or partial use and occupancy of any or all portions of buildings as required for moving in or installing furniture, fixtures, supplies, or equipment and for general cleaning and maintenance work. In such event, the Contractor whose unfinished work is done subsequent to installation of furniture, fixtures, equipment, etc., shall be responsible for the prevention of any damage to such installation. Such use or occupancy by the Owner shall in no instance constitute acceptance of any of the Work.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon completion of the Work, the Contractor shall forward to the Construction Manager a written notice that the Work is ready for final inspection and acceptance and shall also forward to the Construction Manager a final Contractor's Application for Payment. Upon receipt, the Construction Manager will evaluate the completion of Work of the Contractor and then forward the notice and Application, with the Construction Manager's recommendations, to the Architect who will promptly make such inspection. When the Architect, finds the Work acceptable under the Contract Documents and the Contract fully performed, the Construction Manager and Architect will promptly issue a final Certificate for Payment or Project Certificate for Payment stating that to the best of their knowledge, information and belief, and on the basis of their on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Construction Manager's and Architect's final Certificate for Payment or Project Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.1.1 If the Work is not accepted by the Owner after final inspection and additional time is required to complete items identified during the final inspection, the date starting the one-year correction period described in Article 12.2 shall be set by the Architect at his discretion, but not later than the date of the final Certificate for Payment.

§9.10.1.2 If the Architect and the Construction Manager are required to provide additional services, extend the duration of services to the Owner, and/or perform additional final inspections because the Work fails to comply with the requirements of the Contract Documents, or the Contractor did not complete the Work in accordance with the construction schedule or Project schedule, the amount of compensation paid to the Architect and the Construction Manager by the Owner for additional services shall be deducted from the final payment due to the Contractor.

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§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect through the Construction Manager (1) all closeout documents required by the Contract Documents, including, without limitation, as-built drawings, attic stock, maintenance manual, operating instructions and other documents required to be delivered under the Contract in connection with the Work in the form required by the Owner, (2) 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, (3) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (4) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (5) consent of surety, if any, to final payment, (6), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, 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, and (7) all warranties and guarantees required by the Contract Documents. 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. If such lien 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 such lien, including all costs and reasonable attorneys' fees.

§ 9.10.2.1 In addition to the submittals required in Section 9.10.2 above, the Contractor shall submit separate final release or waivers of lien for each Subcontractor, material supplier, or others with lien rights against the Project, and shall submit a list of such parties.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Construction Manager and Architect so confirm, the Owner shall, upon application by the Contractor and certification by the Construction Manager and Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect through the Construction Manager prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

§ 9.10.4 The making of final payment
(Paragraphs deleted)
by the Owner shall not constitute a waiver of claims, causes of action, damages or complaints by the Owner.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing in accordance with Article 15 and identified by that payee in writing as unsettled at the time of the final Application for Payment.

§ 9.10.6 At any time a lien is filed against the Project funds, the Owner may demand that the Contractor discharge said lien, through bonding or otherwise, and the Contractor must obtain the discharge of said lien within seven (7) days of such demand at the Contractor's sole cost and expense, and at no cost to the Owner. If any lien or other encumbrance required to be removed at the Contractor's sole cost and expense pursuant to this Section is not discharged of record as aforesaid, the Owner shall have the right to take such action as the Owner shall deem appropriate (which shall include the right to cause such lien or other encumbrance to be canceled and discharged of record), and in such event, all costs and expenses incurred by the Owner in connection therewith (including, without limitation, premiums for any bond furnished in connection therewith, and reasonable attorneys' fees,
court costs and disbursements), shall be paid by the Contractor to the Owner on demand or, at the option of the Owner, deducted from any payment then due or thereafter becoming due from the Owner to the Contractor in accordance with the provisions of these General Conditions.

§ 9.10.7 Existing warranties shall not deprive the Owner of any cause of action, right, or remedy otherwise available for breach of any of the provisions of the Contract Documents. The periods referred to above shall not be construed as limitations on the time in which the Owner may pursue any such action, right or remedy.

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§ 9.10.8 The Contractor shall achieve final completion of all Work, including, without limitation, correction of punch-list items, preparation and delivery of all manuals, presentation of training and completion of final paper submissions not later than 30 days following the date of Substantial Completion. In the event the Contractor shall fail to achieve final completion of the Work within such a period of time, the Contractor and the Contractor's surety, if any, shall be liable for and shall reimburse the Owner for any and all fees paid to the Architect and Construction Manager and other expenses made necessary by the Contractor's failure. Additional fees and expenses shall be charged by the Owner against any Final Payment due or which may become due to the Contractor, and the Contractor shall promptly pay or refund the Owner the excess, if any, upon the Owner's written request.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, implementing, directing, controlling, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract. The Contractor shall submit the Contractor's safety program to the Construction Manager for review and coordination with the safety programs of other Contractors. The Construction Manager's responsibilities for review and coordination of safety programs shall not extend to direct control over or charge of the acts or omissions of the Contractors, Subcontractors, agents or employees of the Contractors or Subcontractors, or any other persons performing portions of the Work and not directly employed by the Construction Manager. The Contractor's safety precautions and programs shall include specific steps designed to minimize the risk of contracting or spread of COVID-19, including provision of all appropriate personal protective equipment, social distancing, avoiding stacking of trades, and other reasonable precautions.

§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take necessary precautions for safety of, and shall provide reasonable protection to prevent damage, injury, infection or exposure to COVID-19, or loss to

.1 employees on the Work and other persons who may be affected thereby;

.2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor;

.3 the Owner's real and personal property and 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;

.4 construction or operations by the Owner, Separate Contractors, or other Contractors; and

.5 the existing buildings and premises in the vicinity of or affected by the Contractor's operations.

.6 the contractor agrees, in order that the work will be completed with the greatest degree of safety, to conform to the requirements of the NYS SED rescue regulations (excerpt of the constructors responsibilities section 155.5) and the Occupational Safety and Health Act of 1970 (OSHA) as amended and the Construction Safety Act of 1969 as amended, including all standard and regulations that have been since or shall be promulgated by the governmental authorities which administer such acts, and shall indemnify and hold harmless the owner, Construction Manager, the Architect, and all.

§ 10.2.1.6 Safe access to and egress from any building under construction as part of this Contract, or any existing building in which Work is being done under this Contract, shall be maintained and remain unencumbered by the Contractor in accordance with all applicable codes, rules and regulations of authorities having jurisdiction on the Work. The Contractor and its Subcontractors shall cooperate in maintaining this condition. Roadways, paths, walks, exits, service drives and other areas shall remain unobstructed and shall be maintained in a safe and satisfactory condition, for all persons using the building and premises. Materials shall not be stored promiscuously about the site or in the building, but shall be carefully stored in areas which will not interfere with pedestrian traffic or with access to and egress from adjacent properties and use of the building. The Contractor shall provide and maintain such temporary Work as may be required for the protection of its finished Work where liable to injury. The Contractor will be responsible for all of its Work, materials and equipment that may be damaged or stolen during the duration of the Contract and until the Work is accepted by the Owner. The Contractor shall make good any such damage or loss without expense to the Owner. The Contractor shall not permit unnecessary hazards to be created nor permit them to continue if they are discovered. The Contractor's storage and staging areas shall be only in locations assigned or approved by the Owner and Architect and may be required to be relocated by the Contractor as building occupancy or use changes during the course of the Work. This relocation will be done by the Contractor at no additional cost to the Owner.

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§ 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.

§ 10.2.2.1 The Contractor acknowledges that the Labor Law of the State of New York, and regulations adopted thereunder, place upon both the Owner and the Contractor certain duties and that liability for failure to comply therewith is imposed on both the Owner and the Contractor regardless of their respective fault. The Contractor hereby agrees that, as between the Owner and the Contractor, the Contractor is solely responsible for compliance with all such laws and regulations imposed for the protection of persons performing the Contract. The Contractor shall indemnify and hold harmless the Owner of and from any and all liability for violation of such laws and regulations and shall defend any claims or actions which may be brought against the Owner as the result thereof. In the event that the Contractor shall fail or refuse to defend any such action, the Contractor shall be liable to the Owner for all costs of the Owner in defending such claim or action and all costs of the Owner, including attorney's fee, in recovering such defense costs from the Contractor.

§ 10.2.2.2 All laborers, workers, and mechanics employed in the performance of the Work of this Project shall be certified as having successfully completed a course in construction safety and health approved by the United States Department of Labor's Occupational Safety and Health Administration that is at least 10 hours in duration. The Contractor and its Subcontractors shall conduct their operation in accordance with the Safety Guides for Construction as issued by State Education Department, and the Contractor's safety program.

§ 10.2.2.3 All safety equipment including hard hats, weather protective gear and PPE required for the Contractor to perform its Work are to be supplied by the Contractor or its Subcontractors. Within the designated construction areas, the Contractor's employees, superintendents, or other agents, and its Subcontractors, employees, superintendents, or other agents are required to wear hard hats and other required or essential safety equipment. Each person seen without a hard hat, or otherwise failing to comply with this requirement, will be ordered to leave the Project. No prior warnings will be given by the Owner, Construction Manager or Architect. The Contractor and its Subcontractors shall be solely responsible for making up and paying for any loss of production or required progress resulting from the removal of personnel from the Project as set forth herein including any costs incurred by the Owner in connection with the work of other contractors.

§ 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 to property referred to in Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4, except damage or loss attributable to acts or omissions of the Owner, Construction Manager or Architect or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18, and shall not be limited by such damage or loss being insured under property insurance required by the Contract Documents.

§ 10.2.6 The Contractor shall schedule weekly safety meetings and each of its Subcontractors must be properly represented at such meetings. The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner, Construction Manager and Architect.

§ 10.2.7 The Contractor shall not load or permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition. The Contractor shall not load any part of the Work with materials, equipment, shores,

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bracing, or other items which in any way could cause damage to the Work or to other Work or could endanger persons in or about the Work.

§ 10.2.8 If, during the construction, public or private property is damaged or destroyed as a consequence of its Work, the Contractor shall, at its own expense, restore such property to a condition equal to that existing before such damage or injury was done, by repairing, rebuilding or replacing it, or otherwise making good such damage or destruction in an acceptable manner.

§ 10.2.9 The Contractor shall be responsible for all breakage of glass, which has been furnished and installed as part of Contract and existing glass that is broken due to operations under the Contract for Work. No matter by whom or what cause glass was broken, the Contractor shall replace all broken glass before completion and acceptance of the Contractor's Work. The Contractor may claim damages, if applicable.

§ 10.2.10 In addition to all requirements set forth herein, the Contractor and its Subcontractors shall fully comply with the provisions of the federal Occupational Safety and Health Act of 1970, as amended, and with any rules and regulations pursuant to the Act. This requirement shall apply continuously and not be limited to normal working hours.

§ 10.2.11 The Contractor shall also be responsible, at the Contractor's sole cost and expense, for all measures necessary to protect any property adjacent to the Project and improvements therein. Any damage to such property or improvements shall be promptly repaired by the Contractor at its sole expense.

§ 10.2.12 The Contractor shall immediately contact the Construction Manager and, within 24 hours, report, in writing, to the Owner, Architect and Construction Manager, all accidents arising out of or in connection with the Work which cause death, personal injury, or property damage, giving full details and statements of any witnesses. In addition, if death, serious personal injuries, or serious property damages are caused, the accident shall be reported immediately by telephone or messenger to the Owner, Construction Manager, and Architect.

§ 10.2.13 The Contractor shall be solely responsible for any conditions that develop during construction and in the event any structure is dislocated, over strained, or damaged so as to affect is usefulness, the Contractor shall be solely responsible. The Contractor shall take whatever steps necessary to strengthen, relocate or rebuild the structure to meet requirements at the sole expense of the Contractor.

§ 10.2.14 The Contractor is responsible for restoration or repair of utilities, private property, buildings, pavement, walkways, roads, etc. damaged by its activities under this Agreement to the satisfaction of the Owner, Construction Manager and Architect.

§ 10.2.15 From the commencement to the final completion of the Work, the Contractor shall keep the Work and the Owner's building(s) free from accumulation of water no matter the source or cause of water infiltration.

§ 10.2.16 During construction, the Contractor shall be responsible for maintaining a watertight structure. This responsibility shall include additions/alterations of existing buildings. The Contractor shall be responsible for temporary roofing, tarps and other protection at roofs, cavity walls, etc. Should the Contractor fail to provide adequate protection causing flooding, damage or other disturbance to the existing building(s), the Contractor shall be responsible for all costs associated with clean up, remediation and repairs. Inasmuch as flooding and water damage have safety implications to the general public, clean up, remediation and repairs may be made by the Owner without prior notice to the Contractor. Administration costs incurred by the Owner, Construction Manager and Architect will also be back charged to the Contractor. The Contractor, by entering into this Contract, agrees to be liable for these costs.

§ 10.2.17 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.

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§ 10.3 Hazardous Materials

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents and all applicable laws, rules and regulations regarding hazardous materials. 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 report the condition to the Owner, Construction Manager and Architect in writing. The Owner shall arrange for the material to be tested and if the test reveals that the material is a hazardous material or substance which has not been rendered harmless, the Owner shall pay for the test; otherwise, the Contractor shall bear the cost of the test and the Contract Sum shall be reduced by the amount of that cost. The Contractor shall comply with the reasonable instructions of the Owner after the test is conducted. This Section shall not apply in the case of asbestos which is to be removed and disposed of as part of the Work of the Contract.

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify a 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. 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 in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

§ 10.3.3 To the fullest extent permitted by law, but only to the extent of available insurance proceeds, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Construction Manager, Architect, their consultants, and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that the person seeking indemnification: (1) did not bring such material onto the Project site; (2) timely provided notice of the condition and stopped Work in the affected area as required by Section 10.3.1; and (3) has a claim, damage, loss or expense that is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself). The Owner shall have no indemnity obligation to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity or the fault or negligence of a third party for whom the Owner is not responsible.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for 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 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 fault or negligence.

§ 10.3.6 If, without negligence or fault 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 (that was not brought to the site by the Contractor or those for whom the Contractor is responsible) 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.

§ 10.3.7 The Contractor shall notify the Owner of any storage, use, or discovery of hazardous material on the Project site which the Contractor knows or reasonably should know could cause bodily injury or death and of any injury or death attributable to any such hazardous material.

§ 10.3.8 The Contractor shall take all reasonable precautions and measures to prevent any contamination by or spread or disturbance of hazardous or potentially hazardous substances or materials stored, used, or discovered on the Project site.

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§ 10.3.9 For the avoidance of any doubt, COVID-19 shall not be considered a Hazardous Material for purposes of this Article 10.3.

§ 10.4 Emergencies

§ 10.4.1 The Contractor shall provide at the site, such equipment and medical facilities as are necessary to supply first-aid service to anyone at the Work.

§ 10.4.2 The Contractor must promptly report in writing to the Construction Manager all emergencies whatsoever arising out of, or in connection with the performance of the Work, whether on, or adjacent to the site, which caused death, personal injury or property damages, giving full details and statements of witnesses. In addition, if death, injury, or damages are caused, the emergency shall be reported immediately to the Construction Manager, Owner, and Architect.

§ 10.4.3 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.

§ 10.4.4 All fire and emergency access, including roads, rights-of-way, corridors, doors, and stairs, and all existing fire and smoke detection systems shall be maintained at all times in accordance with fire safety laws. If the Work requires the temporary obstruction of any fire and emergency access or existing fire and smoke detection systems, the Construction Manager shall be notified at least 72 hours in advance.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor agrees to secure and maintain, at Contractor's own expense, all insurance coverage required in this Article 11 from one or more insurance companies licensed and admitted to write such insurance in New York State. Insurers must carry an A.M. Best Financial Strength rating of A- or higher. The Contractor's insurance must include the following, without limitation, and must be written with limits no less than specified in Section 11.1.2:

- **.1** claims under workers' compensation, disability benefit, and other similar employee benefit acts applicable to the Work to be performed, including, without limitation, claims by the employees of private entities performing Work at the site that are exempt from workers' compensation insurance coverage requirements on account of number of employees or occupation, which entities must maintain voluntary compensation coverage at the same limits specified for mandatory coverage for the duration of the Project;
- **.2** claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- **.3** claims for damages because of bodily injury, sickness, disease, or death of any person other than the Contractor's employees;
- **.4** claims for damages insured by usual personal injury liability coverage sustained (1) by a person as a result of an offense directly or indirectly related to employment of such person by the Contractor, or (2) by another person;
- **.5** claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including resulting loss of use resulting;
- **.6** claims for damages because of bodily injury, death of a person, or property damage arising out of ownership, maintenance, or use of a motor vehicle; and
- **.7** claims involving contractual liability applicable to the Contractor's obligations under Section 3.18.
- **.8** A fully completed New York Construction Certificate of Liability Insurance Addendum (Acord 855 2014/15) must be included with the certificates of insurance. For any "yes" answers on Items G through L on this Form – additional details must be provided in writing. No exclusions, restrictions and/or modifications to coverages will be accepted.
- **.9** **Where the Contract or Subcontract involves asbestos, the insurance required by section 11.1 shall specifically include the words asbestos abatement work and shall specify any limitations on completed operation time. If there is a limitation it will be at the owner's discretion to accept or reject that limitation.**
- .10 Insurance must remain in effect at least until final payment and all items thereafter when the contractor may be correcting, removing or replacing defective work in accordance with this document, and
- .11 Liability insurance shall include all major divisions of coverage and be on a comprehensive basis including:
  .1 Premises operations without exclusion of x,c, and u coverage;

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.2 Independent Contractors Protective;
.3 Products and completed operation;
.4 Personal Injury Liability;
.5 Owned, non-owned and owned motor vehicles
.7 Broad form property damage including completed operations

§ 11.1.2 Coverages, whether written on an occurrence or claims-made basis, must be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment. Claims-made coverage will only be allowed when the Contractor demonstrates that occurrence-based coverage is not available for a specific type of required coverage. The insurance required by Section 11.1.1 must be written for not less than the following limits, or greater limits as may be required by law, and include the following terms:

.1 Commercial General Liability. Occurrence-based Commercial General Liability coverage to include bodily injury, personal injury, and property damage applicable to ongoing operations, products & completed operations, and contractual liability, all with a per-project aggregate endorsement. No XCU exclusion is allowed for explosion, collapse, and underground operations. Products and Completed Operations coverage must be maintained in force for a minimum of two (2) years following Final Completion of the Project. Minimum limits are:

$2,000,000	General Aggregate
$2,000,000	Products and Completed Operations Aggregate
$1,000,000	Personal and Advertising Injury
$1,000,000	Each Occurrence
$1,000,000	Personal and Advertising Injury
$ 100,000	Fire Damage (any one fire)
$ 10,000	Medical Expense (any one person)

.2 Automobile Liability. Bodily Injury and Property Damage coverage for the Contractor as the owner or lessee of automobiles, trucks, trailers, self-propelled Contractor's equipment, and all other owned and non-owned vehicles registered for use on the public highway and/or used in operations relating to the Contractor's Work, with a minimum Combined Single Limit of $1,000,000. If any such vehicles are to be used to transport hazardous materials, the Contractor shall also provide pollution liability broadened coverage evidenced by ISO Form CA 99 48 and MCS-90.

.3 Excess Liability and/or Umbrella Liability. Minimum limits are:

$5,000,000 each Occurrence and $5,000,000 for general construction and no work at elevation (1 story – 10 feet) or Project values less than or equal to $1,000,000.

$10,000,000 each Occurrence and $10,000,000 Aggregate for high risk construction, work at elevation (>1 story or 10 feet) or Project values greater than $1,000,000.

Umbrella/Excess coverage shall be on a follow-form basis.

.4 Workers' Compensation

.1 Workers' Compensation Requirements. To comply with the New York State Workers' Compensation Law, the Contractor must (1) be legally exempt from obtaining workers' compensation insurance coverage, or (2) obtain such coverage from insurance carriers, or (3) be self-insured or participate in an authorized group self-insurance plan. Minimum limitations are:

Bodily Injury by Accident: $500,000 Each Accident
Bodily Injury by Disease: $500,000 Each Employee
Bodily Injury by Disease: $500,000 Policy Limit

.2 Workers' Compensation Coverage Evidence. To demonstrate compliance with the New York State Workers' Compensation Law, the Contractor must provide **one** of the following forms to the Owner:

.1 **Either** CE-200, "Affidavit For New York Entities And Any Out Of State Entities With No Employees, That New York State Workers' Compensation And/Or Disability Benefits Insurance Coverage Is Not Required"; **or** CE-200, "Affidavit That An Out-Of-State Or Foreign Employer Working In New York State Does Not Require Specific New York State Workers' Compensation And/Or Disability Benefits Insurance Coverage" (either affidavit must be stamped as received by the New York State Workers' Compensation Board); **or**

.2 **Either** C-105-2, "Certificate of NYS Workers' Compensation Insurance Coverage" (for employers insured for workers' compensation through a private insurance carrier – the Contractor's insurance

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carrier must send this form to the Owner),**or** U-26.3, "New York State Insurance Fund Certificate of Workers' Compensation Coverage" (for employers insured for workers' compensation through the State Insurance Fund); **or**

.3 **Either** SI-12, "Certificate of Workers' Compensation Self-Insurance," **or** GSI-105-2, "Certificate of Participation in Workers' Compensation Group Self-Insurance (for employers participating in group self-insurance for workers' compensation – the Contractor's Group Self-Insurance Administrator must send this form to the Owner).

.5 **Employer's Liability/Disability**

.1 **Disability Benefits Requirements.** To comply with the New York State Disability Benefits Law, the Contractor must (1) be legally exempt from obtaining disability benefits insurance coverage, (2) obtain such coverage from insurance carriers, or (3) be self-insured.

.2 **Disability Benefits Coverage Evidence.** To demonstrate compliance with the New York State Disability Benefits Law, the Contractor must provide **one** of the following forms to the Owner:

.1 **Either** CE-200, "Affidavit For New York Entities And Any Out Of State Entities With No Employees, That New York State Workers' Compensation And/Or Disability Benefits Insurance Coverage Is Not Required" **or** CE-200, "Affidavit That An Out-Of-State Or Foreign Employer Working In New York State Does Not Require Specific New York State Workers' Compensation And/Or Disability Benefits Insurance Coverage" (either affidavit must be stamped as received by the New York State Workers' Compensation Board); **or**

.2 **Either** DB-120.1, "Certificate of Disability Benefits," **or** DB-820/829, "Certificate/Cancellation of Insurance" (the Contractor's insurance carrier must send either form to the Owner); **or**

.3 DB-155 (3/04), "Certificate of Disability Benefits Self-Insurance."

.6 **Hazardous Materials.** If the Contractor's Work involves handling or disturbance of asbestos or other hazardous materials, the Contractor shall provide bodily injury and property damage liability insurance applicable to such operations, covering both ongoing operations and products & completed operations. Products and Completed Operations coverage must be maintained in force for a minimum of two (2) years following Final Completion of the Project. Coverage must be for limits not less than:

.1 If covered by the Contractor's umbrella/excess liability policy:

$2,000,000 General Aggregate
$2,000,000 Each Occurrence or Incident:

.2 If not covered by the Contractor's umbrella/excess liability policy:

$6,000,000 General Aggregate
$6,000,000 Each Occurrence or Incident:

.7 **Owner's Protective Liability Policy.** The XCU exclusion must be deleted, and the Named Insureds will be "Nanuet Union Free School District." Minimum limits are:

$2,000,000 Each Occurrence
$4,000,000 Aggregate

OCP coverage must be written with licensed and admitted carriers, list the district as the name insured. No additional insureds will be on the OCP.

§ 11.1.3 Certificates of insurance acceptable to the Owner, together with copies of all insurance policies procured by the Contractor pursuant to this Article 11, including, without limitation, terms, conditions, declarations, riders, and endorsements, must be submitted to the Construction Manager for transmittal to the Owner, with copies to the Architect, prior to commencement of the Work. If any of the foregoing insurance coverages are required to remain in force after final payment, an additional certificate evidencing continuation of such coverage must be submitted with the final Application for Payment as required by Section 9.10.2.2. Information concerning reduction of coverage must be furnished by the Contractor with reasonable promptness. In addition to the Certificates of Insurance and accompanying documents, the Contractor shall provide to the Certificate Holders, on a timely basis, copies of any subsequently issued endorsements that amend any coverages or limits. In addition:

.1 "Certificate Holders" are the Nanuet Union Free School District, 101 Church Street, Nanuet, NY,10954

.2 Coverages reflected in certificates of insurance and underlying policies must comply with all requirements of this Article 11.

.3 All insurance documents must be executed with *authorized* signatures.

.4 All required liability policies must be endorsed to provide that any Notice of Cancellation or Notice of Non-Renewal given to the First Named Insured must also be given to the Additional Insureds identified in Section 11.1.4. **Copies of such endorsements must be furnished to the Certificate Holders.**

.5 Failure of the Owner to object to the Contractor's failure to furnish a certificate or other evidence of required insurance coverages, or to object to any defect in such certificate or other evidence, or to demand receipt of

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such certificate or other evidence, is not a waiver of the Contractor's obligation to furnish the required insurance coverages. Furthermore, nothing contained in this Article 11 imposes on the Owner a duty or obligation to review any certificates or other evidence of insurance coverages or to issue any formal approval or acceptance of such evidence, the duty and obligation of the Contractor being to provide insurance meeting the requirements of this Article 11 regardless of any review or lack of review by the Owner of the Contractor's evidence of insurance.

.6 The Contractor's liability to and indemnification of the Owner is not relieved or diminished by the Contractor securing insurance coverage in accordance with this Article 11. Any acknowledgement of receipt of, or lack of objection by the Owner to, the Contractor's evidence of required insurance coverage is not acceptance in any way of any deficiencies in the Contractor's insurance coverage.

§ 11.1.4 Additional Insureds

§ 11.1.4.1 Policies of insurance required under Sections 11.1.2.1 (Commercial General Liability), 11.1.2.2 (Automobile Liability), 11.1.2.3 (Excess Liability and/or Umbrella Liability), and 11.1.2.6 (Hazardous Materials – if applicable) must also apply to the following as Additional Insureds on a primary and non-contributory basis, with the following designation, unaltered:

Nanuet Union Free School District and their respective employees, interim administrators, authorized volunteers, committee members, student teachers, auxiliary instructors, members of the Board of Education, and consultants (the "District Indemnitees"); KSQ Architects, PC and its consultants ("Designers"), and Jacobs ("Construction Manager"), during both ongoing and complete operations. The additional insured coverage provided shall not preclude coverage in favor of the any District Indemnitees, Designers, or Construction Manager, based on its lack of privity with Contractor or other third party additional insured. Further, such coverage shall not exclude or deny coverage to District Indemnitees, Designers, or the Construction Manager on the basis that the named insured Contractor's Work or operations are not performed directly for the District Indemnitees, Designers, or Construction Manager or other third party additional insured.

§ 11.1.4.2 Coverage Evidence. Additional Insured coverage must be effected through the use of **either** ISO Form CG CG 20 38 and CG 20 37 04 13 **together**. Form CG 20 38 alone is not acceptable. Certificates of Insurance must clearly state how coverage is effected in the Excess/Umbrella Liability layer. Certificates of Insurance must show the form numbers used to effect all of the Additional Insured coverages. A copy of the actual policy language or endorsement that effects this coverage in each policy must be provided to the Owner and Construction Manager with the Certificate of Insurance. In the event Contractor is unable to procure such coverage specifically naming the "District Indemnitees," "Designers," "Construction Manager," or any other third party as an additional insured as required above, Contractor shall notify the Owner and Construction Manager prior to commencing Work and shall not proceed with any Work until authorized by the Owner to do so.

§ 11.1.4.3 No Reliance on "Following Form." The Contractor acknowledges that "Following Form" wording generally does not meet the primary and non-contributory coverage requirement for Additional Insureds, and that the coverage primacy aspect of Additional Insured coverage is typically addressed in the "Other Insurance" provisions of a policy's "Conditions" section, and often requires an amending endorsement to effect coverage on a primary and non-contributory basis. The Contractor therefore must provide such endorsements to the Owner, or other documentation acceptable to the Owner evidencing that the primary and non-contributory coverage requirements are met as to all policies for which they are required under Section 11.4.1.1.

§ 11.1.5 Normal Expiration/Renewal. When any required insurance is to expire due to a normal expiration or renewal date, the Contractor shall supply the Owner, at least ten (10) days prior to either such date, in addition to Certificates of Insurance, with either (1) copies of all renewed insurance policies, including, without limitation, terms, conditions, declarations, riders, and endorsements evidencing continuation of all coverages in the same manner, limits of protection, and scopes of coverage as was provided by the previous policy, or (2) if acceptable to the Owner, all declaration pages, mandatory riders, and/or endorsements that clearly evidence the continuation of all coverages in the same manner, limits of protection, and scope of coverage as provided by the previous policy.

§ 11.1.6 Subcontractors. The Contractor shall cause each Subcontractor to (1) procure insurance during the life of its Subcontract or Sub-subcontract the same insurances as are required of the Contractor as per this Article 11, and (2) cause the issuers of those insurance policies to name the Additional Insureds as Additional Insureds under each

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Subcontractor's comprehensive general, automobile, excess/umbrella, and hazardous materials liability policies. The Additional Insured endorsement included in each such Subcontractor's policies must state that coverage is afforded to all Additional Insureds with respect to any and all claims arising out of operations performed by or on behalf of the Contractor. If the Additional Insureds have other insurance otherwise applicable to a loss, such other insurance will only apply, if at all, on an excess or contingent basis. The amount of each Subcontractor's insurers' liability under each such insurance policy will not be reduced by the existence of such other insurance.

§ 11.1.7 Owner Insurer Loss Payments. In the event the Owner's insurer(s) make(s) any payment toward any loss covered under any policy of insurance the Contractor is required to procure under this Article 11, the Owner's insurer(s) are subrogated to all of the Contractor's rights of recovery against any person or organization including, but not limited to, the Contractor's insurer(s), and the Contractor shall execute and deliver all instruments, papers, and whatever else is necessary to secure those rights. The Contractor shall do nothing after the payment of any damages to prejudice those rights.

§ 11.2 Owner's Liability Insurance

The Owner shall purchase and maintain the Owner's usual liability insurance. The Owner may also, at its sole option, purchase and maintain other insurance for protection against claims that may arise from operations under the Contract Documents. The Contractor is not responsible for purchasing and maintaining such optional Owner's liability insurance unless specifically required in the Contract Documents. Neither the Owner's usual liability insurance nor any other insurance obtained by the Owner reduces or otherwise affects the Contractor's insurance requirements under Section 11.1.

(Paragraphs deleted)

§ 11.3 Property Insurance

§ 11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the State of New York, property insurance on a replacement cost basis. Such property insurance will be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment is made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance will include interests of the Owner, Contractor, Subcontractors, and Sub-subcontractors in the Project.

§ 11.3.1.1 Property insurance will be on a builder's risk, "all-risk," or equivalent policy form and include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings, and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and will cover reasonable compensation for the Architect's, Contractor's, and Construction Manager's services and expenses required as a result of such insured loss. Coverage for other perils is not required unless otherwise provided in the Contract Documents. The form of policy for this coverage shall be Completed Value.

§ 11.3.1.1.1 Contractor is responsible for all tools, equipment, materials, Work, etc., until Substantial Completion and possession by Owner. The Contractor shall provide insurance for theft as he may require for himself, his subcontractors, and his employees' protection. The insurance coverage referred to in this subparagraph shall be in accordance with a standard Builder's Risk Policy used in the State of New York.

§ 11.3.1.2 The Contractor shall provide insurance coverage for portions of the Work stored off the site, in transit and stored on the site but not incorporated into the Work as full replacement cost basis without voluntary deductible. The Contractor shall provide Certificate copies to the Construction Manager showing the coverage for their materials in transit or stored off site.

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 11.3.1.4 The property insurance will cover portions of the Work stored off the site, and also portions of the Work in transit. The insurance required by this Section 11.3 will not, however, cover machinery, tools, equipment, vehicles, shanties, tool houses, trailers, or other temporary or permanent structures owned or rented by the Contractor, a

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Subcontractor, or a Sub-subcontractor, or their employees, utilized in performance of the Work but not incorporated into the permanent improvements. The Contractor is solely responsible for all such items of its own and any under its control. The Contractor shall, at the Contractor's own expense, provide insurance coverage for all of the items described in this Section 11.3.1.4, which is subject to the provisions of Section 11.3.7.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 may not commence until the insurance company or companies providing property insurance consent to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse, or reduction of insurance.

§ 11.3.1.6 The Owner shall not be responsible to or for the Contractor or Subcontractor against any loss by fire, lightning, extended coverage, all risk, theft or vandalism and malicious mischief, or any tools, equipment, vehicles, shanties, tool houses, trailers or other temporary or permanent structures wherever located and owned by the Contractor, Subcontractors, their employees or agents.

§ 11.3.1.7 The form of policy for the coverage required by 11.3.1 shall be Completed Value.

§ 11.3.2 Boiler and Machinery Insurance. The Owner, if applicable to the Work and at its sole option, may purchase and maintain boiler and machinery insurance or shall do so if required by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner. This insurance will include interests of the Owner, Construction Manager, Contractor, Subcontractors and Sub-subcontractors in the Work.

§ 11.3.3 Intentionally omitted.

§ 11.3.4 If the Contractor requests in writing that insurance for risks other than those described in this Section 11.3 or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost for it will be charged to the Contractor by appropriate Change Order.

§ 11.3.5 Intentionally omitted.

§ 11.3.6 Upon the Contractor's request, the Owner will provide copies of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project.

§ 11.3.7 Waivers of Subrogation. The Owner and Contractor waive all rights against (1) each other and any of their respective subcontractors, sub-subcontractors, agents and employees, and (2) the Construction Manager, Construction Manager's consultants, Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their respective subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire or other causes of loss to the extent of proceeds under property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as the Owner and Contractor may have to the proceeds of such insurance held by the Owner. The Owner or Contractor, as appropriate, shall require of the Construction Manager, Construction Manager's consultants, Architect, Architect's consultants, Owner's separate contractors described in Article 6, if any, and any of their respective subcontractors, sub-subcontractors, agents, and employees, by appropriate written agreements, similar waivers each in favor of other parties enumerated in this Section 11.3.7. The policies must provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation is effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity has an insurable interest in the property damaged.

§ 11.3.8 A loss insured under the Owner's property insurance will be adjusted by the Owner and made payable to the Owner for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate written agreements shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

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§ 11.3.9 If required in writing by a party in interest, the Owner shall, upon occurrence of an insured loss, give a bond for proper performance of the Owner's duties. The cost of the bond will be charged against proceeds received. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement. If after such loss no other special agreement is made, and unless the Owner terminates the Contract for convenience, replacement of damaged property will be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner will adjust and settle a loss with insurers unless one of the parties in interest objects in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute will be resolved in the manner selected as the method of binding dispute resolution in the Agreement. Nothing in this Agreement calls for the name of any party other than the Owner as loss payee on the Owner's insurance and no draft or other instrument in payment of any loss will name any other party as a joint payee.

§ 11.3.11 The Contractor's Insurance Company shall acknowledge in writing to the Construction Manager that they have read and will comply with all requirements under Indemnification Section 3.18 of the General Conditions.

§ 11.4

(Paragraphs deleted)

Performance Bond and Payment Bond

(Paragraphs deleted)

§ 11.4.1 The Contractor shall furnish bonds covering faithful performance of the Contract and payment of obligations arising under it. Bonds must be obtained from a surety company or companies satisfactory to the Owner, licensed to do business in the State of New York, and listed in the latest issue of U.S. Treasury Circular 570. The amount of each bond will be equal to one hundred (100) percent of the Contract Sum. Each bond must be maintained throughout the duration of the Project, and subsequently to the extent the Contractor has ongoing performance and payment obligations following completion of the Project.

§ 11.4.1.1 No Performance or Payment Bond shall require, as a condition precedent to termination of a Contract or Contractor, that any notice be sent to or meeting be arranged or held with a Contractor (Principal) and/or surety, prior to such termination. Any such requirement(s) shall be void and unenforceable and the Owner shall have the right to reject any such bond(s) and/or ignore such condition. The exclusive method of termination of a Contract or Contractor is contained in the Contract Documents and a Contractor and surety expressly agreed to be bound thereby.

§ 11.4.1.2 Rider including the following provisions shall be attached to each Performance Bond: "Surety agrees that it consents to and waives notice of any addition, alteration, omission, change or other modification of the Contract Documents. Such addition, alteration, change extension of time or other modification of the Contract Documents or a forbearance on the part of either the Owner or the Contractor to the other, shall not relieve the surety of its obligations hereunder and notice to the surety of such matters is hereby waived"

§ 11.4.2 Bonds must be prepared on the forms of AIA Documents A312-2010 - Performance Bond and A312-2010 - Payment Bond, without modifications other than (1) a mandatory statement in Section 16 of the Performance Bond that it is given as a statutory or other legally required bond and that Section 13 of the Performance Bond applies in full, without exception, (2) a mandatory statement in Section 16 of the Performance Bond that it includes performance by the Contractor of any correction and warranty obligations in the Contract Documents, including such performance after the dates of Substantial and Final Completion, and (3) a mandatory statement in Section 18 of the Payment Bond that it is given as a statutory or other legally required bond and that Section 14 of the Payment Bond applies in full, without exception. The cost of the bonds is included in and will not increase the Contract Sum.

- **.1** The Contractor shall deliver the required bonds to the Owner not later than 7 days following the date the Agreement is entered into and before commencing any of the Work.
- **.2** The Contractor shall require any attorney-in-fact who executes the required bonds on behalf of the surety to affix to the bonds a certified and current copy of their power of attorney authorizing him or her to sign the bond.
- **.3** The bonds must specifically name the Nanuet Union Free School District as Obligee.

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§ 11.4.3 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.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

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

§ 12.1.2 If a portion of the Work has been covered which the Construction Manager or Architect has not specifically requested to observe prior to its being covered, the Construction Manager or Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or one of the other Contractors in which event the Owner shall be responsible for payment of such costs.

§ 12.2 Correction of Work

§ 12.2.1 Before or After Substantial Completion

The Owner, through its Architect or Construction Manager, shall have the authority to reject Work performed by the Contractor that does not conform to the requirements of the Drawings, Specifications, or both. The Contractor shall promptly correct Work rejected by the Construction Manager or Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Construction Manager's and Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 If, within two years after the date of Substantial Completion of the Work or a designated portion of the Work, or the date of acceptance of a portion of the Work that is subject to correction or completion after the date of Substantial Completion of the Work, whichever is later, 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 obligation set forth hereunder shall survive acceptance by the Owner of the Work or termination of the Contract. The Owner shall give such notice promptly after discovery of the condition.

§ 12.2.2.2 The two-year period for correction of the 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 Upon completion of any Work under or pursuant to this Section 12.2, the two-year period for correction of Work in connection with the Work requiring correction shall be renewed and recommence.

§ 12.2.2.4 The obligations shall cover any repair and replacement to any part of the Work or other property caused by the defective Work.

§ 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.

§ 12.2.3.1 If the Contractor fails to commence to correct, repair and make good any defects in its Work within a reasonable time, not to exceed ten (10) days from the date the Contractor received written notice from the Owner per Section 12.2.2.1, the Owner may correct it in accordance with Section 2.5 and the Contractor shall, upon demand, pay to the Owner all amounts which it expends for such corrective work.

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§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner, Multiple Prime Contractors 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. The Contractor shall also replace or repair to satisfaction of Owner any and all damage done to the building or its contents in consequence of work performed in fulfilling any applicable warranty. This clause is general in nature and will not operate to waive stipulations of other clauses that specify warranty periods in excess of two (2) years.

§ 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 two-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 determined by the Owner, with the advice of the Construction Manager and Architect. Such adjustment shall be effected whether or not final payment has been made. For this Section to apply, the Owner must accept non-conforming Work in writing specifying the non-conforming Work being accepted. Notwithstanding any acceptance by the Owner, if the Owner discovers non-conforming Work that the Owner has not expressly accepted in writing, the Owner may demand that the Contractor correct such Work as per the provisions of Article 12 hereof.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the State of New York, and the parties expressly agree that any claim, dispute, or other controversy of any nature arising out of the Contract or performance of the Work shall be commenced and maintained in New York State Supreme Court, **Rockland** County.

§ 13.1.2 The Contractor shall at all times observe and comply with all federal, state and local laws and all laws, ordinances and regulations of the Owner, in any manner affecting the Work and all such orders decreed as exist at present and those which may be enacted later, by bodies or tribunals having jurisdiction or authority over the Work, and the Contractor shall defend, indemnify and save harmless the Owner and its Board of Education, officers, agents, or servants against any claim or liability arising from, or based on, a violation of any such law, ordinances, regulation, order or decree, whether by himself or by his employee or agents. Historical lack of enforcement of any law, local or otherwise, shall not constitute a waiver of Contractor's responsibility for compliance with such law in a manner consistent with the Agreement unless and until the Contractor has received written consent for the waiver of such compliance from the Owner and the agency responsible for the enforcement of such law.

§ 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 Neither the acceptance of all or any part of the work covered by the Contract; nor any payment therefore; nor any order or application for payment issued under the Contract or otherwise issued by the Owner, Architect,

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Construction Manager, or any board member, officer, agent or employee of the Owner; nor any permission or direction to continue with the performance of the Contract before or after its specified completion date; nor any performance by the Owner of any of the Contractor's duties or obligations; nor any aid lent to the Contractor by the Owner in its performance of such duties or obligations; nor any delay or omission by the Owner to exercise any right or remedy accruing to it under the terms of the Contract or existing at law or in equity or by statute or otherwise; nor any other thing done or omitted to be done by the Owner, its commissioners, officers, agents or employees; shall be deemed to be a release to the Contractor or its sureties from any obligations, liabilities or undertakings in connection with the Contract or the performance bond or a waiver of any provision of the Contract or of any rights or remedies to which the Owner may be entitled because of any breach thereof, excepting only a written instrument expressly providing for such release or waiver. No cancellation, rescission or annulment hereof, in whole or as to any part of the Contract, because of any breach hereof, shall be deemed a waiver of any money damages to which the Owner may be entitled because of such breach. No waiver by the Owner of any breach of the Contract shall be deemed to be a waiver of any other or any subsequent breach.

§ 13.3.3 The rights stated in these General Conditions and the Contract Documents are cumulative and not in limitation of any rights of the Owner at law or in equity.

§ 13.3.4 The Owner shall not be responsible for damages or for loss of anticipated profits on Work not performed on account of any termination of the Contractor by the Owner or by virtue of the Owner's exercise of its right to take over the Contractor's Work.

§ 13.3.5 The Owner shall not be liable to the Contractor for punitive damages on account of its termination of the Contractor or any other alleged breach of the Agreement and the Contractor hereby expressly waives its right to claim such damages against the Owner.

§ 13.3.6 The Contractor hereby expressly waives any rights it may have in law or in equity to lost bonding capacity as a result of any of the actions of the Owner, the Architect or the Construction Manager taken in connection with the Contractor's Work on the Project.

§ 13.3.7 The Contractor agrees that it waives the defense of privity of contract as between itself and each other Prime Contractor. In the event that an act or omission by a Prime Contractor or its Subcontractors of any tier causes impact, damage or loss in any form to the Contractor, then the Prime Contractor responsible in whole or in part for such impact, damage or loss agrees it is directly responsible and liable to the Contractor. The Contractor acknowledges and agrees that this waiver of the defense or privity of contract permits and requires it to commence an action or suit directly against the responsible Prime Contractor. The Owner, Architect and the Construction Manager shall not be parties to such suit. The Contractor waives and relinquishes any right and claim as against the Owner, to the extent such claim is caused, or contributed to, by a Prime Contractor or its Subcontractors of any tier.

§ 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. Tests, inspections and approvals of portions of the Contractor's Work required by the Drawings or Specifications shall be made at an appropriate time. Unless otherwise provided, the Contractor shall arrange for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Construction Manager and Architect timely notice of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.4.2 If the Construction Manager, Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.4.1, the Construction Manager or Architect shall, upon written authorization from the Owner, instruct the Contractor to arrange for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Construction Manager and Architect of when and where tests and inspections are to be

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made so that the Construction Manager and Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If such procedures for testing, inspection or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Construction Manager's and Architect's services and expenses shall be at the Contractor's expense, including the cost of retesting for verification of compliance if necessary until the Architect certifies that the Work in question does comply with the requirements of the Contract Documents, and none of such costs shall be included in computing the Contract Sum.

§ 13.4.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Construction Manager for transmittal to the Architect.

§ 13.4.5 If the Construction Manager or Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Construction Manager or Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.4.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.4.7 Any material to be furnished shall be subject to inspections and tests in the shop and field by the Architect. Shop inspection shall not relieve the Contractor of the responsibility to furnish satisfactory materials and the right is reserved to reject any material at any time before final acceptance of the Work, when in the opinion of the Architect the materials and/or workmanship do not conform to the Specification requirements.

§ 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the legal rate as required in General Municipal Law Section 106-b.

§ 13.6 Time Limits on Claims

§ 13.6.1 No action or proceeding shall lie or be maintained by the Contractor, nor anyone claiming under or through the Contractor, against the Owner upon any claim arising out of or based on the Agreement or the Contract Documents or by reason of any act or omission or requirements relating to the giving of notices and information, unless such action or proceeding shall be commenced within one (1) year after submission to the Owner of the final Application for Payment. As to a claim based upon money required to be retained for any period after the date of the final Application for Payment, such action must be commenced within six (6) months after such money becomes due and payable under the terms of the Contract. Notwithstanding, if the Contract is terminated by the Owner, such action by the Contractor must be commenced within six (6) months after the date of such termination. The Contractor's acceptance of final payment shall constitute a release of all claims against the Owner. This provision shall not relieve the Contractor of the obligation to comply with the provisions of the law relating to notices of claim.

§ 13.6.2 Acts or failures to act occurring during the construction of the Project or following the issuance of the final certificate for payment, which give rise to a cause of action shall be deemed to have accrued in any and all events not later than the date of any act or failure to act by the Contractor pursuant to any warranty provided under Section 3.5, the date of any correction of the Work or failure to correct the Work by the Contractor under Section 12.2, or the date of actual commission of any other act or failure to perform any duty or obligation by the Contractor, whichever occurs last.

§ 13.7 No Oral Waiver or Constructive Changes

The provisions of the Contract Documents shall not be changed, amended, waived, or otherwise modified in any respect except by a writing signed by the Owner. No person is authorized on behalf of the Owner to orally change, amend, waive, or otherwise modify the terms of the Contract Documents or any of the Contractor's duties or obligations under or arising out of the Contract Documents. Any change, waiver, approval, or consent granted to the Contractor shall be limited to the specific matters stated in the writing signed by the Owner, and shall not relieve the Contractor of any other of the duties and obligations under the Contract Documents. No "constructive" changes shall be allowed.

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§ 13.8 Notices Regarding Liens
The Contractor shall provide to the Owner copies of all notices of any type regarding liens received from Subcontractors, Sub-subcontractors, or suppliers to the Contractor.

§ 13.9 Wages Rates
The Contractor shall, and cause its Subcontractors to, comply with prevailing wage rate determinations as issued by the State of New York Department of Labor for the location and duration of this Project. Current wage rates for this Project are included in the Project Manual.

§ 13.10 General Provisions
Any specific requirement in this Contract that the responsibilities or obligations of the Contractor also apply to a Subcontractor is added for emphasis and is also hereby deemed to include a Subcontractor of any tier. The omission of a reference to a Subcontractor in connection with any of the Contractor's responsibilities or obligations shall not be construed to diminish, abrogate or limit any responsibilities or obligations of a Subcontractor of any tier under the Contract Documents or the applicable subcontract.

§ 13.11 Written Notice
All notices to be given hereunder shall be in writing and may be given, served, or made by (1) depositing the same in the United States mail addressed to the authorized representative (as specified below) of the party to be notified, postpaid and registered or certified, read receipt requested or (2) depositing the same for overnight delivery (prepaid by and billed to the party giving notice) with a nationally recognized overnight delivery service addressed to the authorized representative of the party being notified or (3) delivering the same in person to the authorized representative of the party being notified or (4) emails to the attention of the authorized representative of the party to be notified with the requirement of a email confirmation notices deposited in the United States mail shall be effective, unless otherwise state in the Contract Documents, from and after the fourth day next following the date deposited in a United States mail receptacle or when actually received, whichever is earlier. Notices transmitted by overnight delivery shall be effective immediately. Email notices shall be effective as of the time received, as shown on a printed email confirmation.

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 90 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; or

.2 An act of government, such as a declaration of national emergency, that requires all Work to be stopped; or

.3 Because the Construction Manager has not certified or the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4 and 9.5, or because the Owner has not made payment after 14 days written notice of such failure to make payment provided that such failure is not due to a disputed amount, and except to the extent the Owner is excused from timely making all or part of any payment on a Certificate for Payment as per any other provisions of the Contract Documents.

Notwithstanding the preceding or anything else in the Contract Documents, the Contractor shall not cease or delay the progress of the Work for any reason other than one set forth in Section 9.7.1, it being agreed that monetary damages shall be an adequate remedy for the Contractor for any breach of this Agreement or the Contract Documents by the Owner.

§ 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.

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§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon 30 days' written notice and opportunity to cure to the Owner, terminate the Contract and recover from the Owner payment for such Work properly performed for which it has not otherwise been compensated, but in no event shall the Owner by liable to the Contractor for any prospective loss, including, but not limited to, termination expenses, loss of anticipated profits, impact damages, unabsorbed overhead, or the like. Notwithstanding the foregoing, any such payments to the Contractor shall be less any setoffs to which the Owner may be entitled as per any other provision of the Contract Documents.

§ 14.1.4 If the Work is stopped for a period of 90 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor 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 30 additional days' written notice to the Owner, Construction Manager and Architect (during which the Owner shall have the right and opportunity to cure), 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** refuses or fails to supply enough properly skilled workers or proper materials or equipment to complete the Work in a diligent, efficient, timely, workmanlike, skillful, and careful manner;
- **.2** fails to make payment to Subcontractors or Suppliers for materials or labor in accordance with the respective agreements between the Contractor and its Subcontractors or Suppliers;
- **.3** disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority, or its health and safety plan;
- **.4** otherwise is guilty of substantial breach of or default under a provision of the Contract Documents;
- **.5** cannot complete the Work within the Contract Time or within the time to which such completion may have been extended; provided, however, that the impossibility of timely completion is, in the Owner's opinion, attributable to conditions within the Contractor's control;
- **.6** breaches any warranty made by the Contractor under or pursuant to the Contract Documents;
- **.7** is or has been unnecessarily or unreasonably or willfully delaying the performance and completion of the Work, or the award of necessary subcontracts, or the placing of necessary material and equipment orders;
- **.8** fails to furnish the Owner with assurances satisfactory to the Owner evidencing the Contractor's ability to complete the Work in compliance with all requirements of the Contract Documents;
- **.9** refuses to proceed with the Work or extra work when and as directed by the Owner, Construction Manager or Architect;
- **.10** fails after commencement of the Work to proceed continuously with the construction and completion of the Work for more than 10 days, except as permitted under the Contract Documents;
- **.11** fails or neglects to complete the Work within the Contract Time or in accordance with the Construction Schedule;
- **.12** refuses or fails to correct deficient Work performed by it;
- **.13** the Contractor's progress of the Work is such that the Owner reasonably believes that the Contractor shall not be able to achieve Substantial Completion by the Substantial Completion Date and the Contractor has not delivered and implemented a recovery plan required under the Contract or has not recovered the schedule sufficient to meet the respective Contract Time requirements as required by written notice to the Contractor by the Owner; or
- **.14** disregards the instructions of the Construction Manager, Architect or Owner (when such instructions are based on the requirements of the Contract Documents).

§ 14.2.2 When any of the above reasons exist, 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 (7) days' written notice, terminate employment of the Contractor at the expiration of such seven (7) day period, 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 utilizing for such purpose such of the Contractor's plant, materials, equipment, tools and supplies remaining on the site,

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and also such subcontractors as it may deem advisable, or if may call upon the Contractor's surety at its own expense to do so. 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. Such accounting shall be final, binding and conclusive upon the Contractor, its surety, and any person claiming under or through the Contractor, as to the amount thereof.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Construction Manager's and Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall, upon application, be certified by the Initial Decision Maker after consultation with the Construction Manager, and this obligation for payment shall survive termination of the Contract.

§ 14.2.4.1 The costs of finishing the Work also include, without limitation, all reasonable attorneys' fees incurred in responding to the default and enforcing the Owner's rights under the Contract Documents (including costs and fees incurred in dispute resolution proceedings), additional title costs, insurance, additional interest because of any delay in completing the Work, loss of State Building Aid, and all other direct and consequential damages incurred by the Owner by reason of the termination of the Contractor as stated herein.

§14.2.4.2 It is recognized that: (1) if an order for relief is entered on behalf of Contractor pursuant to Title 11 of the United States Code, (2) if any other similar order is entered under any other debtor relief laws, (3) if Contractor makes a general assignment for the benefit of its creditors, (4) if a receiver is appointed for the benefit of its creditors, or (5) if a receiver is appointed on account of its insolvency, any such event could impair or frustrate Contractor's performance of the Contract. Accordingly, it is agreed that upon the occurrence of any such event, Owner shall be entitled to request of Contractor or its successor in interest adequate assurance of future performance in accordance with the terms and conditions of the Contract. Failure to comply with such request within ten (10) days of delivery of the request, or Owner's determination that the assurances are not adequate, shall entitle Owner to terminate the Contract and to the accompanying rights set forth in Subparagraphs 14.2.1 through 14.2.4 hereof. In all events pending receipt of adequate assurance of performance and actual performance in accordance therewith, Owner shall be entitled to proceed with the Work with its own forces or with other Contractors on a time and material or other appropriate basis, the cost of which will be back charged against the Contract Sum.

§ 14.2.5 If the Owner wrongfully terminates the Contract for cause, the rights, remedies and obligations of the parties will be the same as if the Owner had terminated the Contract for convenience under Section 14.4.

§ 14.2.6 In the event that the Contractor, or the Contractor's surety, challenges the Owner's termination of the Contract for cause, and the Owner prevails in litigation in connection with such challenge, whether initiated by the Owner or by the Contractor or the Contractor's surety, the Owner shall be entitled to its costs, including reasonable attorney's fees, incurred as a result of such litigation, as part of any judgment against the Contractor or the Contractor's surety. Such costs, including reasonable attorney's fees, shall be deemed a cost of finishing the Work.

§ 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. The Owner shall incur no liability by reason of such suspension, delay, or interruption except that the Contractor may request an extension of its time to complete its Work in accordance with Article 8 hereof.

§ 14.3.2 The Contract Time shall be adjusted for increases in time caused by suspension, delay or interruption as described in Section 14.3.1. No adjustment shall be made to the extent:

.1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or

.2 that an equitable adjustment is made or denied under another provision of this Contract.

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§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the whole or any portion of the Contract for the Owner's convenience and without cause upon not less than seven (7) days' written notice to the Contractor. Notwithstanding any other provision to the contrary in the Contract, the Owner reserves the right at any time and in its absolute discretion to terminate the services of the Contractor or the Work by giving written notice to the Contractor. This termination for convenience of the Owner provision allows and authorizes the Owner to terminate this Contract at any time and for any reason whatsoever. This right may be exercised by the Owner in its complete discretion. Termination by the Owner under this Section shall be by Notice of Termination delivered to the Contractor specifying the extent of termination and the effective date.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall immediately and in accordance with instructions from the Owner:

.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;

.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; and

.4 proceed to complete the performance of the Work required under portions of the Contract not terminated, if any.

§ 14.4.3 Upon receipt of written notice of the Owner's exercise of such termination, the Contractor shall, as the Contractor's sole and exclusive remedy, be paid for the Work properly executed in accordance with the Contract Documents prior to the effective date of termination and for items properly fabricated off-site, delivered and stored in accordance with the Owner's instructions or the Contract Documents before such effective date. The Contractor's entitlement to payment for all such work shall be predicated on its performance of such work in accordance with the Contract Documents as certified by the Architect and Construction Manager. The Contractor shall be entitled to no other payment and waives any claim for damages including, but not limited to, lost profits, any prospective loss, underutilization of personnel or equipment, unabsorbed overhead, and any and all items of consequential loss or damage. The Owner shall be entitled to credit against any payment to be made to the Contractor pursuant to this Section 14.4 the following: (1) payments previously made to the Contractor for the terminated portion of the Work; (2) claims which the Owner has against the Contractor under the Contract Documents; and (3) the value of the materials, supplies, equipment, or other items that are to be disposed of by the Contractor, the cost of which is included in the Contract Sum. Notwithstanding the foregoing, in the event of a termination under Section 14.4.1 prior to the issuance of a Notice to Proceed, the Contractor shall not be entitled to any compensation whatsoever.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition. A Claim is a demand or assertion by the Contractor seeking, as a matter of right, payment of money, 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. Neither a Request for Information, nor a Construction Change Directive, nor a Change Order, nor a reservation of rights, nor minutes of a meeting, nor a daily report, nor any log entry, nor an Owner's request for or the Contractor's response to a Change Order proposal, nor notice of a potential or future claim shall constitute a Claim.

§ 15.1.2 Time Limits on Claims

(Paragraph deleted)

§ 15.1.2.1 Claims by the Contractor must be initiated by written notice to the Owner and the Initial Decision Maker. Claims by the Contractor must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the Contractor first recognizes the condition giving rise to the Claim, whichever is earlier.

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by the Contractor must be initiated by written notice to the Owner and to the Architect with a copy sent to the Construction Manager within the time limits set forth in Section 15.1.2.1 above. The purpose of the written notice is to give the Owner prompt opportunity: (a) to cancel or revise orders or directions, change plans, mitigate or remedy circumstances giving rise to the Claim or to take other action that may be desirable; (b) to monitor and verify the facts and circumstances as they occur; and (c) to verify any costs and expenses claimed by the Contractor contemporaneously as they are incurred. Written notice is required whether or not the Owner, Construction Manager

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or Architect is aware of the facts or circumstances that constitute the basis for the Contractor's Claim, and no action or conduct of the Owner, Construction Manager, Architect or any other person will be regarded as a waiver of such notice requirement except only a written statement to such effect signed by the Owner. Failure of the Contractor to give written notice as required by this Section shall be deemed conclusively to be a waiver and release of any Claim, and such written notice shall be a condition precedent to the Contractor's right to make any Claim arising out of, under or in connection with the Contract or its performance of the Work.

§ 15.1.3.2 Written notice shall contain a heading stating "Notice of Claim" to clearly identify it as such. Such notice shall set forth in detail the circumstances that form the basis for the Claim and shall include the following: (1) a clear statement of the claim, including background and chronology; (2) documentation in support of the claim; (3) documentation in support of claimed damages; and (4) certification by responsible officer of the Contractor. The responsibility to substantiate Claims shall rest with the Contractor. An additional Claim arising from the same occurrence or condition made after the Initial Claim has been implemented by Change Order shall not be considered.

§ 15.1.3.3 The Contractor agrees that it has and will make no claim for damages against the Owner by reason of any act or failure to act by any other Contractor, Separate Contractor or Subcontractors having contracts for performance of any portion of work of the Project or in connection with the Owner's, Architect's or Construction Manager's acts or omissions to act in connection with such other Contractors, Separate Contractors or Subcontractors.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 Pending final resolution of a Claim by the Contractor, except as otherwise agreed in writing or as provided in Section 9.7, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments of undisputed amounts in accordance with the Contract Documents; provided, however, that the Contractor shall use its best efforts to furnish the Architect and Owner, as expeditiously as possible, with notice of any Claim including, without limitation, those in connection with concealed or unknown conditions, once such Claim is recognized, and shall cooperate with the Architect and the Owner in any effort to mitigate the alleged or potential damages, delay or other adverse consequences arising out of the condition which is the cause of such a Claim. The Construction Manager will prepare Change Orders and the Architect will issue a Certificate for Payment or Project Certificate for Payment in accordance with the decisions of the Initial Decision Maker.

(Paragraph deleted)

§ 15.1.5 Claims for Additional Cost. If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.3. The Contractor agrees that an express condition precedent to the Contractor's entitlement to any increase in the Contract Sum shall be full and complete compliance to the satisfaction of the Owner with the requirements of Article 15. The Contractor acknowledges the no damages for delay provisions set forth in Sections 8.3.2 and 15.1.6.1.4 hereof.

§ 15.1.5.1 The Contractor shall not be entitled to any adjustment in the Contract Sum or Contract Time if:

- **.1** The Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner in respect of Contract Sum and Contract Times by the submission of a bid or becoming bound under a negotiated contract; or
- **.2** The existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test or study of the site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for the Contractor prior to Contractor's making such final commitment;
- **.3** The Contractor failed to give the written notice within the time and as required by Section 15.1.2; or
- **.4** If the Owner and the Contractor are unable to agree on entitlement to or as to the amount or length of any such equitable adjustment in the Contract Sum or Contract Times, a claim may be made therefore as provided in Article 15. However, the Owner, Construction Manager, and Architect shall not be liable to the Contractor for any claims, costs, losses or damages sustained by the Contractor on or in connection with any other project or anticipated project.

§ 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 Sections 15.1.2 and 15.1.3 shall be given. The Contractor's Claim shall include an estimate of the probable effect of delay on progress of the Work. In the case of a continuing delay only one Claim is necessary.

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§ 15.1.6.1.1 An application for extension of time must set forth in detail the circumstances that form the basis for the Claim, the date upon which each cause of delay began to affect the progress of the Work, the date upon which each cause of delay ceased to affect the progress of the Work and the number of days' increase in the Contract Time claimed as a consequence of each such cause of delay. The Contractor shall provide such supporting documentation as the Owner, Construction Manager or Architect may require including, where appropriate, a revised construction schedule indicating all the activities affected by the circumstances forming the basis of the Claim for an increase in the Contract Time.

§ 15.1.6.1.2 The Contractor shall not be entitled to a separate increase in the Contract Time for each one of the number of causes of delay which may have concurrent or interrelated effects on the progress of the Work, or for concurrent delays due to the fault of the Contractor.

§ 15.1.6.1.3 The Contractor agrees that an express condition precedent to the Contractor's entitlement to any extension of the Contract Time shall be full and complete compliance to the satisfaction of the Owner with the requirements of Articles 8 and 15.

§ 15.1.6.1.4 The Owner shall not be liable to the Contractor or any of its Subcontractor for claims, impact costs, extended general conditions or delay damages of any nature caused by or arising out of delay, disruption, interference, inefficiencies, impedance, hindrance, acceleration, resequencing, schedule impacts, lack of timeliness by the Owner or its Architect or Construction Manager, and lack of coordination or scheduling, cumulative impact of multiple change orders, errors or omissions in the design of the Project, delay and other performance impacts. The sole remedy against the Owner for such delays shall be the allowance of additional time for completion of the Work, the amount of which shall be subject to the Claims procedure set forth herein. Except to the extent, if any, expressly prohibited by law, the Contractor expressly agrees not to make and hereby waives any claim for damages for delay, including, but not limited to, those resulting from increased labor or material costs, extended general conditions, directions given or not given by the Owner, Construction Manager, or Architect, including scheduling and coordination of the Work; the Architect's preparation of drawings and specifications or the Construction Manager's or Architect's review of shop drawings and requests for instructions; errors or omissions in the design of the Project; or, on account of any delay, disruption, interference, impedance, inefficiency, lack of productivity, obstruction or hindrance for any cause whatsoever by the Owner, Construction Manager, Architect or any other Contractor or Separate Contractor on the Project whether or not foreseeable or anticipated. The Contractor agrees that its sole right and remedy therefore shall be an extension of time, if appropriate. It is emphasized that no monetary recovery may be obtained by the Contractor for delay against the Owner, Construction Manager, Architect, other Contractor or Separate Contractor based on any reason and that the Contractor's sole remedy, if appropriate, is additional time.

§ 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. In planning his construction schedule within the agreed Contract Time, it shall be assumed that the Contractor has anticipated the amount of adverse weather conditions normal to the site of the Work for the season or seasons of the year involved. Only those weather delays attributable to other than normal weather conditions will be considered by the Architect.

§ 15.1.7 Waiver of Claims for Consequential Damages. The Contractor waives any and all claims for consequential damages of any kind and nature arising out of or relating to this Contract. This
(Paragraphs deleted)
waiver of consequential damages shall survive termination of the Contract.

§ 15.2 Initial Decision

§ 15.2.1 Claims by the Contractor, 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 by the Contractor excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to binding dispute resolution of any Claim. If an initial decision has not been rendered within 30 days after the Contractor's Claim has been referred to the Initial Decision Maker, the Contractor may proceed with binding dispute resolution without a decision having been rendered.

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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 by the Contractor 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 by the Contractor, 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 by the Contractor or to furnish additional supporting data, such party shall respond, within 10 days after receipt of such 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 by the Contractor in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim by the Contractor, 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 and Construction Manager, if the Architect or Construction Manager 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 binding dispute resolution.

§ 15.2.6 Intentionally omitted.

§ 15.2.6.1 Intentionally omitted.

§ 15.2.7 Intentionally omitted.

§ 15.2.8 If a Claim by the Contractor 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.

ARTICLE 16 SPECIAL CONDITIONS

§ 16.1 Equal Opportunity

§ 16.1.1 The Contractor shall maintain policies for equal employment opportunity for construction employment. During performance of the Agreement, the Contractor agrees as follows:

§ 16.1.2 The Contractor and its Subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex **(including trans-gender), sexual orientation,** or national origin. The Contractor shall take affirmative action to ensure that all applicants are employed, and that employees are treated during employment without regard to their race, religion, color, sex, **(including trans-gender), sexual orientation,** or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship and on-the-job training.

§ 16.1.3 The Contractor will post and keep posted in conspicuous places, for employees and applicants for employment, notices obtained by the Contractor from the New York State Division of Human Rights as set forth in the General Regulations of that Division at 9 NYCRR 466.1(a), such conspicuous places to be as defined in 9 NYCRR 466.1(b), and such other postings as that Division may require with respect to New York State's laws, codes, rules, and regulations governing discrimination in employment.

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§ 16.1.4 The Contractor will state in all solicitations or advertisements for employees placed by, or on behalf, of the Contractor, that all qualified applicants will be afforded equal employment opportunities without discrimination because of race, creed, color ,**sex, (including trans-gender), sexual orientation,** or national origin.

§ 16.1.5 The Contractor will comply with provisions of Sections 290-299 of the Executive Law and with the Civil Rights Law, will furnish all information and reports deemed necessary by the State Commissioner of Human Rights under these non-discrimination clauses and such sections of the Executive Law, and will permit access to the Contractor's books, records and accounts by the Owner, the State Commissioner of Human Rights, the Attorney General and the Industrial Commissioner for the purposes of investigation to ascertain compliance with these nondiscrimination clauses and such sections of the Executive Law and Civil Rights Law.

§ 16.1.6 The Contractor will send to each labor union, or representatives of workers, with which it has, or is bound by a collective bargaining or other Agreement or understanding notices obtained from the State Commissioner of Human Rights, advising such Labor Union or representative of the Contractor's Agreement under requirements of this Article. If the Contractor was directed to do so by Owner as part of the Bid, the Contractor shall request such labor union or representative to furnish him with a written statement that such labor union or representative will not discriminate because of race, creed, color, **sex, (including trans-gender), sexual orientation,** or national origin and that such labor union or representative either will affirmatively cooperate within the limits of its legal and contractual authority in the implementation of the policy and provisions of these non-discrimination clauses or that it consents and agrees that recruitment accordance with the purposes and provisions of these non-discrimination clauses. If such labor union or representative fails or refuses to comply with such a request that it furnish such a statement, the Contractor shall promptly notify the Owner and State Commissioner of Human Rights of such failure or refusal.

§ 16.1.7 The Agreement may be forthwith canceled, terminated or suspended in whole, or in part, by Owner upon the basis of a finding made by the State Division of Human Rights, that the Contractor has not complied with these non-discrimination clauses, and the Contractor may be declared ineligible for future Contracts made by, or in behalf of, the State, or Authority or Agency of the State, or Housing Authority or an Urban Renewal Agency, or Contracts requiring the approval of the Commissioner of Housing and Community Renewal, until it has satisfied the State Division of Human Rights, that it has established and is carrying out a program in conformity with the provisions of these non-discrimination clauses. Such findings shall be made by the State Division of Human Rights after conciliation efforts by the Division have failed to achieve compliance with these non-discrimination clauses and after a verified complaint has been filed with the Division, notice thereof has been given to the Contractor, and an opportunity has been afforded by the Contractor to be heard publicly in accordance with the Executive Law. Such sanctions may be imposed and remedies invoked immediately of, or in addition to sanction in remedies otherwise provided by law. If the Agreement is canceled or terminated under provisions of this Article, in addition to other rights of Owner provided in the Agreement upon its breach by the Contractor, the Contractor will hold Owner harmless against any additional expenses or costs incurred by Owner in completing the work or in purchasing the services, materials, equipment or supplies contemplated by Agreement and Owner may withhold payments from the Contractor in an amount sufficient for this purpose and recourse may be had against authority on the Performance Bond if necessary.

§ 16.1.8 The Contractor will include the provisions of this Article in every subcontract or purchase order in such a manner that such provisions will be binding upon each subcontractor or vendor as to operations to be performed within the State of New York. The Contractor will take such action in enforcing such provisions of such subcontractor or purchase order as the State Division of Human Rights or the Owner may direct, including sanctions or remedies for non-compliance. If the Contractor becomes involved in or is threatened with litigation with a subcontractor or a vendor, as a result of such direction by the State Division of Human Rights, the Contractor shall promptly so notify the Owner and the Attorney General, requesting the Attorney General to intervene and protect the interests of the State of New York.

§ 16.2 Waiver of Immunity

§ 16.2.1 The Contractor hereby agrees to the provisions of Paragraph 139-a and l39-b of the New York State Finance Law and Section 103-a of the New York General Municipal Law, which require that upon the refusal of a person, when called before a grand jury, head of a State department, temporary State commission or other State agency, or the organized crime task force in the Department of Law, which is empowered to compel the attendance of witnesses and examine them under oath, to testify in an investigation concerning any transaction or contract had with the State, any political subdivision thereof, a public authority or with any public department, agency or official of the State or of any

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political subdivision thereof or of a public authority, to sign a waiver of immunity against subsequent criminal prosecution or to answer any relevant question concerning such transaction or contract.

§ 16.2.1.1 Such person, and any firm, partnership or corporation of which he is a member, partner, director or officer shall be disqualified from thereafter selling to or submitting bids to or receiving awards from or entering into any contracts with New York State or any public department, agency or official thereof for goods, work or services, for a period of five years after such refusal.

(Paragraph deleted)
§ 16.2.1.2 Any and all contracts made with the State of New York, or any public department, agency or official thereof since the effective date of this law, by such person, and by an firm, partnership or corporation of which he is a member, partner, director or officer may be canceled or terminated by the State of New York without incurring any penalty or damages on account of such cancellation or termination, but any moneys owning by the State of New York for goods delivered or work done prior to the cancellation or termination shall be paid.

§ 16.3 Non-Collusive Clause as Required by NYS General Municipal Law Section 103-d
(Paragraph deleted)
§ 16.3.1 Every bid or proposal hereafter made to a political subdivision of the state or any public department, agency or official thereof where competitive bidding is required by statute, rule, regulation or local law, for work or services performed or to be performed or goods sold or to be sold, shall contain the following statement subscribed by the bidder and affirmed by such bidder as true under the penalties of perjury: Non-collusive bidding certification.

(Paragraph deleted)
§ 16.3.2 By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of knowledge and belief, the following:

(Paragraph deleted)
§ 16.3.2.1 The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competitions, as to any matter relating to such prices with any other bidder or with any competitor.

§ 16.3.2.2 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.

(Paragraph deleted)
§ 16.3.2.3 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.

§ 16.3.3 A bid shall not be considered for award nor shall any award be made where requirements of this Article have not been complied with; provided however, that in any case the bidder cannot make the foregoing certification, the bidder shall so state and shall furnish with the bid a signed statement which set forth in detail the reasons therefore. Where requirements of this Article have not been complied with, the bid shall not be considered for award nor shall any award by made unless the head of the purchasing agent of the political subdivision, public department, agency or official thereof to which the bid is made, or his designee, determines that such disclosure was not made for the purpose of restricting competition.

(Paragraph deleted)
§ 16.3.4 The fact that a bidder (a) has published price lists, rates, or tariffs covering items being procured, (b) has informed prospective customers of proposed, or pending, publication of new or revised price list for such items, or (c) has sold the same items to other customers at the same prices being bids, does not constitute a disclosure within the meaning of this Article.

§ 16.3.5 Any bid hereafter made to any political subdivision of the state or any public department, agency official

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thereof by a corporate bidder for work or services performed or to be performed or good sold or to be sold, where competitive bidding is required by statute, rule, regulation, or local law, and where such bid contains the certification referred to in subdivision one of this section, shall be deemed to have been authorized shall be deemed to include the signing and submission of the bid and the inclusion therein of the certificate as to non-collusion as the act and deed of the corporation.

(Paragraph deleted)

§ 16.4 Assignment of Public Contracts

As provided in Section 109 of the General Municipal Law, the Contractor is prohibited from assigning, transferring, conveying, subletting or otherwise disposing of the same, or of his right title, or interest therein, or his power to execute such contract or any other person or corporation without the previous consent in writing of the officer, board or agency awarding the contract. If any contractor, to whom any contract is let, granted and awarded, as required by law, by any officer, board or agency in a political subdivision, or of any district therein, shall without the previous written consent specified in subdivision one of this section, assign, transfer, convey, sublet or otherwise dispose of such contract, or his right, title or interest therein, or his power to execute such contract, to any other person or corporation, the officer, board or agency which let, made, granted, or awarded such contract shall revoke and annul such contract, and the political subdivision or district therein, as the case may be, and such officer, board or agency shall be relieved and discharged form any and all liability and obligations growing out of such contract to such contractor, and to the person or corporation to which such contract shall have been assigned, transferred, conveyed, sublet or otherwise disposed of, and such contractor, and his assignees, transferees or sublessees shall forfeit and lose all moneys, theretofore earned under such contract, except so much as may be required to pay his employees. The provisions of this section shall not hinder, prevent, or affect an assignment by any such contractor for the benefit of his creditors made pursuant to the laws of this state.

§ 16.5 Fingerprinting

Pursuant to the Safe Schools Against Violence in Education Act ("SAVE" legislation) and Part 87 of the Regulations of the Commissioner of Education, any individual who, as a result of their work on this capital project, will move (or migrate) in and out of student occupied areas for more than five (5) days a year, must be fingerprinted. The Contractor shall be responsible to ensure that it (and its employees) are in full compliance with the fingerprinting provisions New York's SAVE Legislation and Part 87 of the Regulations of the Commissioner of Education at the Contractor's sole cost and expense.

(Paragraph deleted)

ARTICLE 17 NEW YORK STATE LABOR LAW REQUIREMENTS

§ 17.1 Working Hours

(Paragraph deleted)

§ 17.1.1 The Contractor specifically agrees as required by the New York State Labor Law ("Labor Law"), Sections 220 and 220-d, as amended, that:

.1 No laborer, worker, or mechanic in the employ of the Contractor, Subcontractor or other person doing or contracting to do the whole or any part of the work included in the Contract Documents shall be permitted or required to work more than eight hours in any one calendar day or more than five (5) days in any one week, except to the extent permitted in the case of extraordinary emergencies described in the Labor Law.

.2 The wages to be paid to each laborer, worker, or mechanic in the employ of the Contractor, Subcontractor, or other person doing or contracting to do all or any part of the work included in the Contract Documents for a legal day's work shall be not less than the prevailing rate of wages as defined by the Labor Law.

.3 Each laborer, workman or mechanic employed by the Contractor, a Subcontractor, or other person doing or contracting to do all or any part of the work included in the Contract Documents shall be provided the supplements required by Article 8 of the Labor Law.

.4 The minimum hourly rate of wage to be paid shall be not less than that stated in the General Conditions, and shall be as designated by the industrial Commissioner.

.5 The Contractor's and any Subcontractor's or other person's filing of payrolls in a manner prescribed by subdivision 3-a of Section 220 of the Labor Law shall be a condition precedent to the to the Owner's payment of any sums due and owing to the Contractor, Subcontractor or other party for work done on or with respect to the Project.

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§ 17.2 Wage Rates

(Paragraph deleted)

§ 17.2.1 The Contractor specifically agrees, as required by the Labor Law, that the Contract may be forfeited and no sum paid for any work done thereunder on a second conviction for willfully paying less than:

.1 the prevailing wage rates as provided in Labor Law Section 220(3) as amended, or,

.2 the minimum wage rates as provided in Labor Law Section 220-d, as amended.

§ 17.2.2 The Contractor shall comply with Prevailing Wage Rates as issued by the State of New York Department of Labor for the location and duration of this Project. Current wage rates for this project are included in the Project Manual as part of the Contract Documents. The Contractor is responsible to regularly review "Prevailing Wage Schedules/Updates" available on the "Prevailing Wage/Public Work" link on State of New York Department of Labor "Business in New York" web page (www.labor.state.ny.gov) to identify and implement any applicable changes to Prevailing Wage Rates during the Project.

(Paragraph deleted)

§ 17.2.3 The Contractor shall comply with all the requirements of the Labor Law Section 220-a, as amended, regarding mandatory submission of certified payroll records, which shall be included with each application for payment.

(Paragraphs deleted)

§ 17.3 Anti-Discrimination

§ 17.3.1 The Contractor specifically agrees, as required by the provisions of Section 220-e of the Labor Law, as amended, that:

.1 In the hiring of employees for the performance of work under the Contract or any subcontract hereunder, no contractor, subcontractor, nor any person acting on behalf of such contractor or subcontractor, shall be reason of race, creed, color, **sex (including transgender),** sexual orientation, or national origin discriminate against any citizen of the State of New York who is qualified and available to perform the work to which the employment relates;

.2 No contractor, subcontractor, nor any person on its behalf, shall in any manner, discriminate or intimidate any employee hired for the performance of work under the contact on account of race, creed, color, sexual orientation, or national origin.

.3 There may be deducted from the amount payable to the Contractor by the Owner under the contract a penalty at fifty dollars for each person for each calendar day during which such person was discriminated against or intimidated in violation of the provisions of the contract; and

.4 The Contract may be canceled or terminated by the Owner, and all monies due or to become due thereunder may be forfeited for a second or any subsequent violation of the terms or conditions of this section of the Contract.

ARTICLE 18 GENERAL MUNICIPAL LAW REQUIREMENTS OF THE STATE OF NEW YORK

§ 18.1 Payment of Contractors and Subcontractors

§ 18.1.1 The Contractor specifically agrees it is bound by Section 106-b of the New York General Municipal Law.

ARTICLE 19 SPECIFIC CONFORMANCE TO THE LAWS OF THE STATE OF NEW YORK

§ 19.1 Statutory Requirements

§ 19.1.1 The parties agree that each is bound to the provisions of the laws of the State of New York governing bidding and contracting for public improvement projects, including but not limited to applicable provisions of the General Obligations Law, Labor Law, and General Municipal Law. To the extent any provisions in the Contract Documents conflict with any provisions of New York Law, the statutory provisions shall prevail and the conflicting provisions in the Contract Documents shall be deemed to conform to the statutory provisions.

§ 19.1.2 To the extent the laws of the State of New York governing bidding and contracting for public improvement projects mandate inclusion of specific terms in contracts for such improvements, but which are not already included in these General Conditions, such terms shall be deemed and hereby are incorporated into these General Conditions.

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Nanuet HS School: 50-01-08-03-0-003-036
Barr Middle School: 50-01-08-03-0-004-021
Miller Elementary School: 50-01-08-03-0-001-025

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16 SPECIAL CONDITIONS

17 NEW YORK STATE LABOR LAW REQUIREMENTS

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18 GENERAL MUNICIPAL LAW REQUIREMENTS OF THE STATE OF NEW YORK

19 SPECIFIC CONFORMANCE TO THE LAWS OF THE STATE OF NEW YORK

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§ 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~~ (hereinafter, the "Agreement"), and consist of the Bidding Documents (including, but not limited to, Invitations to Bid, Instructions to Bidders, sample forms, the Contractor's bid or portions of the addenda relating to bidding requirements), 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,~~ 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,~~ 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.~~ Construction (hereinafter, the "Contract"). The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and the Construction Manager or the Construction Manager's consultants, (3) between the Owner and the Architect or the Architect's consultants, (4) between the Contractor and the Construction Manager or the Construction Manager's consultants, (5) between the Owner and a Subcontractor or Sub-subcontractor (6) between the Construction Manager and the Architect, or (7) between any persons or entities other than the Owner and Contractor. The Construction Manager and Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of their duties.

§ 1.1.2.1 Where the term "Agreement," "Contract" or "Prime Contract" is used in these General Conditions, and other Contract Documents, it shall mean the separate Owner-Contractor Agreement between the Owner and each Prime Contractor identified in Conditions of the Contract (General, Supplementary and other conditions).

§ 1.1.2.2 The Contractor acknowledges and warrants that it has closely examined all the Contract Documents, that they are suitable and sufficient to enable the Contractor to complete the Work in a timely manner for the Contract Sum, and that they include all work, whether or not shown or described, which reasonably may be inferred to be required or useful for the completion of the Work in full compliance with all applicable statutes, codes, laws, ordinances and regulations.

§ 1.1.3 The Work. The term "Work" means the construction and services required by the Contract Documents, or as reasonably inferable therefrom, 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. The Work includes all of the Contractor's responsibilities as to all labor, parts, supplies, equipment, skill, supervision, transportation services, storage requirements, and other facilities and things necessary, proper or incidental to the carrying out and completion of the terms of the Contract Documents and all other items of cost or value needed to produce, construct, and fully complete the Contractor's Work identified by the Contract Documents.

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

§ 1.1.9 Instruments of Service. Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without

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limitation, studies, surveys, models, sketches, drawings, specifications, and other similar ~~materials.~~materials including those in electronic form.

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§ 1.1.11 Miscellaneous Definitions

§ 1.1.11.1 The terms "knowledge," "recognize" and "discover," their respective derivatives and similar terms in the Contract Documents, as used in reference to the Contractor, shall be interpreted to mean that which the Contractor knows (or should know), recognizes (or should recognize) and discovers (or should discover) in exercising the care, skill, and diligence required by the Contract Documents. The expression "reasonably inferable" and similar terms in the Contract Documents shall be interpreted to mean reasonably inferable by a contractor familiar with the Project and exercising care, skill, and diligence required of the Contractor by the Contract Documents.

§ 1.1.11.2 The term "any" in the Contract Documents shall be interpreted as "any and all" whenever one or more than one item would be applicable for completion of the Work.

§ 1.1.11.3 Except as otherwise explicitly provided, the words "approved" or "approval" shall mean the written approval of the Architect or the Construction Manager, or both.

§ 1.1.11.4 "Accepted," "directed," "permitted," "requested," "required," and "selected" are used herein as term connections and unless specifically noted otherwise are to mean "accepted by the Architect," "directed by the Architect," "permitted by the Architect," "requested by the Architect," "required by the Architect," and "selected by the Architect." However, no such implied meaning will be interpreted to extend the Architect's responsibility into the Contractor's areas of construction supervision.

§ 1.1.11.5 The term "as indicated" or "as shown" shall mean "as indicated in the Contract Documents."

§ 1.1.11.6 The term "include" in any form other than "inclusive" is non-limiting and not intended to mean "all inclusive."

§ 1.1.11.7 The terms "furnish" and "furnish all materials," unless specifically noted otherwise, mean "pay for, supply and deliver to the job site all new materials, systems, equipment, product, and/or other items so specified."

§ 1.1.11.8 The terms "install" and "furnish all labor," unless specifically noted otherwise, mean "pay for, perform all operations connected with installation of Work including unloading new product to be installed, supplying all necessary equipment and rigs to do the Work, test, place in operation and service, and remove all packing material."

§ 1.1.11.9 The term "product" includes materials, systems, equipment, and other items to be incorporated into the Work.

§ 1.1.11.10 The term "provide," unless specifically noted otherwise, means "furnish new, install, connect up, complete, test and place in operation and service."

§ 1.1.11.11 The term "replace" or similar term shall mean "restore," "renew," "make good," "reconstruct," or "as applicable using new product."

§ 1.1.11.12 The term "concealed" as used herein shall mean items hidden from sight in such locations as trenches, chases, shafts, furred spaces, walls, slabs, above ceilings and where in sight in crawl spaces or service tunnels.

§1.1.11.13 The term "exposed" as used herein shall mean not "concealed" as defined herein and the spaces behind normally closed doors such as interiors of cabinets.

§ 1.1.11.14 The terms "manufacturer" or "supplier" mean any person or entity which contracts to furnish materials to a Contractor, Subcontractor, or any Sub-subcontractor for use at the site of the Project.

§ 1.1.11.15 "Wiring" shall be understood to mean wires or cables with conduit, fittings, boxes, etc., installed complete.

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§ 1.1.11.16 "Piping" shall be understood to mean all pipes, fittings, nipples, valves and all accessories connected thereto.

§ 1.1.11.17 The Contract Time is the period of time specified in Article 3 of the Agreement for completion of the Work.

§ 1.1.11.18 Terms not otherwise defined herein shall have the meanings set forth elsewhere in 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. It is intended that all plumbing, mechanical, electrical, and other systems will be complete and in proper operation, and that all construction components, whether part of such systems or otherwise, will be complete and in compliance with accepted construction practice upon completion of the Work. Even if items are missing from the Drawings or Specifications, but are normally required for proper operation of plumbing, mechanical, electrical, and other systems, or to complete otherwise incomplete construction, or to meet governing code requirements, they shall be included by the Contractor, unless he sought and received contradictory interpretation or clarification from the Architect.

§ 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.

§ 1.2.1.2 The Contractor and its Subcontractors shall evaluate and satisfy themselves as to the conditions and limitations under which the Work is to be performed, including without limitation (1) location, layout, and nature of the Project site and surrounding areas, (2) generally prevailing climatic conditions, (3) anticipated labor supply and costs, (4) availability and cost of materials, tools, equipment, (5) Owner occupancy requirements and constraints, (6) site safety logistics plan and any phased construction plan and (7) other similar issues. The Owner assumes no responsibility or liability for the physical condition or safety of the Project site or any improvements located on the Project site. The Contractor shall be solely responsible for providing a safe place for the performance of the Work. No adjustments will be made in either the Contract Sum or Contract Time for any failure by the Contractor or any Subcontractor to comply with the requirements of this Section 1.2.1.2.

§ 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. Instructions and other information furnished in the Specifications including, without limitation, items in connection with prefabricated or prefinished items, are not intended to supersede work agreements between employers and employees. Should the Specifications conflict with such work agreements, the work agreements shall be followed, provided such items are provided and finished as specified in the Contract Documents. If necessary, such work shall be performed on the Project site, instead of at the shop, by appropriate labor and in accordance with the requirements of the Drawings and Specifications.

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§ 1.2.4 In the event of inconsistencies within or between parts of the Contract Documents or between the Contract Documents and applicable standards, codes and ordinances, the Contractor shall (1) provide the better quality or greater quantity of work or (2) comply with the more stringent requirements; either or both in accordance with the Architect's interpretation. Where the Contractor perceives a conflict, it shall inform the Architect and Owner thereof and request a decision from the Architect, which shall be promptly communicated by the Architect to the Contractor so as not to cause any delay in the performance of the Work. Any Work performed after perceiving the conflict and prior to resolution by the Architect shall be at the Contractor's risk. The terms and provisions of this Section 1.2.4, however, shall not relieve the Contractor of any of the obligations set forth elsewhere herein.

.1 The Contractor shall not scale Drawings. Dimensions on large scale drawings take precedence over dimensions on small scale drawings. The Contractor shall notify the Architect if additional dimensions are needed. The Contractor shall field verify all dimensions.

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.2 Before ordering any materials or doing any work, the Contractor and each Subcontractor shall verify measurements at the Project Site and shall be responsible for the correctness of such measurements. The Contractor shall confirm all dimensions by field measuring. No extra charge or compensation will be allowed on account of differences between actual dimensions and the dimensions indicated on the Drawings. Any difference that may be found shall be submitted to the Architect for resolution before proceeding with the Work.

.3 If a minor change in the Work is found necessary due to actual field conditions, the Contractor shall submit detailed drawings of such departure for the approval by the Architect before making the change.

.4 Certain portions of the Specifications are written in condensed outline form and omitted words are to be supplied by inference. Naming of an article or operations shall have the effect of stating "Contractor shall furnish, install and complete" said operation or article unless it is further qualified in the context in which it appears.

.5 When reference is made to specifications of a manufacturer, trade association, governmental agency, reference standard or similar source (such as ASTM, ASA, AISC, ACI, etc.) such is made part of these Specifications, having the force and effect as though reproduced herein, and upon entering into the Contract the Contractor acknowledges his familiarity with those pertaining to his work. The date of the reference standard shall be the latest edition at the time of signing the Contract except as specifically indicated otherwise.

.6 The Contract Drawings are intended to show the general arrangement, design, and extent of the Work and are partly diagrammatic. They are not intended to be scaled for any purpose, or to serve as shop drawings. The Contractor and its Subcontractors will cooperate with all other contractors and their respective subcontractors in determining the construction of systems, running of pipe, and locating equipment. The Contractor agrees that the failure to repeat typical details, figures, or notes on all Contract Drawings or other Contract Documents will not be a basis for claims for additional cost or time.

.7 Any necessary variations in routing or installation shall be made to conform to the intent of the Contract Documents without additional costs. Where there are intersections or obstructions involving ducts, piping, or any other equipment requiring offset of materials, the Contractor acknowledges that it gave particular consideration to clearances in advance of submitting its bid, and that no additional costs for these issues will be considered by the Owner.

.8 If conflicting conditions or interferences develop, the Contractor and its Subcontractors will confer with the other contractors and their respective subcontractors whose work is affected to determine a solution acceptable to all interested parties. The suggested solution shall be submitted to the Architect for comment and, if necessary, written approval.

.9 The Contract Documents intend a first class finished product of such character and quality as described in and reasonably inferred from the Contract Documents. The Contractor will perform its Work to be complete and operable, fitting with the work of other contractors and the Owner, and in compliance with best construction practices and the ordinances, codes, and regulations of all bodies or persons having governmental or regulatory authority over the Contractor and its Work.

§ 1.2.5 Execution of the Contract by the Contractor is a representation that the Contractor has carefully examined the Contract Documents and the Project site, and represents that the Contractor is thoroughly familiar with the nature and location of the Work, the Project site, the specific conditions under which the Work is to be performed, and all matters which may in any way affect the Work or its performance. The Contractor further represents that as a result of such examinations and investigations, the Contractor thoroughly understands the Contract Documents and their intent and purpose, and is familiar with all applicable codes, ordinances, laws, regulations, and rules as they apply to the Work, and that the Contractor will abide by same. Claims for additional time or additional compensation as a result of the Contractor's failure to follow the foregoing procedure and to familiarize itself with all conditions and the Contract Documents will not be permitted.

§ 1.2.5.1 The Contractor certifies that it is experienced and familiar with the requirements and conditions imposed during the construction of similar work in the area. This includes, but is not limited to, "out of sequence" or "come back" work for the removal of plant, equipment, temporary wiring or plumbing, etc. This "out of sequence" work may also include phasing of construction activities to accommodate the installation of the Work at various locations and orderly fashion and the completion of Work at various locations or levels at various times. This "phasing," "out of sequence," or "come back" work shall be done at no cost to other Contractors, the Owner or Architect.

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§ 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~~ do not own ~~or~~ and cannot 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.

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§ 1.5.3 The Contractor may not reproduce the Contract Documents in whole or in part for use as shop drawing backgrounds without the prior written consent of the Architect. If consent is given, the Architect shall determine the extent that the Contract Documents may be used in the preparation of shop drawings, as well as the fee that the Architect will be paid, if any and in the Architect's sole discretion, by the Contractor for such use of copyrighted documents.

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§ 2.1.3 The Owner, Architect or Construction Manager shall not supervise, direct or have control or authority over, nor be responsible for, the Contractor's means, methods, techniques, sequences or procedures of construction or the safety precautions and programs incident thereto, or for any failure of the Contractor to comply with laws and regulations applicable to the furnishing or performance of the Work. The Owner, Architect and Construction Manager shall not be responsible for the Contractor's failure to perform or furnish the Work in accordance with the Contract Documents.

§ 2.2 Evidence of the Owner's Financial Arrangements – Intentionally Omitted.

~~**§ 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.~~

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§ 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~~ All permits and fees, approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing ~~facilities. Unless otherwise provided under the Contract Documents, the Owner, assisted by the Construction Manager, shall secure and pay for the building permit.~~facilities are the responsibility of the Contractor under the Contract Documents with the exception of the building permit, which the Owner will obtain from the State Education Department.

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§ 2.3.4 If the employment of the Construction Manager or Architect terminates, the Owner shall employ a successor construction manager or architect ~~to whom the Contractor has no reasonable objection and~~ whose status under the Contract Documents shall be that of the Construction Manager or Architect, respectively.

§ 2.3.5 The Owner shall ~~furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.~~make available for inspection, upon request, that field survey or testing information of existing conditions that is known to be available and that is held by the Owner at its offices. Such records and documents are not Contract Documents, and the Owner makes no representation as to their accuracy or completeness. Notwithstanding the foregoing, information furnished by the Owner in the form of surveys, subsurface investigation reports, soil borings, and other material of a similar nature, is for general information only and is not a guarantee of the completeness or accuracy of such information, unless specifically noted otherwise herein. The Contractor shall verify all existing grades, conditions, and dimensions of existing physical conditions and structures and shall report any inconsistencies in writing to the Architect. The Contractor shall establish all lines and levels required to execute the Work and shall bear all costs involved, and shall be responsible for their accuracy and maintenance.

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

§ 2.3.7 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor ~~one copy of the Contract Documents~~ five (5) sets of Contract Drawings and Project Manuals for use during construction for their own use and for purposes of making reproductions pursuant to Section 1.5.2. The Owner shall furnish additional sets upon a Contractor's written request. Such additional sets will be provided at the cost of printing, postage and handling. Partial sets will not be provided. Subcontractors and other entities desiring copies of Drawings will be provided sets at the cost of printing, postage and handling.

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If the Contractor (1) fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section ~~12.2 or repeatedly~~ 12.2, or (2) fails to carry out Work in accordance with ~~the Contract Documents,~~ the Contract Documents as determined by the Owner, Architect or Construction Manager, or (3) fails or refuses to provide a sufficient amount of properly supervised and coordinated labor, materials, or equipment so as to be able to complete the Work within the Contract Time, or (4) fails to remove and discharge (within seven (7) days) any lien filed upon Owner's property by anyone claiming by, through, or under the Contractor, or (5) fails to perform the Work in a safe manner and in compliance with all applicable health and safety requirements and the Contractor's site specific health and safety plan or (6) disregards the instructions of the Architect, Owner or Construction Manager, as determined by the Owner, Architect or Construction Manager, 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.~~entity. Such order or stoppage by the Owner shall not constitute grounds for termination by the Contractor under Article 14 and shall not be a basis for an extension of the Contract Time under Section 8.3 or Article 15.

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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~~ (including but not limited to all applicable health and safety requirements) and fails within a three (3) work day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner ~~may,~~ may after such three (3) work day period, without prejudice to other remedies the Owner may have, correct ~~such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to review by the Construction Manager and prior approval of the Architect, and the Construction Manager or Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for~~ such deficiencies. In such case an appropriate Change Order or Construction Change Directive shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including the Owner's expenses and compensation for the Construction Manager's and Architect's and their respective consultants' additional services ~~made necessary by such default, neglect, or failure. If current and future payments~~ and other expenses made necessary by such default, neglect or failure. Such Change Order or Construction Change Directive shall be deemed to have been executed by the Contractor, whether or not actually signed by the Contractor. Such action by the Owner and amounts charged to the Contractor shall be equally binding upon the Contractor's performance and payment bond surety. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. ~~If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.~~

§ 2.6 Extent of Owner's Rights

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

§ 2.6.2 In no event shall the Owner, Architect or Construction Manager have any responsibility for the Contractor's construction means, methods, techniques, sequences or procedures or for safety precautions and programs in connection with the Work notwithstanding any of the rights and authority granted the Owner in the Contract Documents.

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The term "Contractor" used herein shall include:

1. That Contractor normally responsible for that Work referenced.
2. "Prime Contractor" meaning either General Contractor, HVAC Contractor, Plumbing Contractor, Electrical Contractor, or any other Contractor whom the Owner has a direct contractual relationship for the referenced Work.
3. "Trade Contractor" meaning the Prime Contractor as above.

§ 3.1.2 The ~~Contractor shall perform the Work in accordance with the Contract Documents.~~plural term "Multiple Prime Contractors" refers to persons or entities who perform construction under contracts with the Owner that are administered by the Construction Manager. The term does not include the Owner's own forces, including persons or entities under separate contracts not administered by the Construction Manager.

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

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

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§ 3.2.1.1 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the Contract Documents relative to that portion of the Work, as well as with information furnished by the Owner pursuant to Section 2.3.5, shall take field measurements of any existing conditions related to that portion of the Work, shall observe any conditions at the site affecting it, and shall at once report in writing to the Construction Manager and the Architect errors, inconsistencies or omissions discovered. The Contractor shall not be liable to the Owner, the Construction Manager or the Architect for damage resulting from errors, inconsistencies or omissions in the Contract Documents unless the Contractor knew or reasonably should have known of such error, inconsistency or omission and failed to report it as required by this section to the Construction Manager and the Architect. If the Contractor performs any construction activity knowing it involves, or reasonably should have known it involves, a recognized error, inconsistency or omission in the Contract Documents without such notice to the Construction Manager and the Architect, the Contractor shall assume full responsibility for such performance and shall bear sole responsibility for the costs for correction.

§ 3.2.1.2 The obligations of the Contractor under Section 3.2.1.1 and this Section 3.2.1.2 are for the purpose of facilitating construction by the Contractor and are not for the purpose of imposing an affirmative obligation on the Contractor to discover errors, omissions, or inconsistencies in the design information in the Contract Documents. The Contractor's review of the Contract Documents is made in the Contractor's capacity as a contractor and not as a licensed design professional unless otherwise specifically so provided in the Contract Documents.

§ 3.2.1.3 Failure by the Contractor to promptly report any errors, inconsistencies, or omissions in the Contract Documents discovered by the Contractor, or which the Contractor reasonably should have known or discovered, shall constitute a waiver by the Contractor of any claim that otherwise might result in a change in the Contract Sum or Contract Time.

§ 3.2.2 ~~Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.5, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Construction Manager and Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information submitted to the Construction Manager in such form as the Construction Manager and Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.~~The Contractor shall be presumed to have examined the Project site(s) to consider fully all conditions that may have a bearing on the Work and to have accounted for these conditions its proposal. The Contractor is deemed to be a qualified expert in the systems and construction requirements of the Work of its Contract. The Contractor hereby specifically acknowledges and declares that the Contract Documents are full and complete, are sufficient to have enabled it to determine the cost of the Work, and that the Drawings, the Specifications, and all Addenda are sufficient to enable the Contractor to construct the Work outlined therein in accordance with applicable laws, statutes, building codes, and regulations, and otherwise to fulfill all of its obligations under the Contract Documents. The Contractor shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the Contractor with the Contract Documents before commencing activities. Errors, inconsistencies or omissions discovered shall be reported to the Construction Manager and the Architect at once. The exactness of grades, elevations, dimensions, or locations given on any Drawings issued by the Architect, or the work installed by other Contractors, is not guaranteed by the Architect, Construction Manager or the Owner. The Contractor shall, therefore, satisfy itself as to the accuracy of all grades, elevations, dimensions, and locations. In all cases of interconnection of its Work with existing or other work, the Contractor shall verify at the site all dimensions relating to such existing or other work. Any errors due to the Contractor's failure to so verify all such grades, elevations, dimensions, or locations shall be promptly rectified by the Contractor without any additional cost to the Owner. Except as to any reported errors, inconsistencies or omissions, and except as to concealed or unknown conditions, by executing the Agreement, the Contractor represents to the Owner, Construction Manager, and the Architect that the Work required by the Contract Documents, including, without limitation, all construction details, construction means, methods, procedure and techniques necessary to perform the Work, use of materials, selection of equipment and requirements of product manufacturers are consistent with: (1) good and sound practices within the construction industry; (2) generally prevailing and accepted industry

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standards applicable to Work; (3) the requirements of any warranties applicable to the Work; and (4) all laws, ordinances, regulations, rules and orders which bear upon the Contractor's performance of the Work.

§ 3.2.3 The Contractor ~~is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Construction Manager and Architect any nonconformity discovered by or made known to the Contractor as a request for information submitted to Construction Manager in such form as the Construction Manager and Architect may require.~~shall perform the Work in accordance with the Contract Documents and submittals approved pursuant to Section 3.12.

§ 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.~~The Contractor may submit Requests for Information ("RFI") to the Architect to help facilitate the Contractor's performance of the Work. Prior to submitting each RFI, the Contractor shall first carefully study and compare the Contract Documents, field conditions, other Owner provided information, Contractor-prepared Coordination Drawings, and prior Project correspondence and documentation to determine that the information to be requested is not reasonably obtainable from such sources. The Contractor shall submit each RFI sufficiently in advance of the date by which such information is required in order to allow the Architect sufficient time to permit adequate review and response and to permit Contractor compliance with the latest construction schedule. The Contractor shall reimburse the Owner amounts charged by the Architect for RFI responses that in the opinion of the Architect were available from a careful review of the Contract Documents, field conditions, other Owner provided information, Contractor-prepared Coordination Drawings, and prior Project correspondence and documentation.

§ 3.2.5 If the Contractor, during the progress of the Work, discovers any discrepancies between the Drawings and the Specifications, errors and/or omissions on the Drawings, or any discrepancies between physical conditions of the Work and the Drawings, and has notified the Architect and Construction Manager in writing under Section 3.2.1, no deviations from the Contract Documents shall be performed by the Contractor until it receives approval in writing from the Architect through the Construction Manager. Any Work performed after such discovery without the approval of the Architect shall be at the Contractor's sole risk and expense.

§ 3.2.6 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Construction Manager and the Architect any nonconformity discovered by or made known to the Contractor as a RFI submitted to the Architect.

§ 3.2.7 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 RFIs pursuant to Sections 3.2.1, 3.2.2, 3.2.4, 3.2.5 or 3.2.6, the Contractor shall make a Claim as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.1, 3.2.2, 3.2.4, 3.2.5 or 3.2.6, the Contractor shall pay such costs and damages to the Owner 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 the Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

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

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§ 3.2.8.1 The Contractor shall be required to establish centerlines, elevations and location of his work when it is required for the benefit of other Contractors needing the information to coordinate location of their work.

§ 3.2.9 Whenever the Drawings show existing or other construction not required as part of the Contract Work, it is understood that it is so shown as a matter of information and that the Owner, while believing such information to be substantially correct, assumes no responsibility thereof. The Contractor shall make itself familiar with all conditions affecting the nature and manner of conducting the Work.

§ 3.2.10 Claims for additional compensation or extension of time due to the Contractor's failure to familiarize itself with the conditions at the site will not be allowed.

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§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and ~~attention.~~ attention, and shall complete the Work in a good and workmanlike manner in accordance with the Contract Documents. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and ~~procedures,~~ procedures and for coordinating all portions of the Work ~~under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely notice to the Owner, the Construction Manager, and the Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. The Construction Manager shall review the proposed alternative for sequencing, constructability, and coordination impacts on the other Contractors. Unless the Architect or the Construction Manager objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.~~subject to the coordination of the Construction Manager. Where the Drawings or Project Manual make reference to particular construction means, methods, techniques, sequences or procedures or indicate or imply that such are to be used in connection with the Contractor's Work, such reference is intended only to indicate that the Contractor's Work is to produce at least the quality of the work implied by the operations described, but the actual determination as to whether or not the described operations may be safely or suitably employed in the performance of the Contractor's Work shall be the sole responsibility of the Contractor. All loss, damage, liability, or cost of correcting defective Work arising from the employment of a specific construction means, method, technique, sequence, or procedure shall be borne solely by the Contractor.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, ~~Subcontractors~~ Subcontractors, Suppliers, 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.~~Subcontractors, Suppliers or Sub-subcontractors, and for any damages, losses, costs and expenses resulting from such acts or omissions, including but not limited to reasonable attorneys' fees.

§ 3.3.3 The Contractor shall be responsible for ~~inspection of portions of the Project already performed to determine that such portions are in proper condition to receive subsequent Work.~~coordinating the work of its own forces and the work of Subcontractors engaged by it to perform the Work of the Project on its behalf. The Contractor shall supply to its own work forces, and Subcontractors engaged by it to perform portions of its Work, copies of the Drawings and Project Manuals for the work to be performed by such individuals/entities on its behalf.

§ 3.3.3.1 The Contractor shall coordinate its operations and cooperate with those of other Contractors performing work on the Project or site thereof to ensure efficient and orderly installation of each part of the Work. Cooperation will be required in the arrangement for the storage of materials and in the detailed execution of the Work. The Contractor shall remain informed of the progress and the detail work of other Contractors and shall notify the Construction Manager immediately of lack of progress or defective workmanship on the part of other Contractors, where such delay or such defective workmanship will interfere with Contractor's own operations. Failure of the Contractor to keep informed of the work progressing on the site or to give notice of lack of progress or defective workmanship by others shall be construed as acceptance of the progress of work and coordination with Contractor's own Work.

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§ 3.3.3.2 The Contractor's obligations under the Contract Documents shall include, without limitation, the following:

.1 Review of all specified construction and installation procedures with its employees and/or Subcontractors, including, without limitation, those recommended by manufacturers, prior to the commencement of the relevant portion of the Work to be performed.

.2 Advising the Construction Manager and the Architect:

.1 if a specified procedure deviates from best construction practice;

.2 if following a procedure will affect any warranties, including the Contractor's general warranty; or

.3 of any objections the Contractor may have to a procedure.

.3 Proposing alternative procedures, as appropriate, which procedures shall be covered by the Contractor's warranty as described in Section 3.5 hereof.

.4 The Contractor shall be responsible for organizing and conducting pre-installation conferences and must coordinate such conferences with the Architect and the Construction Manager.

§ 3.3.3.3 The Contractor and its Subcontractors working on the Project shall attend a preconstruction conference(s) or meeting(s) as deemed necessary by the Construction Manager to coordinate all Work (e.g., demolition, installation, etc.), and as required by the Project Manual.

§ 3.3.4 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Construction Manager or the Architect in their administration of the Contract, or by tests, inspections or approvals required or performed by persons other than the Contractor. The Contractor shall maintain complete inspection records and test date to ensure the quality of the Work is in strict compliance with the requirements of the Contract Documents.

§ 3.3.5 Where equipment lines, piping, ductwork, and/or conduit are shown diagrammatically, the Contractor shall be responsible for the coordination and orderly arrangement of the various lines of piping and conduit included in the Work of its Contract. The Contractor shall coordinate the work of its Subcontractors and prevent all interferences between or among equipment, lines of piping, and architectural features, and avoid any unsightly arrangements in exposed areas. This Section shall not be construed as limiting any obligation of the Contractor under any other provision of the Contract Documents.

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

§ 3.3.7 The Contractor, its employees and Subcontractors, shall be subject to such rules and regulations for the conduct of Work as the Owner may establish, including but not limited to, the Construction Rules and Regulations set forth in Section 3.13.4. The Contractor shall be responsible for the enforcement among its employees of the Owner's instructions.

§ 3.3.8 The Contractor shall inspect all materials as delivered to the Project site and shall reject any materials that will not conform with the requirements of the Contract Documents when properly installed.

§ 3.3.9 The Contractor shall be responsible for and coordinate any and all inspections required by any governmental body having jurisdiction over the Project. Failure to obtain any permits, licenses or other approvals because of the failure of the Contractor to conform to this requirement shall not extend the Contract time, and the Contractor shall not be entitled to any increase in the Contract Sum therefore. In addition, any additional costs and expenses of any nature incurred by the Owner as a result of the Contractor's failure to conform to this requirement shall constitute a charge against the Contractor's Contract.

§ 3.3.10 Shutdowns: Such work as connections to existing sewers, plumbing, heating, and electrical systems shall be coordinated at a time agreeable to the Owner, the Architect, and the Construction Manager, and shall be determined and agreed to well in advance of the actual performance of such work so as to interfere as little as possible with the operation and use of the Owner's existing facilities. Shutdowns must be coordinated through the Construction Manager. The continued uninterrupted operation of all facilities of the Owner's buildings is essential. If any existing facilities must be interrupted, the Contractor for the Work shall provide all necessary temporary facilities and connections necessary for maintaining these existing facilities at no increase in the Contract Sum except as otherwise specified. No mechanical, heating, plumbing, sprinkler, or electric service shall be interrupted at any time except as

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approved in advance by the Owner or when the buildings are not occupied and shall be coordinated with the Owner, as well as the Construction Manager. All communication systems must be maintained without interruption. As much related work as possible shall be performed prior to shutdowns, so as to minimize the period of shut down. All material, equipment, and manpower necessary in the performance of a shutdown shall be on site prior to interruption of service.

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§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for ~~labor,~~ labor (at applicable prevailing wage rates), 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. All materials provided by Contractor shall be new. The Contractor shall work continuously and expeditiously through completion of the Work. Time is of the essence.

§ 3.4.1.1 Notwithstanding any other provision of the Contract Documents, Contractor shall perform at least twenty five (25%) percent of the field work with its own full-time employees. For the purpose of the preceding sentence any part of the work performed by supervisory personnel (persons above level of foreman) or by office personnel shall not be considered part of the Work performed by Contractor's employees. Such items as bonds, certificates, shop drawings and similar items are not to be counted as satisfying the twenty five (25%) percent requirement**.**

§ 3.4.1.1 A shortage of labor in the industry shall not be accepted as an excuse for not properly manning the Project at each site.

§ 3.4.1.2 The Contractor shall be responsible for the care and protection of all equipment and materials for its Work on the Project, including equipment and material furnished by the Owner.

§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect, in consultation with the Construction Manager, and in accordance with a resulting 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.~~them, or persons who within the last five (5) days (a) having been exposed to someone having been diagnosed with a COVID-19 infection; or (b) having had a persistent cough, shortness of breath, or a fever of 100.4 or higher. The Owner reserves the right to have any persons removed from the Project upon reasonable objection.

§ 3.4.3.1 In addition to all other safety requirements, the Contractor shall provide suitable and a sufficient number of safety related facilities and personal protective equipment (PPE) at the site related to protection against the spread of COVID-19, including but not limited to handwashing stations, hand sanitizer, gloves, masks, faceshields, and other equipment as the Owner may reasonably request. Notwithstanding the foregoing, nothing herein shall be construed to delegate or relieve Contractor from having sole and exclusive responsibility for all worksite safety.

§ 3.4.4 All mechanics employed on the Project shall be persons skilled in that work which they are to perform. Work will not be approved if it does not meet the quality of workmanship as called for in the Contract Documents. If this quality of workmanship is not exactly defined herein, it shall be assumed to be the best standards of workmanship for the trade.

§ 3.4.5 Employees of the Contractor or its Subcontractors whose work is unsatisfactory to the Owner, Construction Manager or Architect, or considered by them to be unskilled or otherwise objectionable, will be immediately dismissed from the Project upon notice from the Construction Manager. Those dismissed employees shall be immediately replaced by the Contractor so as not to delay progress of the Work and at no additional cost to the Owner. **All employees of the Contractor or Subcontractor shall be processed through the Owner's database which excludes sex offenders and other people not deemed safe for presence on a school site. Any person who is**

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flagged by that system shall not be employed on site. Further, the Contractor or its Subcontractor shall not employ any person onsite who is known to them to be a sex offender as defined by New York State.

§ 3.4.6 On receipt of the signed Contract, the Contractor will be expected to place firm orders with vendors for needed materials, including Subcontractors and major material suppliers. If deemed necessary to assure delivery of materials at times needed, the Contractor may accept delivery of such materials at any time, and may include the cost of such materials in its next monthly Application for Payment, provided such materials have actually been delivered to Contractor and properly stored by it with approval or under direction of the Architect and the Construction Manager either at the Project site or in an approved storage shed or warehouse, as provided elsewhere in these General Conditions.

§ 3.4.6.1 To the fullest extent possible, the Contractor shall provide products of the same kind, from a single source. When two or more items of same material or equipment are required (pumps, valves, air conditioning units, etc.) they shall be of the same manufacturer. Product manufacturer uniformity does not apply to raw materials, bulk materials, pipe, tube, fittings (except flanged and grooved types), sheet metal, wire, steel bar stock, welding rods, solder, fasteners, motors for dissimilar equipment units, and similar items used in the work, except as otherwise indicated. The Contractor shall provide products which are compatible within systems and other connected items. If Contractor is given option of selecting between two or more products for use on the Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

§ 3.4.6.2 The Contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors. If a dispute arises between the Contractor and other contractors over concurrently selectable but incompatible products, the Architect will determine which products shall be used.

§ 3.4.6.3 With respect to sitework materials, all products submitted for use and incorporated into the Project shall be on the Approved List of Materials and Equipment published by the NYSDOT Materials Bureau, most recent edition.

§ 3.4.6.4 When required, off-site storage shall be the responsibility of the Contractor. If materials are stored off site, the Contractor shall furnish proof of title by Owner and provide a certificate of insurance demonstrating adequate insurance coverage.

§ 3.4.6.5 The Contractor shall deliver all materials at such times as will ensure speedy and uninterrupted progress of the Work.

§ 3.4.6.6 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. The Owner reserves the right to object to Contractor's use of persons who appear unfit or not skilled in the tasks assigned to them. Should any disorderly, incompetent, unfit, unskilled or objectionable person be hired or employed by the Contractor, upon or about the Premises of the Owner, for any purpose or in any capacity, they shall, upon request of the Owner, be removed from the Project and not again be assigned thereon without the written permission of the Owner.

§ 3.4.6.7 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, within 10 days of receipt of the signed Contract, shall furnish in writing the Owner through the Construction Manager and Architect a list showing the name of the manufacturer proposed to be used for each of the products identified in the Specifications, and where applicable, the name of the installing Subcontractor. The Architect will promptly reply to the Contractor in writing stating whether or not the Owner or Architect, after due investigation, has reasonable objection to any such proposed manufacturer or installer. If adequate data on a proposed manufacturer or installer is not available, the Architect may state that action will be deferred until the Contractor provides additional data. Failure of the Owner or Architect to promptly reply shall constitute notice of no reasonable objection. Failure to object to a manufacturer or installer shall not constitute a waiver of the requirements of the Contract Documents, and products furnished by the listed manufacturer shall conform to such requirements.

§ 3.4.7 The Contractor warrants that it has good title to all materials used by it in, on or in connection with the Work. No materials or supplies shall be purchased by the Contractor or any of its Subcontractors that are subject to any

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chattel mortgage, conditional sale, or other agreement by which an interest is retained by the seller.

§ 3.4.8 The Contractor shall make every reasonable effort to avoid labor disputes and to insulate the Owner, Architect and Construction Manager from the effects of labor disputes should any arise. There shall be no strikes, picketing, work stoppages, slowdowns, or other disruptive activity at the Project for any reason by anyone employed or engaged by the Contractor to perform its portion of the Work. There shall be no lockout at the Project by the Contractor. The Contractor shall be responsible for providing the manpower required to proceed with the Work under any circumstance. For the purposes of this Section, every reasonable effort shall include, but not necessarily be limited to:

.1 make all necessary arrangements to reconcile, without delay, damage or cost to the Owner and without recourse to the Architect, the Construction Manager or the Owner, any conflict between its Agreement with the Owner and any agreements or regulations of any kind at any time in force among members or councils which regulate or distinguish what activities shall not be included in the work of any particular trade;

.2 requiring employees, Subcontractors, suppliers and others to use reserve gates which shall be established for the Project;

.3 rearranging work schedules for the Contractor's Work or the work of its Subcontractors; and

.4 including in Contractor's agreements with its Subcontractors the right to fully implement all provisions of this Section.

§ 3.4.8.5 In case the progress of the Work is effected by any undue delay in furnishing or installing any items or materials or equipment required pursuant to the Contract because of a conflict involving any such labor agreement or regulation, the Owner may require that other material or equipment of equal kind and quality be provided pursuant to a Change Order or Construction Change Directive but in no case shall the amount of such change be charged by the Contractor to the Owner as an additional cost to perform the Work.

§ 3.4.8.5.1 No extension of time shall be granted for delays caused by labor or material disputes.

§ 3.4.8.5.2 Should it become necessary to create a separate entrance for a Contractor involved in a dispute, all costs associated with creating that entrance shall be borne by the Contractor involved in the dispute. Such costs shall include, but not limited to signage, fencing, temporary roads and security personnel as deemed necessary by the Owner for the safety of the occupants of the site.

§ 3.4.8.6 The Contractor shall ensure that its Work continues uninterrupted during the pendency of a labor dispute.

§ 3.4.8.7 The Contractor shall be liable to the Owner for all damages suffered by the Owner occurring as a result of work stoppages, slowdowns, disputes or strikes arising from the labor practices of the Contractor or its Subcontractors, Suppliers or Sub-subcontractors.

§ 3.4.9 The Contractor and its Subcontractors employed upon the Work shall abide by and conform with all labor laws and to all other laws, ordinances, and legal requirements now or hereafter applicable to the Work and the construction area.

§ 3.4.10 The Contractor and its Subcontractors shall be responsible for protection of the Work, the work of Separate or other Contractors, and existing construction, both on and off the site, and in the event of damage, shall restore the same to the original condition at no additional cost to the Owner.

§ 3.4.11 If the Work is to be performed by trade unions, the Contractor shall, with the consent of the Owner and the Architect, which shall not be unreasonably withheld, make all necessary arrangements to reconcile, without delay, damage, or cost to the Owner, any conflict between the Contract Documents and any agreements or regulations of any kind, at any time in force among members or councils that regulate or distinguish what activities are included in the work of any particular trade.

§ 3.4.12 No new asbestos containing building materials shall be used in construction. No materials containing asbestos in any form shall be used in, on, or around the Owner's buildings**.**

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§ 3.4.13 Equivalents and Substitutions

§ 3.4.13.1 Equivalents. In the Specifications, one or more kinds, types, brands, or manufacturers or materials are regarded as the required standard of quality and are presumed to be equal. The Contractor may select one of these items or, if the Contractor desires to use any kind type, brand, or manufacturer or material other than those named in the Specifications, it shall indicate in writing, and prior to award of the Contract, what kind, type, brand or manufacturer is included in the base bid for the specified item. The Contractor shall follow the submission requirements for equivalents as provided in the Project Manual. Any proposed equivalent shall not be purchased or installed by the Contractor without the Architect's review process having been completed and the product accepted by written notification.

§ 3.4.13.2 Substitutions. After the Contract has been executed, the Owner, Construction Manager and Architect will consider a formal request for the substitution of products in place of those specified only under conditions set forth in the Specifications.

§ 3.4.13.3 By making said requests in conformance with procedures established herein and elsewhere in the Project Manual, the Contractor: (1) represents that it has personally investigated the proposed substitute product and has determined that it is equal to or superior in all respects to that specified; (2) represents that the warranty for the substitution will be the same, or greater than, that applicable to the specified product; (3) certifies that the cost data is complete and includes all related costs under the Contract, including professional services necessary and/or required for the Architect or its consultants to implement said substitution and waives any and all claims for additional costs related to the substitution which subsequently become apparent; (4) represents that it will coordinate the installation of the accepted substitute, making all such changes to the Drawings effected by the change, including but not limited to the electrical, plumbing, site work and heating and ventilating Specifications as may be required for the Work to be complete in all respects; and (5) represents that it will reimburse the Owner for all additional costs billed by the Architect or its consultants for the review of the substitution request(s), any redesign of the Work of this Contractor or associated contractors, additional site visits related to the substitution request and for the work to prepare Change Orders or Construction Change Directives.

§ 3.4.13.4 Substitutions and alternates may be rejected without explanation and will be considered only under one or more of the following conditions:

1. required for compliance with interpretation of code requirements or insurance regulations then existing;
2. unavailability of specified products, through no fault of the Contractor;
3. subsequent information discloses inability of specified products to perform properly or to fit in designated space;
4. manufacturer/fabricator refuses to certify or guarantee performance of specified products as required;
5. when in the judgment of the Owner, a substitution would be substantially in the Owner's best interests, in terms of costs, time or other considerations; and
6. where the Contractor establishes that the substituted product is equal or better than the specified product in all respects.

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§ 3.5.1 The Contractor warrants to the Owner, Construction ~~Manager,~~ Manager and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants good title to all materials, supplies, and equipment installed or incorporated in the Work. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. ~~If required by the Construction Manager or~~ All warranties and guarantees specifically called for by the Contract Documents shall expressly run to the benefit of the Owner. If required by the Architect, the Contractor shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with instructions of the applicable supplier, except as otherwise provided in the Contract Documents. The Contractor shall perform the Work in strict accordance with the Contract Documents and best industry practices. The Contractor, at its expense, shall upon demand by the Owner, Construction Manager or Architect remove and replace materials not meeting specifications or materials failing to perform as represented or warranted by the manufacturer, regardless of whether incorporated into the Work. The Contractor shall promptly replace or correct any

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Work or materials that the Owner, Construction Manager or Architect rejects as failing to conform to the requirements of the Contract Documents. The foregoing warranty obligations shall survive completion or termination of the Contract, are not limited by the provisions of Article 12, and are in addition to and not in limitation of any other warranty, right or remedy set forth in the Contract Documents or otherwise prescribed by law.

§ 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.~~The Contractor warrants the Work and its performance to the Owner unconditionally. The Contractor shall perform all warranty obligations and responsibilities for the Work under the Contract Documents. The Contractor, at its own expense, shall remedy defects due to improper and/or defective workmanship or materials appearing within **two (2) years** of the Contractor completing the Work or such longer period as may be set forth in the Contract Documents ("Correction Period"), as further described in Article 12 of this Agreement. Upon completion of the Work, the Contractor shall assign and provide to the Owner all written warranties and guarantees from Subcontractors, suppliers, and material or equipment manufacturers. The Contractor shall fully cooperate with the Owner in the event the Owner pursues remedies under any warranties or guarantees assigned to the Owner. The Contractor acknowledges that its obligations to the Owner under this Section 3.5.2 and under Section 12.2 are joint and several with its Subcontractors, suppliers, vendors and manufacturers of all materials and equipment supplied on account of the Work. The Contractor is responsible for all harm caused by its failure to maintain equipment and materials installed through the Contractor's completion of its Work. The requirements of this Section 3.5 will continue notwithstanding termination of the Contractor for any reason. The foregoing warranty obligations are not limited by the provisions of Article 12, do not limit the Owner's assertion of a breach of warranty obligations following the three-year Correction Period, and are in addition to and not in limitation of any other warranty set forth in the Contract Documents or required by law.

§ 3.5.3 No warranties or guarantees by the Contractor will deprive the Owner of any cause of action, right, or remedy otherwise available for breach of any of the provisions of the Contract Documents. The Correction Period does not limit the time in which the Owner may pursue any such action, right, or remedy.

§ 3.5.3.1 The Contractor shall deliver to the Owner upon completion of all work under its Contract, its written guarantee made out to the Owner in a form acceptable to the Owner, guaranteeing (and he does so guarantee) all of the Work under the Contract to be free from faulty materials, and free from improper workmanship, and guarantees against injury from proper and usual wear and aging. This guarantee shall be made to cover (and does cover) a period of two (2) years from the date of Substantial Completion all work under the Contract, or for a longer period where so stipulated in the Contract Documents.

§ 3.5.4 All required maintenance shall be the Contractor's responsibility until the Owner has accepted the Project as complete, all required maintenance and user's manuals have been turned over to the Owner, and the Owner's designated personnel have been instructed in the maintenance and operation of all applicable materials. This maintenance shall include a complete turnover procedure at the time of completion, including complete cleaning, testing and adjustment. The Contractor shall keep records of all such maintenance performed as required by this Section, including work performed and times and dates on which it was performed. These records shall be turned over to the Owner at closeout.

§ 3.5.5 Neither final payment nor provision in the Contract Documents nor partial or entire occupancy of premises by Owner shall constitute an acceptance of Work not done in accordance with the Contract Documents or relieve the Contractor of liability in respect to any express warranties or responsibilities for faulty or defective materials or workmanship.

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

§ 3.6.1 The Owner is exempt from payment of federal, state, and local sales and compensation use taxes on all supplies and materials incorporated into and becoming an integral component part of the structures, buildings, or real property pursuant to this Contract. Such taxes are therefore not to be included in the Contractor's bid or the Contract Sum. The Owner shall deliver to the Contractor the appropriate exemption certificate required to be supplied by the Owner, and the Contractor and its Subcontractors and materialmen shall be solely responsible for obtaining and delivering any and all exemption or other certificates and for furnishing a Contractor Exempt Purchase Certificate or other appropriate

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certificates to all persons, firms, or corporations from whom they purchase supplies, materials, and equipment for the performance of the Work.

§ 3.6.1.1 The Contractor's attention is called to fact that materials not actually incorporated into Work will not be exempt from payment of sales or compensating use taxes, and the Contractor and its Subcontractor shall be responsible for and shall pay any and all applicable taxes. This will apply to such things as:

.1 construction machinery and equipment including rentals or repair parts;
.2 The Contractor's office supplies;
.3 The Contractor's supplies, tools and miscellaneous equipment including forms, materials, and scaffolding (whether purchased or rented);
.4 temporary heat;
.5 telephone or electric services; and
.6 any other items purchased or rented by the Contractor for the Contractor's use in performing its Work and not incorporated into realty.

§ 3.6.2 The Contractor accepts full and exclusive liability for payment of any and all contributions, assessments or taxes for unemployment insurance or old age insurance, or annuities now or hereafter imposed by the government of the United States, or by the government of any city, county or state of United States, which are measured by salaries or other remuneration paid to persons employed by the Contractor or any Subcontractor for Work performed under this Contract.

§ 3.7.1 ~~Unless otherwise provided in the Contract Documents, the Owner, assisted by the Construction Manager, shall secure and pay for the building permit. The Contractor shall secure and pay for other permits, fees, licenses, and inspections by government agencies necessary for~~ The Contractor shall, as soon as practicable, furnish the Owner, Architect, and Construction Manager with copies or certificates of all permits, fees, licenses, and inspections necessary for the 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.~~Work, including, without limitation, all applicable building permits other than those required of the Owner under Sections 2.3.1. All inspection fees and other costs of such permits and licenses required to be obtained by the Contractor as may be imposed by any municipal or other entity shall be paid by the Contractor and shall not serve as the basis for any increase in the Contract Sum.

§ 3.7.2 The Contractor shall comply ~~with~~ with, and give notices required ~~by~~ by, applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work. If the Contractor fails to give such notices, it shall be liable for and shall indemnify and hold harmless (a) the Owner, its consultants, employees, officers and agents and (b) the Architect, Construction Manager and their consultants, employees, officers and agents against any resulting fines, penalties, judgments, or damages, including reasonable attorney's fees, imposed on or incurred by the parties indemnified hereunder.

§ 3.7.2.1 In accordance with New York State Labor Law Article 8, Section 220, subd. 3-a(a), the Contractor shall submit to the Owner within 30 days after issuance of Contractor's first payroll, and every 30 days thereafter, a transcript of the original payroll record, subscribed and affirmed as true under the penalties of perjury.

§ 3.7.2.2 The Contractor shall comply with all applicable New York State Department of Labor requirements, including the provision that every worker employed in performance of a public work contract shall be certified as having completed an OSHA 10-hour safety training course. The Contractor and its Subcontractors shall be solely responsible for compliance with this requirement with respect to their employees. The Contractor's or Subcontractor's failure to comply with this requirement shall not transfer or in any way impose the responsibility for worker safety upon the Owner or the Architect.

§ 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.~~all costs attributable to the correction thereof or related thereto, including reimbursement to the Owner for any additional services required of the Construction Manager or Architect, or both, as well as all fines and penalties, if any.

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§ 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~~ (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~~ give prompt written notice to the Owner, Construction Manager, and the Architect ~~before conditions are disturbed~~ of such conditions before they are disturbed or affected work is performed and in no event later than ~~14~~ three (3) business days after first observance of the conditions. The Architect ~~and~~ or Construction Manager will promptly investigate such conditions and, if the Architect, in consultation with the Construction Manager, determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend ~~that~~ an equitable adjustment ~~be made~~ in the Contract Sum or Contract Time, or both. If the Architect, in consultation with the Construction Manager, determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner, Construction Manager, and ~~Contractor,~~ Contractor in writing, stating the reasons. If the ~~Owner or~~ Contractor disputes the Architect's determination or recommendation, ~~either party may submit a Claim as provided in Article 15.~~it may proceed as provided in Article 15. No adjustment in the Contract Time or Contract Sum will be permitted, however, in connection with a concealed or unknown condition that does not differ materially from those conditions disclosed or that reasonably should have been disclosed by the Contractor's (1) prior inspections, tests, and reviews, or (2) inspections, tests, and reviews the Contractor had the opportunity to make or should have performed in connection with the Project.

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.2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit, ,including the costs for bonds 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. The Contractor is not entitled to overhead and profit on unexpended allowance amounts or any portions thereof.

...

§ 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~~ Prior to starting the Work, the Contractor shall designate the Project Manager, Superintendent and other key individuals who shall be assigned to the Project through and including Final Completion. Such designations shall be in writing and provided to the Construction Manager, Architect and Owner and shall include the qualifications of such individuals. The Superintendent shall be in attendance at the Project site throughout the work, remain on the Project site not less than eight hours per day, five days per week, until termination of the Contract, unless the job is suspended, work is stopped by the Owner, or no work is scheduled. The Superintendent shall be approved by the Owner in its sole discretion. Said representatives shall be qualified in the type of work to be undertaken and shall not be changed during the course of construction without the prior written consent of the Owner. Should a representative leave the Contractor's employ, the Contractor shall promptly designate a new representative. The Owner shall have the right, at any time and in its sole discretion, to direct a change in the Contractor's representatives if their performance is unsatisfactory. In the event of such a demand, the Contractor shall within seven (7) days after notification thereof, replace said individual(s) with an individual(s) satisfactory to the Owner, in the Owner's sole discretion. If said replacement is disapproved, the Contractor may, at the Owner's option, be terminated for cause. The Superintendent shall represent the Contractor, and communications given to the ~~superintendent~~ Superintendent shall be as binding as if given to the Contractor. The Owner shall have no obligation to direct or monitor the Contractor's employees. All references herein to the Superintendent shall be taken to mean the Contractor's superintending staff. Each Subcontractor shall designate the Project Manager, Superintendent and other key individuals who shall be assigned to the Project. Important communications shall be confirmed in writing. Other communications shall be similarly confirmed on written request in each case. The Contractor's Superintendent shall attend all Project meetings, regardless of whether held prior to or following Substantial Completion of the Work.

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§ 3.9.2 The ~~Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect, through the Construction Manager, of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Construction Manager may notify the Contractor, stating whether the Owner, the Construction Manager, or the Architect (1) has reasonable objection to the proposed superintendent or (2) require additional time for review. Failure of the Construction Manager to provide notice within the 14-day period shall constitute notice of no reasonable objection.~~Contractor shall provide, or otherwise see that, the Project Manager, or Superintendents or responsible workers of the Contractor and its major Subcontractors are equipped with cellular phones and radios. The Contractor shall provide the Owner, the Construction Manager, and the Architect with the number for each phone and worker.

§ 3.9.3 The ~~Contractor shall not employ a proposed superintendent to whom the Owner, Construction Manager, or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.~~Contractor's supervisory personnel, including Superintendents and their assistants, shall be versed in the English language. In the event the Contractor's supervisory personnel, Superintendents and their assistants are not versed in the English language, the Contractor shall employ the services of a full-time on-site interpreter to facilitate communications with such supervisory personnel.

§3.9.4 The Contractor shall not reduce or terminate supervision of the Work, nor change the superintendent without the prior written approval of the Owner.

§3.9.5 If, for any reason, the Contractor takes an action resulting in any of the changes noted in Subsection 3.9.4, the Owner may take remedial action to **ensure** continued progress of the Work, including the hiring of suitable supervisory personnel, and charge the Contractor all costs associated with these remedial actions including the costs of legal and additional construction management and architectural services.
§3.9.6 The Contractor shall furnish the Construction Manager, in writing the names, addresses and telephone number of the members of his organization who can be contacted in the event of an off-hours emergency at the building.

§3.9.6 The Contractor shall attend progress meetings with the Construction Manager and such other persons the owner may require. The progress meetings shall include all key personnel on the job, including the contractor and subcontractors, or other persons in charge of various phases of the work.

§3.9.7 Prior to the commencement of Work, the Contractor shall provide the Construction Manager and the Architect with:
.1 A written list of subcontractors, sub-subcontractors, suppliers and vendors with names, addresses, telephone numbers, and descriptions of the work they shall perform or furnish;
.2 The name, address and telephone number of the bonding company, banking and insurance company for the Contractor including the name, address and telephone number of each bonding company's primary contact representative for the Project;
.3 Detailed Subcontractor schedules indicating the approximate quantity of shop drawings, sequence, timing and man loading; and
.4 A cash flow projection for the life of the Project, including a schedule and graph showing the amount of Work projected to be completed each month or billing period and a dollar value for the anticipated billings each month or billing period. This shall be completed after an agreed upon schedule of values has been approved by the Construction Manage
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§ 3.10.1 The Contractor, ~~promptly~~ promptly, but in no event later than 14 days, after being awarded the Contract, shall prepare and submit for the Owner's and Architect's ~~information,~~ information and the Construction Manager's ~~use in developing the Project schedule,~~ approval a Contractor's construction schedule for the ~~Work. The~~ Work in electronic format with predecessor logic. The construction 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 Contractor's construction schedule shall provide for the orderly progression of the Work to ~~completion~~ completion, and shall not exceed time limits current under the Contract Documents. The Contractor's construction schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project. ~~The Contractor shall cooperate with the Construction Manager in scheduling and performing the Contractor's Work to avoid conflict~~

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~~with, and as to cause no delay in, the work or activities of other Contractors, or the construction or operations of the Owner's own forces or Separate Contractors.~~

~~§ 3.10.2~~ ~~The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Construction Manager's and Architect's approval. The Architect and Construction Manager's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Construction Manager and Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.~~

§ 3.10.1.1 Time is of the essence for this Project. The Work shall be performed continuously and without interruption, so that all Work can be completed in the time set forth in the Contract Documents.

§ 3.10.1.2 The sequence of the Work shall be scheduled with the Owner so as to minimize interference with the Owner's use of existing structures, and the Owner's approval shall be obtained prior to starting of the Work.

§ 3.10.1.3 The Contractor shall conform to the most recent Project Schedule, and all Work shall be completed on or before the dates established in the Contract Documents. The Contractor shall monitor the progress of the Work for conformance with the requirements of the Project Schedule and shall promptly advise the Owner and Construction Manager of any delays or potential delays.

§ 3.10.2.1 The Construction Manager shall prepare, publish, and, from time-to-time, revise a master integrated Project Schedule based upon the construction schedules submitted by the various Prime Contractors. Failure by the Contractor to furnish any required schedule or schedule revision in a timely manner shall entitle the Construction Manager to prepare a schedule for the Contractor's Work, to which the Contractor shall be bound.

§ 3.10.2.2 The Contractor shall cooperate with the Construction Manager in scheduling and performing the Contractor's Work to avoid conflict, delay in or interference with the Work of other Contractors or the construction or operations of the Owner's own forces. The Owner shall have the right, without penalty, to direct the Contractor to delay, postpone or reschedule any portion of the Work that may interfere with or disrupt the operations of the Owner.

§ 3.10.3 The Contractor shall ~~participate with other Contractors, the Construction Manager, and the Owner in reviewing and coordinating all schedules for incorporation into the Project schedule that is prepared by the Construction Manager. The Contractor shall make revisions to the construction schedule and submittal schedule as deemed necessary by the Construction Manager to conform to the Project schedule.~~
conform to the most recent Project Schedule.

§ 3.10.4 ~~The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner, Construction Manager, and Architect, and incorporated into the approved Project schedule.~~In the event the Owner determines that the performance of the Work has not progressed to the level of completion required of the Contract Documents or that the Contractor has failed to maintain its construction schedule or the Project Schedule, the Owner shall have the right to order the Contractor to take corrective measures necessary to expedite the progress of construction including without limitations, additional shifts, overtime, additional manpower or equipment as well as other similar measures (hereinafter referred to collectively as "extraordinary measures"). Such extraordinary measures shall continue until the progress of Work complies with milestone and critical path dates set forth in the Contract Documents and the Project Schedule. The Contractor shall not be entitled to an adjustment in Contract Sum or Contract Time in connection with extraordinary measures required by the Owner.

§ 3.10.5 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter update it as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Construction Manager's and Architect's approval. The Architect and Construction Manager's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Construction Manager and Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, 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.

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§ 3.10.6 The Contractor shall participate with other Contractors, the Construction Manager and Owner in reviewing and coordinating all schedules for incorporation into the Project Schedule that is prepared by the Construction Manager. The Contractor shall revise the construction schedule and submittal schedule as deemed necessary by the Construction Manager to conform to the Project Schedule and the Contract Documents.

§ 3.10.7 The Contractor shall perform the Work in general accordance with the most recent construction schedules submitted to the Owner, Construction Manager and Architect and incorporated into the approved Project Schedule. The Contractor shall monitor the progress of the Work for conformance with the requirements of its construction schedule and Project Schedule and shall promptly advise the Owner of any delays or potential delays affecting the critical path.

§ 3.10.8 If the Contractor fails to maintain the approved construction schedule or Project Schedule and meet all critical path dates for the Work, the Owner may request a recovery plan from the Contractor and reserves the right to withhold payment until such time as the Contractor submits a recovery plan. The recovery plan must show how the Work may plausibly be brought on schedule, including, as necessary, acceleration of the Work by means of overtime, additional crews, additional shifts, additional equipment or re-sequencing of the Work to achieve completion of the remaining critical path dates in the construction schedule or Project Schedule. The Contractor shall submit as part of its recovery plan: (i) a "resource loaded" schedule showing the Contractor's plan to deploy manpower per trade, per work area, per day, together with essential materials and equipment, and other resources necessary to timely accomplish the Work; and (ii) a two-week "look ahead" schedule identifying tasks to be accomplished within the coming two week period, the work areas and categories of work, and necessary manpower resources, together with other data necessary to demonstrate to the Owner the viability of the Contractor's recovery plan ("2 Week Plans"). The Contractor shall continue to submit 2 Week Plans until either the Contractor demonstrates that the Project Schedule has recovered from the unexcused delay, or the Owner notifies the Contractor in writing that further 2 Week Plans are no longer required. The cost of preparing and performing the recovery plan shall be borne solely by the Contractor. No approval or consent by the Owner of any plan for resequencing or acceleration of the Work submitted by Contractor shall constitute a waiver by Owner of any damages or losses which the Owner may suffer by reason of such resequencing or the failure of Contractor to meet the Substantial Completion Date or the final completion date.

§ 3.10.9 The Contractor specifically represents and warrants to the Owner that that the Contract Sum and the Contract Time contemplate compliance with all current, and reasonable foreseeable future, federal, state and local "Stay at Home," "Social Distancing" and related orders, regulations and guidance related to limiting the spread of COVID-19 disease (the "COVID Requirements"). Accordingly, the Contractor hereby waives any claim for an increase in the Contract Sum or an extension of the Contract Time on account of the COVID Requirements. The Contractor shall promptly notify the Owner of any COVID Requirements that would impact the Project.

§ 3.10.10 Due to the ongoing COVID-19 pandemic and the resulting uncertainty with regard to, among other things, (a) what restrictions, if any, will be applicable to construction activities due to federal, state or local orders, laws, regulations or rules related to the COVID-19 pandemic (including, without limitation, social distancing, PPE, cleaning and disinfection requirements) and (b) the duration of any restrictions imposed on construction activities, the Owner may modify the schedule set forth in the Contract Documents and the Project Schedule. Similarly, restrictions, if any, that will be or are applicable to construction activities due to federal, state or local orders, laws, regulations or rules related to the COVID-19 pandemic (including, without limitation, social distancing, PPE, cleaning and disinfection requirements) may cause the Owner to have the Work or the Project commence later than the date specified in the Contract Documents. The Contractor acknowledges and agrees that there should be no additional compensation paid for schedule modifications caused directly or indirectly by the COVID-19 pandemic. The Contractor further acknowledges and agrees that its sole remedy for any schedule modifications or delays caused directly or indirectly by the COVID-19 pandemic shall be an extension of the Contract Time, if warranted. The Contractor further acknowledges and agrees that it shall have on file and provide a copy to the Owner of its written COVID-19 business reopening plan, and it shall comply in all respects with such plan for the duration of the Project. The Contractor, not the Owner, shall be responsible for compliance with its COVID-19 business reopening plan and all safety requirements associated with COVID-19 protections for workers and the general public.

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~~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~~

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~~similar required submittals. These shall be in electronic form or paper copy, available to the Construction Manager, Architect, and Owner, and delivered to the Construction Manager for submittal to the Owner upon completion of the Work as a record of the Work as constructed.~~**§ 3.11.1** The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These documents shall be available to the Architect and delivered to the Construction Manager for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.11.2 The Contractor shall maintain at the site, and shall make available to the Owner, Construction Manager and Architect, one record copy of the Drawings (the "Record Drawings") in good order. The Record Drawings shall be prepared and updated during the prosecution of the Contractor's Work. The prints for Record Drawing use will be a set of black line prints provided by the Architect to the Contractor at the start of construction. The Contractor shall maintain said set in good condition and shall use colored pencils to mark up said set with "record information" in a legible manner to show: (i) deviations from the Drawings made during construction; (ii) details in the Work not previously shown; (iii) changes to existing conditions or existing conditions found to differ from those shown on any existing drawings; (iv) the actual installed position of equipment, piping, conduits, light switches, electric fixtures, circuiting, ducts, dampers, access panels, control valves, drains, openings, and stub-outs, etc.; (v) architectural and structural changes in the design; and (vi) such other information as either the Owner or Architect may reasonably request. At the completion of the work, the Contractor shall transfer all information on record drawings to reproducible drawings with new information clouded and noted. Such drawings shall be stamped with the Contractor's name and "AS-BUILT" in the lower righthand corner. The colored record drawing and the as-built reproducible drawing shall be forwarded to the Construction Manager for delivery to the Owner. Final payment and any retainage shall not be due and owing to Contractor until the Record and As-Built drawings receive the approval from the Architect and the Owner (and all other closeout requirements are met).

§ 3.11.3 The Contractor shall maintain all approved permit drawings in a manner so as to make them accessible to government inspectors and other authorized agencies having jurisdiction over the Project. All approved drawings shall be wrapped, marked and delivered to the Owner within 60 days of final completion of the Contractor's Work.
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§ 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. Each submittal shall bear written confirmation that the Contractor has satisfied its obligations under the Contract Documents with respect to the Contractor's review and approval of the submittal. The Contractor shall comply with the provisions and procedures for Shop Drawings, Product Data, and Samples set forth in Specifications Section 01 33 00, "Submittal Procedures."

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, operating and maintenance procedures, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

...

§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to (1) demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract ~~Documents~~ Documents, and (2) show a system or product's ability to meet applicable criteria for those portions of the Work for which the Contract Documents require submittals. Review by the Architect and Construction Manager is subject to the limitations of Sections 4.2.10 through 4.2.12. Informational submittals upon which the Construction Manager and Architect are not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Construction Manager or Architect without action.

§ 3.12.4.1 Shop drawings and product submittals for all site improvement, architectural, structural, mechanical, electrical and signal work shall be submitted to the Architect for its review. Refer to Contract (General, Supplementary and other conditions) Section on "SUBMITTALS" for more complete information.

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§ 3.12.4.2 The Contractor represents and warrants that all shop drawings shall be prepared by a person or entity possessing expertise and experience in the trade for which the shop drawing has been prepared and, if required by the Contract Documents or law, by a licensed professional engineer.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Architect, with copies to the Construction Manager, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the Project submittal schedule approved by the Construction Manager and Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of other Contractors, Separate Contractors, or the Owner's own forces. The Contractor shall cooperate with the Construction Manager in the coordination of the Contractor's Shop Drawings, Product Data, Samples, and similar submittals with related documents submitted by other Contractors.

§ 3.12.5.1 No extension of time will be granted to the Contractor because of failure to have shop drawings, product data, and samples submitted in ample time to allow for review by the Architect or its consultants.

...

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been reviewed and approved by the Architect. Resubmission of rejected documents shall be performed within 10 calendar days, or sooner if required by the progress of construction. No claim for delay or cost shall be accepted as a result of rejected submittal documents. If the Architect is required to review the Contractor's submittal more than twice, the Contractor shall bear the cost and expense associated with such additional review as set forth in the Project Manual.

§ 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,~~ Samples or similar ~~submittals,~~ submittals unless the Contractor has specifically ~~notified~~ informed the Construction Manager and Architect in writing 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,~~ Samples or similar ~~submittals,~~ 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,~~ Samples or similar submittals, to revisions other than those requested by the Construction Manager and Architect on previous submittals. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions. Resubmission of rejected documents shall be performed within ten (10) calendar days. No claim for delay or cost shall be accepted as a result of rejected documents.

§ 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,~~ 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, the Architect, and the Construction Manager~~ 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

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criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. ~~The Construction Manager shall review submittals for sequencing, constructability, and coordination impacts on other Contractors.~~

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§ 3.12.11 The Architect's review of the Contractor's submittals will be limited to examination of an initial submittal and one resubmittal. The Owner is entitled to obtain reimbursement from the Contractor for amounts paid to the Architect for evaluation of additional resubmittals.

§ 3.13.1 The Owner shall not be liable to the Contractor, subcontractors of any tier, suppliers, their employees or anyone else with respect to the condition of the Project site. The Owner shall have the right to refuse admittance to the site to any agent or employee of the Contractor, its subcontractors of any tier, or its suppliers whose presence the Owner deems hostile to the Owner's interests. The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public ~~authorities,~~ authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment. The use of the Owner's assets and property are extremely limited. The Contractor shall fully comprehend the intent of the Contract Documents pertaining to site and building limitations including, without limitation, Division 1 Specifications sections, the phased construction plan, and the site safety and logistics plan(s).

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§ 3.13.3 The Contractor shall perform and shall ensure that all Subcontractors and suppliers perform all Work in a manner that permits reasonable access to the Project site and to all adjacent premises. The Contractor shall not, and shall not permit any Subcontractor or supplier to, conduct the Work in a manner that disturbs or that could be reasonably anticipated to disturb operations and persons located in or on portions of the site not affected by the Work. The occupied portion of any of the Owner's buildings shall always comply with the minimum requirements necessary to maintain a certificate of occupancy.

§ 3.13.4 Construction Rules and Regulations. The following rules and regulations shall be observed and enforced by all Contractors in connection with all phases of the Work:

.1 In accordance with New York State law, smoking is prohibited anywhere on school property. Violators will be subject to arrest and/or fine of $1,000 per occurrence. No alcoholic beverages or controlled substances are permitted on school property, and persons under the influence of alcoholic beverages or controlled substances may not enter in or remain on school property.

.2 In accordance with the United States Gun-Free School Zones Act of 1994, no firearms are permitted within 1,000 feet of any school building, with certain limited exceptions as set forth therein. In addition to such limitations, no firearms shall be brought on school property without the Owner's express prior consent.

.3 Appropriate protective gear (hard hats, safety shoes, goggles, etc.) are to be worn as required by OSHA standards, the New York State Department of Labor, and prudent practice. Shirts are to be worn at all times. No short pants are permitted.

.4 Any person who uses inappropriate language, or who is disruptive to the school environment, will be banned from the site.

.5 The Contractor's personnel shall not converse with school employees, students and or local residents.

.6 All persons on the Project site will comply with all reasonable instructions regarding conduct and safety which are given by the Architect, the Construction Manager or the Owner's school administrators.

.7 All construction materials shall be stored in a safe and secure manner. No deliveries will be allowed during school bus drop off or pick up hours as determined by the Owner. All deliveries shall be scheduled and coordinated with the Construction Manager and the Owner's security department. Unexpected or uncoordinated deliveries may be turned away by the Owner or the Construction Manager at the discretion or necessity of the Owner. The Owner's enforcement of this provision shall not be construed by the Contractor or Subcontractor as the basis for a claim of delay in time or monetary damages alleged to have been incurred as a result of refusal of delivery.

.8 Use of the existing building facilities during construction is prohibited, specifically including toilet rooms, telephones and water fountains.

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.9 The Contractor's schedule shall allow for blackout dates during which no noisy Work will be allowed, as determined by the Construction Manager. The Contractor may consult the Owner's school calendar for all test and examination dates, but these dates are subject to change.

.10 To gain access to the Work, entrances and parking areas will be designated by the Owner for the Contractor's use. Any vehicles or trucks in non-designated areas may be towed at the Contractor's expense. Gates shall always be locked unless a worker is in attendance to prevent unauthorized entry.

.11 Should it become necessary to obtain access to the existing building during construction hours for measurements or other non-disruptive work, the Contractor shall be escorted by the Construction Manager.

.12 All persons must wear photo identification badges at all times while working at the site. Identification badges must be provided by the Contractor for its personnel, including subcontractors, consultants, visitors and others.

.13 No asbestos containing products are to be used anywhere on this Project.

.14 No lead containing products are to be used anywhere on this Project.

.15 Asbestos manifests showing the locations of all known asbestos bearing materials are available in each building, and should be consulted prior to the commencement of any work, including but not limited to demolition.

.16 Demolition is to occur only when the building is unoccupied. Dust partitions and negative air are to be installed prior to commencing demolition. The Contractor must obtain Construction Manager approval on dust partitions and negative air prior to commencing demolition work. Debris shall be removed by using an enclosed chute or similar sealed system.

.17 (a) Prior to the commencement of Work, the Contractor must submit construction plans, which show the location of dust particles, exhaust & fresh air fans and describe in detail the operation procedures during demolition and construction which may generate dust.

(b) All entrances to classrooms shall be sealed with at least 6 mil. polyethylene sheeting to prevent dust created by demolition and construction work from entering the classrooms. Entrances and egress to the work zone shall be covered with a triple flap 6 mil. polyethylene doorway to allow access to the area without the release of dust. The Contractor is, additionally, responsible for all debris and dust infiltrating adjacent and undisturbed areas of the building.

(c) Shut down and lock out all electrical and HVAC in the work area. Cut, cap, and seal all duct work where it enters the work area from another space. All duct work and conduit within the space shall be removed during demolition work.

(d) The Contractor shall install dust protection barriers and poly sheeting. There shall be no or minimum damage to adjacent surfaces. The Contractor is responsible to repair any damage to existing surfaces.

.18 Painting or other chemical applications shall be done in the Owner's existing building only when it is unoccupied. Storage of chemicals and painting shall be outside the Owner's existing or new structures, and shall follow manufacturer's storage guidelines.

.19 Oxygen or other gas containers shall be properly stored and secured per OSHA requirements, to the satisfaction of the Construction Manager. Failure to do so will result in a $250 back-charge, per occurrence.

.20 The Contractor is responsible for cleaning its own materials and debris. Failure to maintain a clean work site daily will result in others performing the work at the Owner's request, and the Contractor will be backcharged for the cleaning cost plus construction administration fees. This may be done without the typical 3-day notice to the Contractor.

.21 The Contractor must send a qualified representative, knowledgeable in the Project and authorized to make decisions on behalf of the Contractor, to every Project meeting.

.22 The Contractor shall cooperate with the Owner's school principal and custodial staff; however, if any additional work is requested the Contractor shall not proceed unless written approval is received from the Owner. The Contractor will not be compensated for any additional work performed without the Owner's prior written approval.

.23 Deliveries sent to the Project site will not be signed for or unloaded by the Owner. They will be directed to the construction site and if no employee is on site, the delivery will be rejected, at the Contractor's expense.

.24 The General Construction Contractor shall be responsible for managing dust and dirt. On the exterior, site shall be watered down frequently to prevent dust clouds from rising. Streets shall be maintained clean per the Construction Manager's request.

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.25 All hot tar roofing shall be installed after school hours or on weekends/holidays only. Kettles shall not be lit until all students have left the Owner's building.

.26 The Contractor shall submit a weekly work schedule indicating workdays, work hours and manpower allocation.

.27 No storage of materials will be permitted within the Owner's buildings at any time during construction. The Contractor must provide exterior storage containers when required. The Contractor shall be responsible for securing appropriate space for its material with the Construction Manager prior to delivery. Final location of storage containers shall be determined by the Owner and/or Construction Manager. If insufficient space is available on the site, the Contractor shall provide local off-site storage, storage containers, etc. at its own cost and expense. Should any of the material stored on-site obstruct the progress of any portion of the Work or the Project, this material shall be removed by the Contractor without reimbursement of cost, from place to place or from the premises, as the Construction Manager may direct.

.28 The General Construction Contractor shall be responsible for maintaining all appropriate site safety signage.

.29 The Contractor shall be responsible for protecting the Owner's property. All existing shrubs, trees, lawn fixtures, sculptures and miscellaneous equipment shall be protected at all times. Any removals or relocation of said objects, if allowed shall be as directed by the Owner in writing.

.30 The General Construction Contractor shall provide and service portable lavatories for the duration of construction as provided in the Contract Documents. Lavatories shall be serviced by the General Construction Contractor on a regular basis to maintain sanitary conditions.

.31 The General Construction Contractor shall protect all existing roofs during construction and shall be responsible for any damage to roofs during construction. The General Construction Contractor shall make all repairs to any damaged areas, as required by the manufacturer of the roof system.

.32 The General Construction Contractor shall be responsible for providing weather-proof protection over all rough openings, including windows.

.33 The Contractor shall be responsible for conducting pre-construction walk-throughs and videotaping existing conditions. The Contractor shall schedule a representative of both the Owner and the Construction Manager to be present at this taping. In the absence of this record, the Contractor shall be responsible for paying the costs associated with any and all repairs in an area where the Contractor is working or has worked, as may be deemed necessary by the Owner or the Construction Manager.

.34 Manufacturers Material Safety Data Sheets (MSDS) shall be available at the site for all products used in the Project.

.35 No weapons are permitted on the Owner's property by law.

.36 Neither the Contractor nor any person on its behalf shall, in any manner, engage in discrimination, intimidation or harassment of any person on the Project site.

.37 Proper attire is required for personal safety and clothing must not sexually explicit or contain messages of a vulgar nature, disrespectful of ethnic or religious groups **or any group covered under the Dignity for All Students Act**, or which promote the use of tobacco, alcohol or drugs.

.38 Only materials and equipment that are to be used directly in the Work shall be brought to and stored on the Project site by the Contractor. After equipment is no longer required for the Work, it shall be promptly removed from the Project site. Protection of construction materials and equipment stored at the Project site from weather, theft, damage, and all other adversity is solely the responsibility of the Contractor.

.39 The Contractor will ensure that the Work, at all times, is performed in a manner that affords reasonable access, both vehicular and pedestrian, to the site of the Work and all adjacent areas. The Work will be performed in such a manner that public areas adjacent to the site of the Work will be free from all debris, building materials and equipment likely to cause hazardous conditions. Without limitation of any other provision of the Contract Documents, the Contractor will use its best efforts to minimize any interference with the occupancy or beneficial use of (1) any areas and buildings adjacent to the site of the Work; or (2) the Owner's building in the event of partial occupancy, as more specifically described in Section 9.9.

.40 The Contractor is required to protect its own Work and work areas, preconstruction, during construction and post construction.

.41 During exterior renovation work, overhead protection shall be provided for any sidewalks or areas immediately beneath the work site or such areas shall be fenced off and provided with warning signs to prevent entry.

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.42 The Contractor shall exert utmost care and diligence when working in or near any existing buildings or site work. The absence of protection around such items shall not excuse the Contractor from its liability to provide protection. Any damage to existing buildings, sitework or facilities due to the actions or inactions of the Contractor shall be repaired by and charged to the Contractor.

.43 The Contractor shall be responsible for the removal and replacement of existing ceiling tiles and grid in areas of the existing building where its Work is required and new ceilings are not scheduled for installation. In the event that the existing ceilings are damaged and cannot be replaced to the satisfaction of the Owner, the responsible contractor shall be liable for the costs of replacing in kind, the existing ceilings with new tile and grid.

.44 The General Construction Contractor shall provide necessary and required security measures to adequately safeguard the construction site from vandalism and intrusion of unauthorized persons. The General Construction Contractor shall submit its means and methods of security to the Construction Manager for review and comment. The Project site must be secured 24 hours a day, 7 days a week including holidays. The General Construction Contractor's failure to secure the site as required by this paragraph will result in the Owner engaging the services of such necessary personnel so as to provide such security. No notice will be given the General Construction Contractor of the Owner's intention to engage such security services and all costs and expenses associated with the Owner's security of the site in this regard will be back charged to the General Construction Contractor. While the Owner may have security guards patrolling the project areas, the function of such security guards is not for the purpose of specifically guarding the Contractor's property or operations of work.

.45 The Contractor and any entity for which the Contractor is responsible shall not erect any sign on the Project site without the written consent of the Owner, which may be withheld in the sole discretion of the Owner.

.46 Without limitation of any other provision of the Contract Documents, the Contractor will comply with all reasonable rules and regulations promulgated by the Owner or Construction Manager in connection with the use and occupancy of the Project site and the buildings, as amended from time to time by the Owner or the Construction Manager.

§ 3.13.5 Only materials and equipment that are to be used directly in the Work shall be brought to and stored on the Project site by the Contractor. After equipment is no longer required for the Work, it shall be promptly removed from the Project site. Protection of construction materials and equipment stored at the Project site from weather, theft, damage, and all other adversity is solely the responsibility of the Contractor.

§ 3.13.6 The Contractor shall ensure that the Work, at all times, is performed in a manner that affords reasonable access, both vehicular and pedestrian, to the site of the Work and all adjacent areas. The Work will be performed in such a manner that public areas adjacent to the site of the Work will be free from all debris, building materials and equipment likely to cause hazardous conditions. Without limitation of any other provision of the Contract Documents, the Contractor shall use its best efforts to minimize any interference with the occupancy or beneficial use of (1) any areas and buildings adjacent to the site of the Work; or (2) the building in the event of partial occupancy, as more specifically described in Paragraph 9.9.

§ 3.13.7 The Contractor shall not permit any workers to use any existing facilities at the Project site, including without limitation, lavatories and toilets. To gain access to the Work, entrances and parking areas will be designated by the Owner for the Contractor's use. Without limitation of any other provision of the Contract Documents, the Contractor will comply with all reasonable rules and regulations promulgated by the Owner in connection with the use and occupancy of the Project site and the Owner's building(s), as amended from time to time by the Owner.

§ 3.13.8 Construction areas that are under the control of the Contractor and therefore not occupied by the Owner's staff or students shall be separated from occupied areas. Provisions shall be made to prevent the passage of dust and contaminants into occupied parts of the Owner's building(s). Periodic inspection and repairs of the containment barriers must be made to prevent exposure to dust or contaminants. Gypsum board must be used in exit ways or other areas that require fire rated separation. Heavy duty plastic sheeting may be used only for a vapor, fine dust or air infiltration barrier, and shall not be used to separate occupied spaces from construction areas.

§ 3.13.9 Prior to starting Work, the Contractor shall submit a written report to the Owner, Construction Manager and Architect identifying existing damage to roads, walks, lawns, buildings and other property to be affected by this Contract. Failure to submit the report shall render the Contractor responsible for existing damage. The Contractor may

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request and schedule an inspection with the Owner, Construction Manager and Architect prior to submittal of the report. The Contractor shall obtain the consent of adjoining property owners regarding temporary easements of any other manner of physical encroachment.

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§ 3.14.3 The word "new" used herein shall mean Work which has been or is to be installed under the terms of the Contract for this Project. The word "existing" used herein shall mean existing conditions previous to the award of a Contract for this Project. In order to eliminate cutting and patching as much as possible, the Contractor shall, during the progress of its Work, provide and set proper sleeves, inserts, and other fixtures as required for its new Work and shall give proper and detailed instructions to others where the Work may be affected by their work, with adequate notice prior to the erection of new Work. Cutting and patching work as required to install new Work or remove existing work shall be done carefully and neatly with as little damage as possible. The Contractor shall refer to the Specifications for proper cutting and patching requirements. Any costs caused by defective or ill-timed Work of the Contractor shall be borne by the Contractor. Cutting and patching of any Work shall be made in such a manner as to not breach any provisions of any guaranty or warranty on existing work left in place or any guaranty or warranty required for the Contractor's new Work. Patching of work shall match existing adjacent surfaces and patchwork shall be disguised completely to hide any trace of patching. All new Work on existing roofs must be provided by a company specializing in performing the Work and approved by the existing roofing material manufacturer. It shall be the responsibility of the Contractor performing the cutting and patching to maintain any existing roofing warranty.

§ 3.14.4 Only trades persons skilled and experienced in cutting and patching shall perform such work.

§ 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. On a daily basis, the Contractor shall clean the areas in which it has performed work and shall remove all waste, materials, rubbish, its tools, construction equipment, machinery and surplus materials. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, ~~machinery,~~ machinery and surplus materials from and about the Project. The Contractor shall completely clean the site of the Work, removing and disposing of all construction-related debris and rubbish, and cleaning all Work-related stains, spots, marks, dirt, mortar smears, plaster smears, paint smears, caulking smears, and other foreign materials from exposed surfaces inside and outside the Owner's buildings and within the Project limit lines.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner, or Construction Manager with the Owner's approval, may do so and the Owner shall be entitled to reimbursement from the Contractor. At its option, the Owner may deduct the cost of clean-up pursuant to this Section 3.15.2 from any payments otherwise due to the Contractor pursuant to this Contract.

...

The Contractor shall provide the Owner, Construction Manager, and Architect with access to the Work in preparation and progress wherever located. Federal, state, and local agencies with jurisdiction over the Project shall at all times have access to the Work wherever it is in preparation or progress. The Contractor shall provide for such access so that such agencies may perform their functions. The Contactor shall also allow access for all required tests and inspections.

...

§ 3.18.1 To the fullest extent permitted by law, the Contractor ~~shall~~ shall, and cause its Subcontractors to, defend, indemnify and hold harmless the Owner, Construction Manager, Architect, ~~Construction Manager's and Architect's consultants, and~~ and their consultants, officers, directors, board members, agents and employees of any of them (collectively, "Indemnitees," individually, "Indemnitee") from and against all losses, damages, liabilities, actions, causes of action, claims, demands, fines, penalties, judgments, costs (including but not limited to attorneys' fees and expenses incurred in connection therewith and in the enforcement of this indemnification), charges, expenses and demands of whatever kind in connection with or arising from or out of (a) any negligent, willful or wrongful act or omission resulting in bodily injury (including death), personal injury or property damage (including loss of use) by the Contractor, its Subcontractors, Suppliers, their respective officers, employees, servants, agents, suppliers, invitees, successors and assigns (collectively, "Contractor Parties," and individually, "Contractor Party"), (b) performance of or

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failure to perform the Work or any breach of this Contract or infringement of any patent right by any Contractor Party, or (c) any statutorily imposed liability for injury to employees or failure to comply with any laws or regulations affecting the Work, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Nothing contained herein shall be construed to obligate the Contractor to indemnify, defend, and hold an Indemnitee harmless for claims caused solely by the Indemnitee's negligent acts or omissions.

The Contractor agrees to include the following indemnity provision in each and every contract it enters into with a Subcontractor, and to require that Subcontractor to include such provision in each contract it enters into with any lower tier Sub-subcontractor: "To the fullest extent permitted by law, sub-contractor shall defend, indemnify and hold harmless the Contractor, Owner, Owner's Consultants, Construction Manager's and Architect's consultants, and each of their respective representatives, board members, employees, directors, officers, and agents, from and against any and all claims, suits, actions, damages, losses, fines, penalties, costs, charges and expenses, including but not limited to attorneys' ~~fees,~~ fees and the costs of any proceeding, arising out of or resulting from ~~performance of the Work, provided that such claim, damage, loss,~~ any performance of or failure to perform the Work, acts or omissions of the Subcontractor, its lower-tier Sub-subcontractors, and others for whom the Subcontractor is responsible, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or economic losses or damages, damage to or destruction of property, and for environmental damage, or to injury to or destruction of tangible property ~~(other than the Work itself),~~ and nuisance, but only to the extent caused by the ~~negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone~~ acts or omissions or a breach of contract of the a Subcontractor, a Sub-Subcontractor to Subcontractor, and any person or entity directly or indirectly employed by them or any person or entity for whose acts they may be liable, regardless of whether or not such claim, damage, ~~loss,~~ loss or expense is caused in part by a party indemnified ~~hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.~~hereunder."
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§ 3.18.3 The Contractor's defense and indemnity obligations under this Section 3.18 shall specifically include all claims and judgments that may be made against the Indemnitees under the Labor Law of the State of New York, and similar laws of other state or governmental bodies having jurisdiction; and further, against claims and judgments arising from violation of public ordinances and requirements of governing execution of the Work.

§ 3.18.4 Claims by Governmental Authorities. To the fullest extent permitted by law, the Contractor shall defend, indemnify, and hold harmless the Indemnitees from and against claims, damages, losses, and expenses arising out of any claims made against the Indemnitees under the laws of federal, state, or other governmental bodies having jurisdiction over the Work, including but not limited to claims arising from violation of public ordinances and other requirements of governing authorities, due to the Contractor's method of execution of the Work or implementation of any of the Contractor's other obligations under the Contract Documents.

§ 3.18.5 Liens and Security Interests. To the fullest extent permitted by law, the Contractor shall defend, indemnify, and hold harmless the Indemnitees from and against any actions, law suits, or other proceedings brought against Indemnitees as a result of liens or security interests of any type arising from the Work and filed against the Work, the site of any of the Work, the Project site and any improvements thereon, payments due the Contractor, or any portion of the property of any of the Indemnitees.

§ 3.18.6 Intellectual Property. The Contractor shall defend, indemnify, and hold harmless the Indemnitees from and against any claim or demand for patent fees, royalties, or otherwise on account of any invention, machine, article, process, copyright, or arrangement that may be used by the Contractor in performing the Work, other than as to any of the foregoing expressly called for in the Contract Documents to be so used. In the event of any injunction or legal action regarding such claim or demand that results in stopping the Work in whole or part, the Owner shall have the right to direct the Contractor to change the manner of performance of the Work to avoid such stoppage, all cost and expense occasioned thereby to be borne solely by the Contractor.

§ 3.18.7 The Contractor shall further indemnify and hold harmless the Indemnitees from and against any costs and expenses (including reasonable attorneys' fees) incurred by any of the Indemnitees in enforcing any of the Contractor's defense, indemnity, and hold harmless obligations under this Section 3.18 or as may otherwise be provided elsewhere in the Contract.

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§ 3.18.8 Subject to Section 3.18.9, all obligations of the Contractor under this Section 3.18 to defend the Indemnitees are obligations to provide full defenses at the sole cost and expense of the Contractor, regardless of any alleged culpability on the part of any Indemnitee or any ultimate determination of relative shares of liability of any Indemnitee or limitation of the Contractor's indemnity obligations in light of such determination.

§ 3.18.9 To the extent any defense, indemnity, or hold harmless obligations under this Section 3.18 are made void or otherwise impaired by any law controlling their construction (including but not limited to laws limiting such obligations to the extent of the portion of damages caused by an indemnitor), such obligations shall be deemed to conform to the greatest rights to defense and indemnity permitted by such law (including but not limited to New York State General Obligations Law Section 5-322.1).

§ 3.18.10 All provisions of this Section 3.18 shall survive termination of the Agreement or final completion. No obligations under this Section 3.18 shall be construed to negate, abridge, or reduce other rights or obligations to defense and indemnity, including but not limited to common law indemnity, which would otherwise exist as to a party or person described in this Section 3.18.

§ 3.19 Existing Features and Underground Data

§ 3.19.1 The location of existing features shown on plans is intended for general information only. The Contractor, alone, is responsible for accurate determination of the location of all structures, and shall not be entitled to any increase in the Contract Sum or Contract Time due to difficulties or distances encountered in the Work, which should have been foreseeable thereby.

§ 3.19.2 The locations, depths and data as to underground conditions have been obtained from records, surface indications and data furnished by others. Information furnished is solely for the convenience of the Contractor without any warranty, expressed or implied as to its accuracy or completeness. The Contractor shall make no claim against the Owner, Construction Manager or Architect with respect to the accuracy or completeness of such information if it is erroneous, or if the conditions found at the time of construction are different from those as indicated.

§ 3.20 Construction Stresses

§ 3.20.1 The Contractor shall be solely responsible for the conditions which develop during construction and in the event any structure is dislocated, over strained, or damaged so as to affect its usefulness, the Contractor shall be solely responsible. The Contractor shall, at its own expense, take whatever steps necessary to strengthen, relocate, or rebuild the structure to meet all applicable requirements.

§ 3.20.2 The Contractor is responsible for restoration or repair of utilities, private property, buildings, pavement, walkways, roads, or other property damaged by its activities under this Agreement.

§ 3.21 Training and Instructions

§ 3.21.1 Upon Substantial Completion of the Work, the Contractor shall orient and instruct personnel of the Owner designated by it in the operation and maintenance of all equipment furnished by the Contractor and shall turn over all pertinent literature and operational manuals relating to the equipment. The format for organizing, binding, and delivering such manuals shall be as described in the Specifications.

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§ 4.1.1.1 Architect's Consultants: All firms listed on the title sheet of the Specifications, except for the Owner and Construction Manager, are Consultants employed by the Architect, and are agents of the Architect and will make observation of their respective branches of the Work. All changes in the Work must be processed through the Architect. Consultants shall not order extra Work or make changes in the Work.

§ 4.1.3 ~~Duties, responsibilities, and limitations of authority of the Construction Manager and Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner, Construction Manager, Architect, and Contractor. Consent shall not be unreasonably withheld.~~The Architect is the interpreter of the technical requirements of the Drawings and Specifications with regard to questions the Contractor may have concerning its obligations under either. The Architect shall render such interpretations with such promptness as necessary to maintain progress of the Work.

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...

§ 4.2.1 The Construction Manager and Architect will provide administration of the Contract as described in the Contract Documents and will be the Owner's representatives during construction until the date the Architect issues the final Certificate for ~~Payment.~~ Payment and during the correction period described in Article 12. The Construction Manager and Architect ~~will~~ have the authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

...

§ 4.2.4 The Construction Manager will schedule and coordinate the activities of the Contractor and other Multiple Prime Contractors in accordance with the latest approved Project ~~schedule.~~Schedule. The Contractor shall participate with other Contractors and the Construction Manager, the Architect and Owner in reviewing their construction schedules when directed to do so. The Contractor shall make any revisions to the construction schedule deemed necessary by the Owner or Construction Manager. The approved construction schedules shall be integrated into the Project Schedule and constitute the schedules to be used by the Contractor, other Contractors, the Architect, the Construction Manager and the Owner until subsequently revised.

§ 4.2.4.1 The Contractor shall assume full responsibility for the execution of its Work in the allotted duration times set forth in the Project Schedule.

§ 4.2.5 The Construction Manager, except to the extent required by Section 4.2.4, and Architect will not have control over, or 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, except as provided in Section 3.3.1, and neither will be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. Neither the Construction Manager nor the Architect will have control over or charge ~~of,~~ of or be responsible for acts or omissions ~~of,~~ of the Contractor, Subcontractors, or their agents or employees, or of any other persons or entities performing portions of the Work.

§ 4.2.6 ~~Communications.~~ ~~The Owner shall communicate with the Contractor and the Construction Manager's consultants through the Construction Manager~~ **Communications Facilitating Contract Administration.** Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Construction Manager, and shall contemporaneously provide the same communications to the Architect about matters arising out of or relating to the Contract Documents. ~~The Owner and Construction Manager shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Construction Manager otherwise relating to the Project.~~ Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with other Multiple Prime Contractors shall be through the Construction ~~Manager.~~ Manager and shall be contemporaneously provided to the Architect if those communications are about matters arising out of or related to the Contract Documents. Communications by and with the Owner's own forces ~~and Separate Contractors~~ shall be through the Owner.~~The Contract Documents may specify other communication protocols.~~

§ 4.2.7 The Construction Manager and Architect will review and certify all Applications for Payment by the Contractor, in accordance with the provisions of Article 9. The Construction Manager will assemble each of the Contractor's Applications for Payment with similar applications from other Prime Contractors into a Project Application and Certificate for Payment, all of which will be submitted to the Architect with the Construction Manager's recommendations as to certifications in whole or part by the Architect.

§ 4.2.8 The Architect and Construction Manager have authority to reject Work that does not conform to the Contract ~~Documents,~~ Documents and will notify each other about the rejection. The Construction Manager shall determine in general whether the Work of the Contractor is being performed in accordance with the requirements of the Contract Documents and notify the Owner, Contractor and Architect of defects and deficiencies in the Work. Whenever the Construction Manager considers it necessary or advisable, the Construction Manager will have authority to require

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additional inspection or testing of the Work in accordance with Sections ~~13.4.2 and 13.4.3,~~ 13.5.2 and 13.5.3, upon written authorization of the Owner, whether or not ~~the~~ such Work is fabricated, installed or completed. The foregoing authority of the Construction Manager will be subject to the provisions of Sections 4.2.18 through 4.2.20 inclusive, with respect to interpretations and decisions of the Architect. However, neither the Architect's nor the Construction Manager's authority to act under this Section 4.2.8 nor a decision made by either of them in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect or the Construction Manager to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons performing any of the Work.

§ 4.2.9 ~~Utilizing the submittal schedule provided by the Contractor, the Construction Manager shall prepare, and revise as necessary, a Project submittal schedule incorporating information from other Contractors, the Owner, Owner's consultants, Owner's Separate Contractors and vendors, governmental agencies, and participants in the Project under the management of the Construction Manager. The Project submittal schedule and any revisions shall be submitted to the Architect for approval.~~The Construction Manager will receive and promptly transmit to the Architect all submittals from the Contractor such as Shop Drawings, Product Data and Samples. The Construction Manager's actions will be taken in accordance with the Project submittal schedule approved by the Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness while allowing sufficient time to permit adequate review by the Architect.

§ 4.2.10 The ~~Construction Manager will receive and promptly review for conformance with the submittal requirements of the Contract Documents, all submittals from the Contractor such as Shop Drawings, Product Data, and Samples. Where there are other Contractors, the Construction Manager will also check and coordinate the information contained within each submittal received from the Contractor and other Contractors, and transmit to the Architect those recommended for approval. By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Construction Manager represents to the Owner and Architect that the Construction Manager has reviewed and recommended them for approval. The Construction Manager's actions~~ 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 ~~Project~~ submittal schedule approved by the Architect or, in the absence of an approved ~~Project~~ submittal schedule, with reasonable promptness while allowing sufficient time ~~to permit adequate review by the Architect.~~in the Architect's professional judgment to permit adequate review. Upon the Architect's completed review, the Architect shall transmit its submittal review to the Construction Manager.

§ 4.2.11 ~~The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Upon the Architect's completed review, the Architect shall transmit its submittal review to the Construction Manager.~~Review of the Contractor's submittals by the Architect is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The 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, unless otherwise specifically stated by the Architect, 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.

§ 4.2.11.1 The Architect's review of Contractor's submittals shall be limited to an initial submittal and one (1) resubmittal. If the Architect is required to review additional submittals because the initial submittal and resubmittal failed to conform to the information given and the design concept expressed in the Contract Documents, the amount of compensation paid to the Architect by the Owner for additional services shall be deducted from the payments to the Contractor.

§ 4.2.11.2 The review will not be considered complete until an "ACTION" stamp or other written notice to that effect has been received by the Contractor.

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§ 4.2.12 ~~Review of the Contractor's submittals by the Construction Manager and Architect is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Construction Manager and Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Construction Manager and Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.~~The Construction Manager will prepare Change Orders and Construction Change Directives.

§ 4.2.13 The Construction Manager ~~will prepare Change Orders and Construction Change Directives.~~and the Architect will take appropriate action on Change Orders or Construction Change Directives in accordance with Article 7 and the Architect will have authority to order minor changes in the Work as provided in Section 7.4. The Architect, in consultation with the Construction Manager, will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.14 ~~The Construction Manager and the Architect will take appropriate action on Change Orders or Construction Change Directives in accordance with Article 7, and the Architect will have authority to order minor changes in the Work as provided in Section 7.4. The Architect, in consultation with the Construction Manager, will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.~~Utilizing the documents provided by the Contractor, the Construction Manager will maintain at the site for the Owner one copy of all Contract Documents, approved Shop Drawings, Product Data, Samples and similar required submittals, in good order and marked currently to record all changes and selections made during construction. These will be available to the Architect and the Contractor, and will be delivered to the Owner upon completion of the Project.

§ 4.2.15 ~~Utilizing the documents provided by the Contractor, the Construction Manager will maintain at the site for the Owner one copy of all Contract Documents, approved Shop Drawings, Product Data, Samples, and similar required submittals, in good order and marked currently to record all changes and selections made during construction. These will be available to the Architect and the Contractor, and will be delivered to the Owner upon completion of the Project.~~The Construction Manager will assist the Architect in conducting inspections to determine the dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion in conjunction with the Architect pursuant to Section 9.8; and receive and forward to the Owner written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10. The Construction Manager will forward to the Architect a final Application and Certificate for Payment or final Project Application and Project Certificate for Payment upon the Contractor's compliance with the requirements of the Contract Documents.

§ 4.2.16 ~~The Construction Manager will assist the Architect in conducting inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion in conjunction with the Architect pursuant to Section 9.8; and receive and forward to the Owner written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10. The Construction Manager will forward to the Architect a final Application and Certificate for Payment or final Project Application and Project Certificate for Payment upon the Contractor's compliance with the requirements of~~ 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 duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

§ 4.2.17 ~~If the Owner and Architect agree, the Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The Owner shall notify the Construction Manager of any change in the duties, responsibilities and limitations of authority of the Project representatives.~~The Architect will interpret and decide matters concerning performance under, and requirements of the Contract Documents on written request of the Construction Manager, Owner or Contractor through the Construction Manager. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

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

§ 4.2.18.1 If Work is described or indicated in a manner which makes it impossible to carry out the requirements of the Contract Documents, or should discrepancies appear among the Contract Documents, the Contractor shall request interpretation before proceeding with the Work. If the Contractor fails to make such a request, no excuse will be entertained for failure to carry out the Work of the Contract Documents. Should a conflict occur in or between Contract Documents, the Contractor is deemed to have included in the Contract Sum the more expensive manner of doing the Work.

§ 4.2.19 ~~Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either, and will not be liable for results of interpretations or decisions so rendered in good faith.~~The Architect's decisions, after consultation with the Owner, on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.20 The ~~Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.~~Construction Manager will receive and review requests for information from the Contractor, and forward each request for information to the Architect, with the Construction Manager's recommendation. The Architect will review and respond in writing to the Construction Manager to requests for information about the Contract Documents. The Construction Manager's recommendation and the Architect's response to each request will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

~~**§ 4.2.21** The Construction Manager will receive and review requests for information from the Contractor, and forward each request for information to the Architect, with the Construction Manager's recommendation. The Architect will review and respond in writing, through the Construction Manager, to requests for information about the Contract Documents. The Construction Manager's recommendation and the Architect's response to each request will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.~~

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§ 5.2.1 Unless otherwise stated in the Contract ~~Documents, the Contractor, as soon as practicable~~ Documents or the bidding requirements, the Contractor, within ten (10) days after award of the Contract, shall ~~notify the Construction Manager,~~ furnish in writing to the Construction Manager for review by the Owner, Construction Manager and ~~Architect, of the persons or entities proposed for each principal portion of the Work, including~~ Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special ~~design. Within 14 days of receipt of the information, the Construction Manager may notify the Contractor~~ design) proposed for each principal portion of the Work. The Construction Manager may reply within 14 days to the Contractor in writing stating (1) whether the Owner, the Construction Manager or the Architect ~~(1)~~ has reasonable objection to any such proposed person or entity or, (2) that the Construction Manager, Architect or Owner requires additional time for review. Failure of the Construction ~~Manager to provide notice~~ Manager, Owner, or Architect to reply within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.1.1 In no case shall payments be made on the Contract until a complete list of Subcontractors has been submitted by the Contractor to the Construction Manager for review by the Owner, Construction Manager, and Architect. Such list shall not be considered complete if the Owner, Construction Manager or Architect has any reasonable objection to any name listed thereon. Such list shall be submitted and resubmitted if necessary until it is considered complete.

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§ 5.2.1.2 Subcontractors will not be acceptable unless, when requested by the Owner, Architect or Construction Manager, evidence is furnished by the Contractor that the proposed Subcontractor has satisfactorily completed similar subcontracts as contemplated under this Contract, and has the necessary experience, personnel, equipment, plant and financial ability to complete the proposed subcontract in accordance with the intent of the Contract Documents and the Project Schedule. As verification of financial ability, the Owner reserves the right to request and receive up to five (5) years of financial statements, bank references, bond/insurance company references and all other information required to assess financial ability.

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§ 5.2.3 If the Owner, Construction Manager or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner, Construction Manager ~~or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.~~and Architect have no objection.

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§ 5.2.5 The Maintenance of the Project Schedule is critical. The Contractor shall award subcontracts to entities capable of performing in a manner that will maintain the Project Schedule and require its subcontractors to complete their work in accordance with the Project Schedule.

§ 5.2.6 Upon written request from or on behalf of the Owner, the Contractor shall provide to the Owner executed, unredacted copies of all subcontracts, purchase orders or other agreements relating to the Work.

~~By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, that the Contractor, by these Contract Documents, assumes toward the Owner, Construction Manager and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner, Construction Manager and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.~~**§ 5.3.1** 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 responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner, Construction Manager and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner, Construction Manager and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors. Each subcontract shall contain provision for execution of lien waivers in form and substance acceptable to the Owner as a condition of payment by the Contractor. The

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Contractor shall require each Subcontractor to (1) inspect the Project site, including all relevant surfaces and job conditions, before beginning the Work and (2) accept or cite necessary corrections in the Project site, including surfaces or job conditions, before beginning the Work.

§ 5.3.2 The Contractor shall promptly notify the Owner and Architect of any material defaults by any Subcontractor or whether it has terminated its agreement with any of its Subcontractors for any reason.
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.1 assignment is effective only after termination of the Contract by the Owner ~~for cause pursuant to Section 14.2~~ pursuant to Article 14 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and

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§ 5.4.2 Upon such assignment, if the Work has been suspended for more than ~~30 days,~~ 60 days, through no fault of the Subcontractor, 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.~~

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§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, ~~and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract~~ which include persons or entities under separate contracts not administered by the Construction Manager, and to award other contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation.

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§ 6.1.4 The Contractor accepts assignment of, and liability for, all purchase orders and other agreements for procurement of materials and equipment that are identified as part of the Contract Documents. The Contractor shall be responsible for such pre-purchased items, if any, as if the Contractor were the original purchaser. The Contract Sum includes, without limitation, all costs and expenses in connection with delivery, storage, insurance, installation and testing of items covered in any assigned purchase orders or agreements. All warranty and correction of the Work obligations under the Contract Documents shall also apply to any pre-purchased items, unless the Contract Documents specifically provide otherwise.

§ 6.2.1 The Contractor ~~shall afford the Owner's own forces, Separate Contractors, Construction Manager and other Contractors~~ recognizes and acknowledges that the Project is governed by and subject to the provisions of New York State General Municipal Law §101, et seq., governing the award of contracts on public improvement projects. As such, the Contractor recognizes and acknowledges that other Contractors or Separate Contractors will be performing work on the project in conjunction with it. As such, the Contractor shall afford the Owner's own forces and other Contractors or 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.

§ 6.2.1.1 The Contractor shall not commit or permit any act which will interfere with the performance of the work of any other Contractor or Separate Contractor performing work on the Project. If the Contractor sustains any damage through any act or omission of Separate or other Contractors having a contract with the Owner for the performance of work upon the site or of work which may be necessary to be performed for the proper execution of the work to be performed hereunder, or through any act or omission of a subcontractor of such Separate or other Contractor, the Contractor shall promptly notify the Owner and the Construction Manager of such damage

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§ 6.2.1.2 The Contractor agrees to defend and indemnify Owner, Architect, Construction Manager, Consultants and Sub-consultants, from all claims made against any of them arising out of the Contractor's acts or omissions or the acts or omissions of any Subcontractor of the Contractor which have caused damage to the Owner, Architect, Construction Manager, Separate Contractor or other Contractor on the Project. The Owner's right to indemnification hereunder shall in no way be diminished, waived or discharged, or by the exercise of any other remedy provided for by the contract or by law. Further, the Owner shall withhold from the Contractor's Contract Sum an amount sufficient to cover such damage and all expenses and costs associated with the damage sustained.
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§ 6.2.2.1 The Contractor shall promptly correct discrepancies or defects in its Work identified by Separate Contractors as affecting proper execution and results of the work of the Separate Contractors.

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

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction, or to property of the Owner, Separate Contractors, or other Contractors as provided in Section ~~10.2.5.~~10.2.5 or elsewhere in the Contract Documents.

...

§ 6.2.6 Should the Contractor or its Subcontractors cause damage to the work or property of any Separate Contractor or other Multiple Prime Contractor, the Contractor shall, upon due notice, promptly attempt to settle by agreement or otherwise resolve the dispute with the Separate Contractor or other Multiple Prime Contractor. If such separate trade contractor or other Multiple Prime Contractor sues or makes any other claim against the Owner, Construction Manager, or Architect on account of any damage alleged to have been caused by the Contractor or its Subcontractors, the Contractor shall defend, indemnify, and hold harmless the Owner, Construction Manager, and Architect against such claim or proceedings at the Contractor's own expense. The Owner's right to indemnification hereunder shall in no way be diminished, waived or discharged, or by the exercise of any other remedy provided for by the Contract Documents or by law. Further, the Owner shall be entitled to withhold from the Contractor's Contract Sum an amount sufficient to cover such damage and all expenses and costs associated with the damage sustained.

§ 6.2.7 When the Work of the Contractor or its Subcontractors overlap or dovetail with that of other Contractors, materials shall be delivered and operations conducted to carry on the Work continuously, in an efficient, workmanlike manner.

§ 6.2.8 In case of interference between the operations of the Contractor and other Contractors, the Construction Manager will be the sole judge of the rights of each contractor and shall have the authority to decide in what manner the Work may proceed, and in all cases its decision shall be final. Any decision as to the method and times of conducting the Work or the use of space as required in this paragraph shall not be basis of any claim for delay or damages by the Contractor.

§ 6.2.9 The Contractor, including its Subcontractors, shall keep itself informed of the progress of other Contractors and shall notify the Architect or the Construction Manager immediately in writing of lack of progress on the part of other Contractors where such delay will interfere with its own operations. Failure of the Contractor to keep informed of the work progressing on the Project and failure to give notice of lack of progress by others shall be construed as acceptance by the Contractor of the status of the work as being satisfactory for proper coordination with the Contractor's Work.

§ 6.2.10 Delays or oversights on the part of the Contractor or its Subcontractors in getting any or all of the Work done in the proper way, thereby causing cutting, removing and replacing Work already in place, shall not be the basis for a claim for extra compensation or additional time.

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§ 6.2.11 The Contractor shall promptly correct discrepancies or defects in its Work which have been identified by Separate Contractor(s) or other Contractor(s) as affecting proper execution and results of the work of such other Contractor(s).

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§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, only by Change Order, Construction Change Directive or field order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents. The Owner may in its sole discretion reduce the scope of the Contractor's Contract with or without any specific reasons therefor.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Construction Manager, Architect and ~~Contractor. A~~ Contractor; a Construction Change Directive requires agreement by the Owner, Construction Manager and Architect and may or may not be agreed to by the ~~Contractor. An~~ Contractor; a field order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.2.1 Field orders are an interpretation of the Drawings or Specifications which order minor changes in the Contractor's work which will not result in an increase or decrease in the Contract Sum. From time to time, the Architect may issue field orders to the Contractor. The work included in such field order shall be performed by the Contractor at no additional cost to the Owner and shall not form the basis for a claim for an extension of the Contract Time. Hence, the Contractor shall perform the work included in field orders so as to cause no delay to its Work and/or the work of other Contractors or Separate Contractors engaged by the Owner in connection with the Project. All field orders shall be given to the Contractor and the Construction Manager by the Architect in writing.

§ 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,~~ Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change ~~Directive, or~~ Directive or field order for a minor change in the Work. Additional work performed without authorization of a Change Order will not entitle the Contractor to an increase in the Contract Sum or an extension of the Contract Time. No course of conduct or prior dealings between the parties, nor express or implied acceptance of alterations or additions to the Work, and no claim that the Owner has been unjustly enriched by any alteration or addition to the Work, whether or not there is, in fact, any unjust enrichment of the Owner, shall be the basis for any claim to an increase in any amounts due under the Contract Documents or a change in any time period provided for in the Contract Documents. **No amount shall be payable by the Owner to the Contractor for performance of work without a written and fully executed Change Order.**

§ 7.1.4 Costs for changes in the Work shall not be allowed in excess of usual rentals charged in the area where the Project is located for similar equipment of like size and condition, including costs of necessary supplies and repairs for operating equipment on site in connection with other work unless its use incurs actual and additional costs to Contractor. If equipment not on Site is required for change in work only, cost of transporting equipment to and from Site will be allowed.

§ 7.1.5 When the Owner or Architect (in association with the Construction Manager) request that the Contractor perform work which is not included in the Contract Drawings or Specifications and which will result in additional cost to the Owner, the Architect shall request that the Contractor submit its proposal for performing such additional work. The Contractor shall submit its proposal to the Construction Manager and Architect for review. The Contractor's proposal shall include a complete itemization of the costs associated with performing its work including labor and materials. All proposals for any work that a Contractor, its Subcontractor(s) or Sub-subcontractor(s) perform in connection with additional work shall be properly itemized and supported by sufficient substantiating data, including but not limited to material descriptions, material quantities, material unit prices, labor trade listings, labor hour quantities, labor trade rates, equipment descriptions and equipment rates with a percentage allowance for overhead and profit as set forth in Section 7.3.11.

§ 7.1.6 Overtime, when specifically authorized by the Owner in writing, and not as a corrective measure by the Contractor to expedite the progress of construction as ordered by the Owner based on its determination that the performance of the Work has not progressed to the level of completion required by the approved Schedule, shall be

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paid for by the Owner on the basis of premium payment only, plus the cost of insurance and taxes based on the premium payment period. Overhead and profit will not be paid by the Owner for overtime.

§ 7.1.7 Costs to which overhead and profit is to be applied shall be determined in accordance with Section 7.3.4. The allowable overhead and profit mark-up shall include, but not be limited to, the following:

.1 home office expense;
.2 field office expense;
.3 supervision;
.4 project management & estimation; and
.5 small tools & equipment.

§ 7.1.8 Unit prices shall be submitted in the Bid Form for various items as set forth therein, and are subject to approval and acceptance by the Owner. The Owner reserves the right to reject any unit price which is unreasonable or unbalanced, as compared with prevailing costs, or as compared with the unit prices submitted by other bidders for the Project. Approved unit prices quoted shall include all profit, overhead, bonds, insurance, labor, materials, equipment, tools, applicable taxes necessary to complete the work item and shall apply to all work added or work deducted.
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~~A Change Order is a written instrument prepared by the Construction Manager and signed by the Owner, Construction Manager, Architect, and Contractor, stating their agreement upon all of the following:~~**§ 7.2.1** A Change Order is a written instrument prepared by the Construction Manager and signed by the Owner, Construction Manager, Architect, and Contractor, stating their agreement upon all of the following:

...

.3 The extent of the adjustment, if any, in the Contract Time.

§ 7.2.1.4 Changes in the Work involving additional Work or deletion of Work effecting an addition to or subtraction from the Contract Sum shall not be made until the Contractor submits to the Architect and Construction Manager the cost of the added or deleted Work with a complete and detailed listing of all Subcontractors involved, all materials, labor, overhead and profit and an appropriate Change Order has been issued. If requested, the Contractor shall submit detailed quotations for Subcontractors and material suppliers. Changes in the Work when not involving additions or deletions from the Contract Sum shall not be made until the Architect has issued an appropriate Change Order. All Change Orders must have the approval of the Owner, Construction Manager and Architect in writing.

§ 7.2.2 Methods used in determining adjustments to the Contract Sum may include those listed in Section 7.3.3.

§ 7.2.3 Agreement on any Change Order shall constitute a final settlement of all Claims and other matters related to the change in Work that is the subject of the Change Order, including, but not limited to, all direct and indirect costs associated with such change (including, without limitation, all costs of associated delay, interference, acceleration, inefficiency, overhead, as well as costs of material, labor and supervision), and any and all adjustments to the Contract Sum and the Contract Time. Payment of a Change Order shall constitute accord and satisfaction of all Claims of the Contractor in connection with the change or changes to the Contract addressed by the Change Order and it is understood and agreed that a signed Change Order shall be the complete and fully integrated agreement for all related costs and there are no oral or written understandings, reservations, representations or agreements, directly or indirectly, connected with the Change Order and not affirmatively stated on the signed Change Order. In the event a Change Order increases the Contract Sum, the Contractor shall include the Work covered by such Change Orders in Applications for Payments as if such Work were originally part of the Contract Documents.

§ 7.2.4 Upon the Contractor's completion of the Change Order work, and prior to payment being made to the Contractor for such work, the Contractor shall provide the Owner with the following information:

.1 Certified payrolls itemizing the labor actually utilized in connection with the Change Order work; and
.2 Copies of invoices from its Subcontractors supplying work in connection with the Change Order work.

§ 7.2.5 Additional work performed without authorization of a Change Order will not entitle the Contractor to an increase in the Contract Sum or an extension of the Contract Time, except at provided in Section 7.3, and except in the case of an emergency as provided in Section 10.4.

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§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order. In the event the Contractor and the Owner cannot agree on the sum by which the Contract Sum or the amount of time by which the Contract Time is to be increased or reduced based upon changes to the scope of the Work as described in Article 7, the Architect or Construction Manager shall issue a Construction Change Directive reflecting the addition to or reduction of the scope of the Contractor's Contract.

§ 7.3.2.1 If the Owner and the Contractor cannot agree that the requested Work properly forms the basis for a Change Order or on the sum by which the Contract is to be increased or reduced based upon changes to the scope of Work, the Architect or Construction Manager shall issue a Construction Change Directive signed by the Owner, Construction Manager and Architect reflecting the addition to, or removal of, the scope of Work and the Contractor shall (a) in the case of additional work to be performed by the Contractor, perform such additional work in an expeditious manner so as not to delay the Work of the Contractor or other Contractors working at the site an keep records of its performance of such additional work, and (b) in the case of work to be removed from the scope of the Contractor's Work, refrain from taking any steps in connection with the work associated with the deduction of the Contractor's Work. The Construction Change Directive shall include: (a) a description of the work being added or removed from the Contractor's scope of Work; (b) the amount the Owner has determined to be the cost associated with the additional work (as those costs are identified and limited in Section 7.3.4) or removal of the scope of the Contractor's Contract until the Owner and the Contractor agree upon the increase or decrease in the Contractor's Contract Sum, or until a claim filed by the Contractor has been determined; and (c) the extent to which the Contract Time will be adjusted as a result of the change in the scope of Work. Any claims must be filed in accordance with the requirements set forth in Article 15 of these General Conditions. Failure to timely file any claim in accordance with requirements set forth therein shall constitute a waiver of such claim.

§ 7.3.3 If the Construction Change Directive provides for a method for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

.2 Unit prices stated in the Contract Documents or subsequently agreed ~~upon;~~upon (unit prices shall be deemed to include all costs and expenses for the Contractor's changed Work, including costs of general conditions, insurance/bonds and overhead and profit attributable to the change);

.3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage ~~fee;~~ fee subject to the limitations of Section 7.3.11; or

.4 As provided in Section ~~7.3.4.~~7.3.4 subject to the limitations of Section 7.3.11.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Construction Manager shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in ~~the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount.~~ Section 7.3.11. In such case, and also under Section ~~7.3.3.3,~~ 7.3.11, the Contractor shall keep and present, in such form as the Construction Manager may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

.1 ~~Costs of labor, including applicable payroll taxes,~~ Actual costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, ~~workers' compensation insurance, and other employee costs approved by the Construction Manager and Architect;~~and workers compensation insurance;

.2 ~~Costs~~ Actual costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;

.3 ~~Rental~~ Actual rental costs of machinery and equipment, exclusive of hand tools, ~~whether rented from the Contractor or others;~~rented from third parties; and

.4 ~~Costs~~ Actual 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.~~use or similar taxes related to the additional work.

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§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Construction Manager of the Contractor's agreement or disagreement with (1) the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum ~~or Contract Time.~~or Contract Time or (2) the amount of the increase or decrease in the Contract Sum and Contract Time as provided in Section 7.3.2.1. Any claims must be filed in accordance with the requirements set forth in Article 15 of these General Conditions. Failure to timely file any claim in accordance with requirements set forth therein shall constitute a waiver of such claim.

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§ 7.3.8 ~~The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Construction Manager and Architect.~~ When the Owner or Architect request that portions of the Contractor's Work originally included in the Drawings or Specifications be deleted and which will result in a reduction of the Contract Sum, the Architect shall request that the Contractor submit its proposal for deleting the scope of such Work from the Contract. The Contractor's proposal shall include a complete itemization of the costs associated with deducting such Work including labor, materials, overhead and profit. The Contractor shall not be entitled to retain its overhead or profit for such work nor shall any of its Subcontractors which were to perform the work being deducted from the Contractor's scope of Work. Additionally, the Contractor shall reflect the reduced cost of premiums on bonds which are to be supplied herein as a result of such change. 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.
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§ 7.3.11 The limit for the combined overhead and profit included in the total cost to the Owner shall be based on the following schedule:

- **.1** For the Contractor, for Work performed by the Contractor's own forces, fifteen percent (15%) of the direct cost for labor and materials.
- **.2** For the Contractor, for Work performed by the Contractor's Subcontractor, maximum of five percent (5%) of the amount due the Subcontractor for the Contractor's overhead and profit. For the Subcontractor, for Work performed by the Subcontractor's own forces, ten percent (10%) of the direct cost for labor and materials. The total combined overhead and profit for a change order shall be limited to 15% of the direct cost regardless if the Work is performed by the Contractor or the Subcontractor.
- **.3** The markup on any part of the Work a Subcontractor subcontracts will be limited to one overhead and profit figure, in addition to the Contractor's overhead and profit markup. The Subcontractor and Sub-subcontractor may divide the overhead and profit amount as they agree upon.
- **.4** Cost to which overhead and profit is to be applied shall be determined in accordance with Section 7.3.7.
- **.5** In order to facilitate checking of quotations for extras and credits, all proposals, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs including labor, materials, and subcontracts. Labor and material shall be itemized in the manner prescribed above. Where major cost items are subcontracts, they shall be itemized also.
- **.6** Overhead and profit mark-up shall include, but not be limited to, the following:
  - **.1** home office expense;
  - **.2** field office expense;
  - **.3** supervision;
  - **.4** project management & estimation;
  - **.5** small tools & equipment;
  - **.6** research & layout;
  - **.7** inspections & permits;
  - **.8** material handing;
  - **.9** record drawings: and
  - **.10** safety and cleanup

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§ 8.1.2 The date of commencement of the Work is the date established in the Agreement. The date shall not be postponed or extended by the failure to act of the Contractor or persons or entities for whom the Contractor is responsible to act.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8. The date of final completion is the date certified by the Architect and Owner in accordance with Section 9.10. Unless otherwise agreed in writing by the Owner, the Contractor agrees that Final Completion shall occur not more than 30 calendar days after the date of Substantial Completion.
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§ 8.1.5 Work remaining to be completed after Substantial Completion, shall be limited to items which can ordinarily be completed within a thirty (30) day period (one month) before final payment is made.

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§ 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.~~Owner and the Owner's approval of such insurance. The date of commencement of the Work shall not be changed by the effective date of such insurance. The Work can not start until the required insurance and bonds are provided and the Contract has been executed.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion and final completion within the Contract Time. The Contractor agrees that the Work shall be prosecuted regularly, diligently and uninterruptedly at such rate of progress as will **ensure** full completion thereof within the Contract Time specified and, further, to provide such protections as may be necessary. It is expressly understood and agreed by the Contractor that the time for the substantial and final completion of the Work is a reasonable time for its completion, taking into consideration, among other things, the average climatic range and usual weather conditions prevailing in the Project's locality.

§ 8.2.4 In no case shall the Contractor delay the progress of the Work, or any part thereof, on account of changes in the Work or disputes caused by proposed or ordered changes in the Work (including the equitable value of the changes), or any disputes or disagreements as to the Work or extra work.

§ 8.2.5 If the Contractor does not achieve the completion date and milestone date for each work item in the Contract, a milestone or critical path date reflected on the Project Schedule, or the date of Substantial Completion for the Work or any part thereof, the Contractor shall be responsible for all direct and consequential damages to Owner arising from any delay of the Contractor, its Sub-Contractors, Sub-subcontractors, and suppliers, in performing or completing the Work in accordance with the time requirements of the Contract, by way of example but not as a limitation: (i) additional architectural and construction management fees related to extended services; (ii) additional project management costs; (iii) financing costs (including delayed or lost State Building Aid); (vi) temporary storage and dislocation costs; and (v) costs related to the disruption or relocation of the Owner's personnel, academic and other departments, including equipment and machinery, affected by the Owner's inability to timely occupy the Project facilities. The Owner shall have the right to deduct the amount of the foregoing damages from any payment then due or thereafter becoming due from the Owner to the Contractor. If the Contract Sum is exhausted, the Contractor shall pay such amounts to the Owner on demand.

§ 8.2.6 In the event the Contractor fails to complete all Work under this Contract by said scheduled dates, the Contractor will not be permitted to perform any work during normal school hours without the express written authorization of the Owner. Such Work shall only be performed after school hours, Saturdays, Sundays, holidays or periods when school is unoccupied at no additional cost of any kind to the Owner. In addition to damages incurred by the Owner in connection with the Contractor's delay, the Contractor shall be liable for all costs incurred by the Owner to provide staff, Architect and Construction Manager personnel as required to make facility accessible by Contractor and perform inspections during such off hours.

§ 8.2.7 The Contractor understands that in order to meet the requirements of the Project schedule, including intermittent milestone and critical path dates set forth in the Contract Documents, it may be required to work its

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personnel and equipment overtime on regular work days and on Saturdays and holidays, the cost of which is included in the Contract Sum. If the Owner specifically approves in writing reimbursement for overtime, the Contractor shall be paid by the Owner on the basis of the premium payment.

§ 8.2.8 The Owner shall have the right at any time to modify the Project Schedule; to suspend, delay or accelerate, in whole or in part, the commencement or execution of the Work or any potion thereof or to vary the sequence thereof; and to prescribe the time, order and priority of the various portions of the Work, and all other matters relating to the scheduling of the Work. The Contractor shall not be entitled to additional compensation for any such decisions made by the Owner.

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§ 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~~ as a result of: Acts of God (such as tornado, flood, hurricane, pandemics [see exception below], epidemics, etc. making performance temporarily impossible); the negligent acts or omissions of the Owner, Architect, Construction Manager, ~~or an employee of any of them, or of the Owner's own forces, Separate Contractors, or other Contractors; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts and the Architect, based on the recommendation of the Construction Manager, determines justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine.~~other Contractors, or their agents or employees; strikes, lockouts or other labor disturbances (not arising from the labor practices of Contractor or its Subcontractors, Suppliers, or Sub-subcontractors to comply with their obligations arising under the Contract); unusually adverse weather conditions; freight embargoes (provided that delays by the Contractor, its Subcontractors, Sub-subcontractors or Suppliers do not constitute an excusable cause of delay); changes in the work to be performed by the Contractor (not caused or resulting from the failure of the Contractor or its Subcontractors, Suppliers or Sub-subcontractors); or changes to laws or regulations after the effective date of the Contract, provided the Contractor has used all reasonable efforts to mitigate the foregoing causes; then the Contractor shall be entitled to a day for day extension of the Contract Time for the established delay to the critical path of the Work subject to the provisions of this Article 8 and Article 15. All other delays of the Project, including but not limited to, Architect review and/or approval of shop drawings or other submittals, requests for information, clarifications, samples, and change orders; Owner schedule; Architect certification of payment; payment by Owner of Contractor's Application for Payment; coordination among the Multiple Prime Contractors; unavailability of materials and/or equipment; surveying/testing; closeout, etc. are deemed to be foreseeable and contemplated and, therefore, shall not form the basis for a claim for an extension of time or additional compensation by the Contractor. **Conditions caused by the COVID-19 pandemic or epidemic, or any variants of the disease, shall not form the basis of an excuse under this section. No additional time or compensation shall be provided to the Contractor for COVID-19 or any variant.**

§ 8.3.1.1 The Contractor further acknowledges and agrees that adjustments in the Contract Time will be permitted for a delay only to the extent such delay (1) is not caused or could not have been anticipated by the Contractor, (2) could not be limited or avoided by the Contractor's timely notice to the Owner of the delay or reasonable likelihood that a delay will occur, and (3) is of a duration of more than one (1) day.

§ 8.3.1.2 The Contractor's inability to secure sufficient personnel for the performance of the Work shall not constitute a basis for an extension of time. The Contractor shall not be entitled to an extension of time if the Architect or Construction Manager stops the Work due to the existence of or reasonable suspicion of a deficiency in the Work.

§ 8.3.1.3 An extension of the Contract Time, if requested by the Contractor, shall only be considered after the Contractor has made reasonable effort to recover the lost time. An extension, or extensions, of time may be granted subject to the provisions of this Article 8, but only after written application therefore by the Contractor. An extension of time shall be only for the number of days of delay which the Architect may determine to be due solely to the causes set forth in the application for extension of time. The Contractor shall not be entitled to receive a separate extension of time for each one of several causes of delay operating concurrently; but if at all, only the actual period of delay as determined by the Construction Manager or Architect.

§ 8.3.1.4 All requests for additional time shall be made in writing, delivered to the Construction Manager within five (5) days from the time when the circumstance with potential for delay becomes reasonably known to the Contractor,

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supported by documentation which demonstrates to the Architect and Construction Manager's satisfaction that the critical path of the Work has been significantly altered by the delays to the activities in question, and that the Project schedule cannot be maintained by re-ordering other activities within the Project at no cost. This request shall also contain, at a minimum, the following information: (1) date of start of delay; (2) specific cause of delay; (3) effect of delay on construction progress; and (4) date of termination of delay. Upon receipt of the Contractor's request for an extension of time, the Owner will ascertain the facts and extent of the delay, and may, in its sole discretion, extend the time for completion of the Contractor's Work when in its judgment such an extension is justified. The Owner's determination will be final and binding in any litigation commenced by the Contractor against the Owner which arises out of the Owner's denial of an extension of time to the Contractor. Any approval of an extension of the Contractor's time to complete its Work shall be memorialized by written change order, signed by the Owner, Contractor, Architect and Construction Manager. When the Owner determines that the Contractor will be granted an extension of time, such extension shall be computed in accordance with the following: for each day of delay in the completion of its Work, the Contractor shall be allowed one day of additional time to complete its Contract. The Contractor shall not be entitled to receive a separate extension of time for each one of several causes of delay operating concurrently; rather, only the actual period of delay as determined by the Owner or its Architect may be allowed.

§ 8.3.1.5 Failure of the Contractor to give written notice as required by Section 8.3.1.4 or to strictly comply with the requirements of Article 8 shall be deemed conclusively to be a waiver and release of such claim, and such notice shall be a condition precedent to the Contractor's right to make a claim for any claim arising out of, under or in connection with the Contractor or the performance of the Work.

§ 8.3.2 ~~Claims relating to time shall be made in accordance with applicable provisions of Article 15.~~Notwithstanding anything to the contrary in the Contract Documents, an extension in the Contract Time, to the extent permitted and justified under Section 8.3.1, shall be the sole remedy of the Contractor for, and the Contractor waives its right to any claim for damages to the extent arising from, any (1) delay in the commencement, prosecution, or completion of the Work; (2) hindrance or obstruction in the performance of the Work; (3) loss of productivity or acceleration; or (4) other claims for disruption, interference, inefficiencies, impedance, hindrance, acceleration, resequencing, schedule impacts, lack of timeliness by the Owner or its consultants, and lack of coordination, errors or omissions in the design of the Project, cumulative impact of multiple change orders, delay and other impacts (collective referred to herein as "Delay(s)"). In no event shall the Contractor be entitled to any compensation or recovery of any damages in connection with any Delay, including, but not limited to, delay costs, loss of productivity or efficiency, lost profits, extended jobsite general conditions and home office overhead, consequential damages, lost opportunity costs, impact damages, or other similar remuneration. The Owner's exercise of any of its rights or remedies under the Contract Documents (including, but not limited to, ordering changes in the Work, or directing suspension, rescheduling or correction of the Work), regardless of the extent or frequency of the Owner's exercise of such rights or remedies, shall not be construed as interference, hindrance or obstruction with the Contractor's performance of the Work and shall not entitle the Contractor to any additional compensation. The Contractor shall include a no-damages-for-delay clause in all subcontracts for the performance of the Work.

§ 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.~~Delays that affect the scheduled completion of the Work and are attributable to interference between Multiple Prime Contractors, Separate Contractors, Subcontractors, suppliers, utility companies or municipalities, shall be compensated solely by the granting of an extension of time to the Contractor by the Owner to complete the Work without charges to the Owner. The parties acknowledge that the Contract Time takes into account the time necessary for review of shop drawings, design errors or omissions, coordination amongst Contractors, change orders, delays incurred by seasonal limitations and other administrative processing by all parties involved and are not compensatory. The Contractor agrees that it has included in its Bid prices the additional cost of doing work under this Contract caused by interference of other Prime Contractors, Separate Contractors, Subcontractors, etc. and the other non-compensatory Delays described above.

§ 8.3.4 When the Contract Time has been extended, as provided under Section 8.3, such extension of time shall not be considered as justifying extra compensation to the Contractor for administrative costs, home office, estimating, extended general conditions or other similar impact costs. The Contractor acknowledges that in agreeing to the Contract Sum it assessed the potential impact of the limitations in Section 8.3.2 on its ability to recover additional compensation in connection with a Work delay, interference, impact or hindrance and agrees that those limitations shall apply regardless of the accuracy of the Contractor's assessment or actual costs incurred by the Contractor.

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§ 8.3.5 If the Contractor submits a progress report indicating, or otherwise expresses an intention to achieve, completion of the Work prior to any completion date required by the Contract Documents or expiration of the Contract Time, no liability of the Owner to the Contractor for any failure of the Contractor to so complete the Work shall be created or implied.

§ 8.3.6 The intent of the Contract is for Work to follow a logical sequence. The Contractor, however, may be required by the Owner, Construction Manager or Architect to temporarily omit or leave out any section of Work or perform Work out of sequence. Out of sequence work and come back time to these areas shall be performed at no additional cost to the Owner.

§ 8.3.7 Claims relating to Contract Time shall be made in accordance with applicable provisions of Article 15.

§ 8.4 LIQUIDATED DAMAGES

§ 8.4.1 Contractor realizes that time is of the essence on this Contract and the Construction Schedule shall be submitted per Sections included herein. In the event the Contractor fails to submit a Construction Schedule by said date, the sum per calendar day of ($1000) ONE THOUSAND DOLLARS will be subtracted from the Contract Sum due the Contractor in the form of a change order.

§ 8.4.2 Contractor realizes that time is of the essence on this Contract and the completion date for any work or the date of Substantial Completion shall be no later than the date indicated in these Contract Documents. The Contractor understands that the substantial disruption of the School District's educational process will occur if the project is not completed by the dates outlined in Division 1 of the specifications. In the event that the Contractor fails to complete any work or substantially complete the work under the Contract by said schedule, the sum per calendar day of ($1,000) ONE THOUSAND DOLLARS will be deducted from the Contract Sum due the Contractor in the form of a change order, except in cases where a delay is due to unforeseeable causes beyond the control and without the fault or negligence of the Contractor, including acts of God, or of the Public enemy, acts of the government, in either sovereign or contractual capacity, fires, floods, epidemics, **(except COVID-19 or its variants)** quarantine restrictions **(except from COVID-19 or its variants),** freight embargos, or delays of Subcontractors or suppliers due to such causes. Delays in acquisition of materials other than by reason of freight embargoes will not constitute a delay excusable under this provisions unless approved by the Owner in writing.

Within five (5) calendar days from the occurrence of any such delay, the Contractor shall notify the Owner in writing the cause of delay. The Owner will ascertain the facts and extent of the delay, and extend the time for completing the Work when in his judgment the findings of fact justify such an extension. Owner's findings of fact will be final and binding on any litigation.

The said sum per calendar day shall constitute the Liquidated Damages incurred by the Owner for each day of the delay beyond the agreed upon dates. Such Liquidated Damages shall be in addition to any other damages (other than by reason of delay) Owner may incur as a result of Contractor's breach of Contract.

In the event the Contractor fails to complete all work under this Contract by said scheduled dates, the Contractor will not be permitted to perform any work during the normal school hours. Such work shall only be performed after school hours, Saturdays, Sundays, holidays or periods when school is unoccupied at no additional cost of any kind to the Owner. In addition to Liquidated Damages, the Contractor shall be liable for all additional costs incurred by the Owner to provide staff, Architect, and Owner's Representative personnel as required to make facility accessible by Contractor and perform inspections during such off hours. In the event that the completion dates are not met, inspections will be performed once each week unless, the Owner or the Architect determine, at their sole discretion, that additional inspections are needed.

All costs incurred by the Owner, Owner's Representative, Architect, Architect's consultants, for the cost of additional inspections, at the rate of ($800) EIGHT HUNDRED DOLLARS per inspection or more due to time requirements, will be subtracted from payment due the Contractor. If the amount due the Contractor for payment is insufficient, any deficiency shall be paid by the Contractor to the Owner. Additionally, a cost of $750 per day for extended Construction Management time will be charged to the Contractor causing the delay.

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§ 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. Notwithstanding anything to the contrary contained in the Contract Documents, the Owner may withhold or offset any payment to the Contractor if and for so long as the Contractor fails to perform any of its obligations under any of the Contract Documents; provided, however, that any such holdbacks shall be limited to an amount sufficient in the reasonable opinion of the Owner to cure any default or failure of performance by the Contractor.

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~~Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Construction Manager, before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Construction Manager and the Architect. This schedule, unless objected to by the Construction Manager or Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. The Construction Manager shall forward to the Architect the Contractor's schedule of values. Any changes to the schedule of values shall be submitted to the Construction Manager and supported by such data to substantiate its accuracy as the Construction Manager and the Architect may require, and unless objected to by the Construction Manager or the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.~~**§ 9.2.1** Within 30 days of Contract Award, the Contractor shall submit to the Construction Manager a schedule of values allocated to various portions of the Work for each building, prepared in the currently authorized form of AIA Document G703 – Continuation Sheet and supported by such data to substantiate its accuracy as the Construction Manager and Architect may require. This schedule, unless objected to by the Construction Manager or Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. The schedule of values shall state the names of all Subcontractors, Sub-subcontractors and material suppliers and the amounts to become due to each breakdown by specification section. The schedule of values shall contain, along with individual work items, separate line items for (1) mobilization, bonds, insurance, etc., (2) value of administrative close out submittals, (3) Allowance(s) if required elsewhere in the Project Manual, (4) separate subtotals by building, and (5) buildings further separated between "Additions/New Construction" and "Renovations/Reconstruction" as applicable. At the direction of the Architect, it shall include quantities, if applicable. The total for all items shall aggregate the Contract Sum.

§ 9.2.2 Any schedule of values that fails to include sufficient detail, is unbalanced or exhibits "front loading" of the value of the Contractor's Work will be rejected. Furthermore, if the schedule of values has been approved by the Construction Manager and the Architect and is subsequently used, but later is found by the Construction Manager or Architect to be improper for any reason, sufficient funds shall be withheld from the Contractor's future applications for payment to ensure an adequate reserve (exclusive of normal retainage) to complete the Contractor's Work.

§ 9.2.3 The schedule of values shall be drafted so as to reflect multiple construction sites, multiple locations within each site, additions versus renovations of work, and the like so as to satisfy any New York State Education Department requirements for the Project.

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§ 9.3.1 ~~At least fifteen days before the date established for each progress payment,~~ In accordance with Article 5 of the Agreement and the Payment Procedures in the Specifications, the Contractor shall submit to the ~~Construction Manager~~ 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~~ notarized and reflecting retainage as provided elsewhere in the Contract Documents. Applications for Payment will be in the currently authorized form of AIA Document G732 - 2019, "Application and Certificate for Payment," accompanied by AIA Document G703-1992, "Continuation Sheet," and must include (add and/or deduct) adjustments to the Contract Sum resulting from Work performed under approved Change Orders (specified under Article 7) and shall be shown separately on the application for previous and current periods. Each Application and Certificate of Payment shall be accompanied by two (2) copies of the Pay Application Lien Waiver and Release in the form set forth in the Payment Procedures in the Specifications. Each Application for Payment shall be prepared in such form and supported by such data to substantiate the Contractor's right to payments as the Owner, Construction Manager or Architect ~~require, such as copies of requisitions, and releases of waivers of lien from Subcontractors and suppliers, and shall reflect retainage if provided for in the Contract Documents.~~may require such as copies of requisitions from Subcontractor and material suppliers.

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Each Application for Payment forwarded to the Owner by the Construction Manager or Architect shall be subject to audit and approval by the Owner in accordance with the Owner's normal audit.

§ 9.3.1.1 ~~As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Construction Manager and Architect, but not yet included in Change Orders.~~The Construction Manager and Architect shall review the application for payment submitted by the Contractor and shall advise the Contractor of any adjustments to be made thereto. The Construction Manager and/or the Architect may make such adjustments under the circumstances set forth in Section 9.5.1. If any such adjustments are made by the Architect or Construction Manager, the Contractor shall submit an original itemized revised application with all documentation required by Section 9.3.1.

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

§ 9.3.1.3 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 material supplier unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.1.4 Until Substantial Completion, the Owner shall pay ninety-five percent (95%) of the amount due the Contractor on account of progress payments, less an amount necessary to satisfy any claims, liens, or judgments against Contractor, which have not been suitably discharged. In accordance with Section 9.8.5, the Owner shall pay the entire amount retained from previous progress payments less two (2) times the amount required to complete items identified in a list prepared in accordance with Section 9.8.2 and the amount required to satisfy any outstanding claims, liens, or judgments against the Contractor.

§ 9.3.1.5 The Contractor and its Subcontractors are required to submit certified payroll information to the Owner in accordance with New York State Law.

§ 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 Project site for subsequent incorporation in the Work. If approved in advance in writing 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~~ interest. The costs of applicable insurance, storage, and transportation ~~to the site, for such materials and equipment stored off the site.~~to the site for such materials and equipment stored off the site shall not increase the Contract Sum.

§ 9.3.2.1 Payment may be made for materials and equipment delivered and suitably stored on-site for future incorporation in the Work, subject to the following conditions:

.1 Request for payment shall be considered for material or equipment, which is in short or critical supply, which has been specially fabricated for the Project or, at the discretion of the Construction Manager and Architect, for other materials or equipment.

.2 A request for payment of material stored on-site must be made by the Contractor ten (10) days prior to actual, monthly cut-off date for Payment Applications.

.3 Procedures required by the Owner shall include, but not necessarily limited to, submission by the Contractor to the Construction Manager and Architect of bills of sale and bills of lading for such materials and equipment, provisions of opportunity for the Construction Manager's and Architect's visual verification that such materials and equipment are in fact in storage; and, if stored off-site, submission by the Contractor of verification that such materials and equipment are stored in a bonded warehouse.

.4 All such materials and equipment, including materials and equipment stored on-site but not yet incorporated into the Work, upon which partial payments have been made shall become the property of the Owner, but the care and protection of such materials and equipment shall remain the responsibility of the Contractor until incorporation into the Work and accepted by the Owner at substantial

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completion, including maintaining insurance coverage on a replacement cost basis without voluntary deductible.

§ 9.3.2.2 Payment may be made for materials and equipment delivered and suitably stored off-site for future incorporation in the Work, subject to the following conditions:

.1 The Contractor shall submit: a written validation by the Owner, Construction Manager or Architect that such materials are stored safely off site, in the quantities and condition stated by the Contractor; a copy of an invoice for the material and equipment; a bill of sale or equivalent indication of the quantity and value of the material or equipment; a written statement indicating the location and method of storage; and property insurance certificate or rider covering the specific material or equipment, which shall name the Owner as an additional insured party.

.2 The Contractor shall submit a verification that such materials and equipment are stored in a bonded warehouse.

.3 A request for payment of material stored off-site must be made by the Contractor 10 days prior to actual, monthly cut-off date for Payment Applications.

.4 All such materials and equipment upon which partial payments have been made shall become the property of the Owner, but the care and protection of such materials and equipment shall remain the responsibility of the contractor until incorporation into the Work and accepted by the Owner at substantial completion, including maintaining insurance coverage on a replacement cost basis without voluntary deductible.

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

§ 9.3.4 The Contractor further expressly undertakes to defend the Indemnitees (as defined previously in Section 3.18), at the Contractor's sole expense, against any actions, lawsuits or proceedings brought against Indemnitees as a result of liens filed against the Owner, the Work, the site of any of the Work, the Project site and any improvements thereon, payments due the Contractor or any portion of the property of any of the Indemnities (referred to collectively as liens in this Section 9.3.4). The Contractor hereby agrees to defend, indemnify, and hold Indemnitees harmless against any such liens or claims of lien and agrees to pay any judgment or lien resulting from any such actions, lawsuits, or proceedings.

§ 9.3.5 The Owner shall release any payments withheld due to a lien or a claim of lien if the Contractor obtains security acceptable to the Owner or a lien bond which is: (1) issued by a surety acceptable to the Owner, (2) in form and substance satisfactory to the Owner, and (3) in an amount not less than One Hundred Fifty percent (150%) of such lien claim. By posting a lien bond or other acceptable security, however, the Contractor shall not be relieved of any responsibilities or obligations under this Section 9.3, including, without limitation, the duty to defend and indemnify the Indemnities in an action on the lien, lien discharge bond or underlying debt. The cost of any premiums incurred in connection with such bonds and security shall be the responsibility of the Contractor and shall not be part of, or cause any adjustment to, the Contract Sum.

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§ 9.4.1 ~~Where there is only one Contractor, the~~ The Construction Manager will, within seven (7) days after the Construction Manager's receipt of the Contractor's Application for Payment, review the Application, certify the amount the Construction Manager determines is due the Contractor, and forward the Contractor's Application and Certificate for Payment to the Architect. Within seven (7) days after the Architect receives the Contractor's Application for Payment from the Construction Manager, the Architect will either ~~(1)~~ issue to the Owner a Certificate ~~for Payment, in the full amount of the Application~~ for Payment, with a copy to the Construction ~~Manager; or (2) issue to the Owner a Certificate for Payment for~~ Manager, for such amount as the Architect determines is properly due, ~~and~~ or notify the Construction Manager and Owner in writing of the Architect's reasons for withholding certification in ~~part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Construction Manager and Owner of the Architect's reason for withholding certification in whole~~ whole or in part as

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provided in Section 9.5.1. The Construction Manager will promptly forward to the Contractor the Architect's notice of withholding certification.

§ 9.4.2 Where there is more than one Contractor performing portions of the Project, the Construction Manager will, within seven (7) days after the Construction Manager receives all of the Contractors' Applications for Payment: (1) review the Applications and certify the amount the Construction Manager determines is due each of the Contractors; (2) prepare a Summary of Contractors' Applications for Payment by combining information from each Contractor's application with information from similar applications for progress payments from the other Contractors; (3) prepare a Project Application and Certificate for Payment; (4) certify the amount the Construction Manager determines is due all Contractors; and (5) forward the Summary of Contractors' Applications for Payment and Project Application and Certificate for Payment to the Architect.

§ 9.4.2.1 Within seven (7) days after the Architect receives the Project Application and Project Certificate for Payment and the Summary of Contractors' Applications for Payment from the Construction Manager, the Architect will either (1) issue to the Owner a Project Certificate for Payment, with a copy to the Construction Manager; or (2) issue to the Owner a Project Certificate for Payment for such amount as the Architect determines is properly due, and notify the Construction Manager and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Project Application for Payment, and notify the Construction Manager and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1. The Construction Manager will promptly forward the Architect's notice of withholding certification to the Contractors.

§ 9.4.3 The Construction Manager's certification of an Application for Payment ~~or, in the case of more than one Contractor, a Project Application and Certificate for Payment,~~ shall be based upon the Construction Manager's evaluation of the Work and the ~~data in the Application or Applications~~ information provided as part of the Application for Payment. The Construction Manager's certification will constitute a representation that, to the best of the Construction Manager's knowledge, ~~information,~~ information and belief, the Work has progressed to the point ~~indicated,~~ indicated and the quality of the Work is in accordance with the Contract ~~Documents, and that the Contractor is, or Contractors are, entitled to payment in~~ Documents. The certification will also constitute a recommendation to the Architect and Owner that the Contractor be paid the amount certified.

§ 9.4.4 The Architect's issuance of a Certificate for Payment ~~or, in the case of more than one Contractor, Project Application and Certificate for Payment,~~ shall be based upon the Architect's evaluation of the Work, the recommendation of the Construction Manager, and ~~data in the Application for Payment or Project~~ information provided as part of the Application for Payment. The Architect's certification will constitute a representation that, to the best of the Architect's knowledge, ~~information,~~ information and belief, the Work has progressed to the point indicated, that the quality of the Work is in accordance with the Contract Documents, and that the Contractor ~~is, or Contractors are,~~ is entitled to payment in the amount certified.

§ 9.4.5 The representations made pursuant to Sections 9.4.3 and 9.4.4 are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to ~~completion,~~ completion and to specific qualifications expressed by the Construction Manager or Architect.

§ 9.4.6 The issuance of a separate Certificate for Payment or a Project Certificate for Payment will not be a representation that the Construction Manager or Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the ~~Work;~~ Work, (2) reviewed the Contractor's construction means, methods, techniques, ~~sequences, or procedures;~~ sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to ~~payment;~~ 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.

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§ 9.5.1 The Construction Manager or Architect may withhold a Certificate for Payment ~~or Project Certificate for Payment~~ in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Construction Manager's or Architect's opinion the representations to the Owner required by Section ~~9.4.3 and 9.4.4~~ 9.4.4 and 9.4.5 cannot be made. If the Construction Manager or Architect is unable to certify payment in the amount of the Application, the Construction Manager will notify the Contractor and Owner as provided in Section ~~9.4.1 and 9.4.2.~~ 9.4.1. If the

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Contractor, Construction Manager and Architect cannot agree on a revised amount, the Architect will promptly issue ~~a Certificate for Payment or~~ a ~~Project~~ Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Construction Manager or Architect may also withhold a Certificate for Payment or, because of subsequently discovered ~~evidence,~~ evidence or subsequent observations, may nullify the whole or a part of a ~~Certificate for Payment or Project~~ Certificate for Payment previously issued, to such extent as may be necessary in the Construction Manager's or Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from the acts and omissions described in Section 3.3.2 because of

...

.2 third party claims filed or reasonable evidence indicating probable filing of such ~~claims,~~ claims unless security acceptable to the Owner is provided by the Contractor;

...

.5 damage to the ~~Owner~~ Owner, another Prime Contractor or a Separate ~~Contractor or other~~ Contractor;
.6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; ~~or~~
.7 ~~repeated~~ failure to carry out the Work in accordance with the Contract ~~Documents.~~Documents;
.8 receipt by the Owner of a notice of withholding from the New York State Department of Labor or other administrative agencies having jurisdiction over the Project;
.9 failure to comply with applicable federal, state or local statutes, regulations, and/or laws, including, without limitation, laws and regulations applicable to the provision of certified payrolls;
.10 failure of the Contractor to provide executed performance and payment bonds and a current certificate of insurance and endorsements;
.11 reasonable evidence that the Work has not progressed as indicated on the Application for Payment;
.12 damages caused to the Owner, Construction Manager, the Architect or another Contractor as a result the Contractor's performance of its Work;
.13 the Architect's and/or the Construction Manager's discovery or observation of work which has been previously paid for by the Owner which is defective and/or incomplete;
.14 The amount requested exceeds the percent completion of Work on the site; or
.15 breach of this Agreement.

Notwithstanding the extent to which the Construction Manager and/or Architect certify an Application for Payment, the Owner shall have the right to withhold payment, in whole or in part, should the Owner determine that any of the grounds for withholding certification set forth in this Section 9.5.1 do in fact exist. If the Owner withholds payment, in whole or in part, the Owner shall promptly provide to the Contractor, Architect and Construction Manager a written explanation of the reason(s) for which payment is withheld and shall promptly pay, in accordance with the Contract Documents, all amounts which are not in dispute.

§ 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~~ If the Contractor disputes any determination by the Owner, Construction Manager or Architect with regard to any Certificate for Payment or in the event of a bona fide dispute between the Contractor and Owner, the Contractor nevertheless shall expeditiously continue to prosecute the Work and may submit a Claim in accordance with Article 15.

§ 9.5.3 When the above reasons for withholding certification or the Owner's withholding of payment are removed, certification will be made for amounts previously withheld.

§ 9.5.4 If the Architect or Construction Manager withholds certification for payment under Section 9.5.1, or if the Owner otherwise deems it necessary to protect its interests or the interests of the Project, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor ~~or supplier~~ or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Construction ~~Manager,~~ Manager and both will reflect such payment on the next Certificate for Payment.

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§ 9.5.5 Notwithstanding anything above to the contrary, the Owner has the right to withhold payment to the Contractor to protect itself against damages incurred or which may be incurred as a result of the Contractor's breach or negligence, including, but not limited to, the items set forth in Section 9.5.1. With respect to any liens, claims, or other circumstances for which the Owner is entitled to withhold payments pursuant to decisions by the Architect pursuant to Section 9.5.1, the Owner shall be entitled to withhold a sum equal to twice the stated amounts of such liens or claims, or, where there is no stated amount, twice the amount determined by the Architect to be necessary to protect the interests of the Owner. The Owner will release payments withheld due to liens provided that the Contractor obtains a discharge of record of such lien, by bonding or otherwise. By posting a lien discharge bond, however, the Contractor shall not be relieved of any responsibilities or obligations under the Agreement, including, without limitation, the duty to defend, indemnify, and hold harmless the Indemnitees (as defined previously in Section 3.18). The cost of any premiums or other expenses incurred in connection with such bonds or other means of discharge of record shall be the sole responsibility of the Contractor and shall not be part of, or cause any adjustment to, the Contract Sum.

§ 9.5.6 If the Owner is entitled to reimbursement or payment from the Contractor under or pursuant to the Contract, including but not limited to these General Conditions, such payment shall be made promptly upon demand by the Owner. Notwithstanding anything contained herein to the contrary, if the Contractor fails to promptly make any payment due the Owner, or the Owner incurs any costs and expenses to cure any default of the Contractor or to correct defective work, the Owner shall have an absolute right to offset such amount against the Contract Sum and may, in the Owner's sole discretion, elect either to: (1) deduct an amount equal to that which the Owner is entitled from any payment then or thereafter due the Contractor from the Owner, or (2) issue a written notice to the Contractor reducing the Contract Sum by an amount equal to that which the Owner is entitled.

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§ 9.6.1 After the Architect has issued a Certificate for ~~Payment or Project Certificate for~~ Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents unless such requisition is not in accordance with the terms of the Contract Documents, and shall so notify the Construction Manager and Architect.

§ 9.6.2 Payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held in trust by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contracts with the Contractor for which payment was made by the Owner. The Contractor shall strictly comply with any common law, statutory, or decisional law trust fund requirements in the State of New York (including, without limitation, the requirements of New York Lien Law Article 3-A), and hereby agrees that the Owner has the same rights as any beneficiary of such trusts to examine the books and records of the Contractor to determine such compliance, from time to time at the Owner's sole discretion. The Contractor shall promptly pay each Subcontractor, ~~no later than seven days after~~ upon receipt of payment from the Owner, ~~the amount to which the~~ out of the amount paid to the Contractor on account of such Subcontractor's portion of the Work, the amount to which said Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of ~~the~~ such 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.~~similar manner.

§ 9.6.2.1 Within seven (7) days of receipt of a payment from the Owner, the Contractor shall pay each of its Subcontractors and suppliers for work performed and materials furnished by them as reflected in the payment from the Owner, less an amount necessary to satisfy any outstanding claims, liens, or judgments and less a retained amount of not more than 5%, except that the Contractor may retain not more than 10% provided that prior to entering into a Subcontract with the Contractor, the Subcontractor is unable or unwilling to provide a performance bond and labor and material payment bond both in the full amount of the subcontract at the request of the Contractor. The Contractor shall not retain portions of the proceeds owed any Subcontractor or supplier from the Owner's payment to the Contractor for the "contract balance." Similar provisions apply to the Subcontractor and/or supplier paying each of its Subcontractors and suppliers. Nothing in this Section shall create in the Owner any obligation to pay, or to ensure that the Contractor pays, any Subcontractor or supplier, or any relationship in contract or otherwise, implied or expressed, between any Subcontractor or supplier and the Owner. The Contractor agrees that it shall comply with the payment requirements of Section 106-b(2) of the New York General Municipal Law, as amended, and that to the extent there is any conflict between that statutory section and the provisions of this Section 9.6.2.1, the provisions of the statute shall prevail.

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§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven (7) days, the Owner shall have the right to contact Subcontractors ~~and suppliers~~ to ascertain whether they have been properly paid. Neither the ~~Owner,~~ Owner nor Construction Manager nor Architect shall have an obligation to ~~pay,~~ pay or to see to the payment of money ~~to,~~ to a Subcontractor ~~or supplier,~~ except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to its suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

...

§ 9.6.7 ~~Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments~~ Payments received by the Contractor for Work properly performed by Subcontractors ~~or provided by~~ and 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, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of ~~trust, or~~ trust or shall 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.~~

~~If the Construction Manager and Architect do not issue a Certificate for Payment or a Project Certificate for Payment, through no fault of the Contractor, within fourteen days after the Construction Manager's receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Construction Manager and Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' notice to the Owner, Construction Manager and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.~~**§ 9.7.1** If, through no fault of the Contractor, the Construction Manager and Architect do not issue a Certificate for Payment within 20 days of the Construction Manager's receipt of the Contractor's Application for Payment or if, through no fault of the Contractor, the Owner does not pay the Contractor the amount certified by the Construction Manager and Architect, subject to the Owner's right to withhold payment under the terms of the Contract Documents, within 30 days of the date established for such payment in the Contract Documents, then the Contractor may, upon seven (7) additional days' written notice and opportunity to cure to the Owner, Construction Manager and Architect, stop the Work until payment of the amount owing has been received. To the extent it is determined that payment to the Contractor was improperly held through no fault of the Contractor and the Contractor elected to stop its Work consistent with the procedure set forth in this Section, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up as provided for in the Contract Documents. However, if the Contractor stops its Work and it is determined that the Owner had the right to withhold payment under the terms of the Contract Documents, then the Contractor shall be responsible to the Owner for all costs and damages (including attorneys' fees) arising from such stoppage of Work and the Contractor shall not be entitled to any adjustment in the Contract Sum or the Contract Time. This Section shall not apply: (a) to the extent that the Contractor owes to the Owner any amount pursuant to the provisions of this Contract, or (b) to the extent the Owner is required to expend amounts to purchase additional insurance on behalf of the Contractor to meet the insurance requirements of this Agreement.

§ 9.7.2 If the Owner is entitled to payment from the Contractor under or pursuant to the Contract Documents, such payment shall be made promptly upon demand by the Owner. Notwithstanding anything contained in the Contract

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Documents to the contrary, if the Contractor fails to promptly make any payment due the Owner, or the Owner incurs any costs or expenses to cure any default of the Contractor or to correct defective work, the Owner shall have an absolute right to offset such amount against the Contract Sum and may, in the Owner's sole discretion, elect either to (1) deduct an amount equal to that which the Owner is entitled from any payment then or thereafter due the Contractor from the Owner, or (2) issue a written notice to the Contractor reducing the Contract Sum by an amount equal to that which the Owner is entitled.

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§ 9.8.1 ~~Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is~~ The date of Substantial Completion of the Project or a designated portion thereof is the date when construction is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize ~~the Work for its intended use.~~the entire Project (or such portion thereof as Owner earlier elects to occupy or utilize) for the use for which it is intended. Minor items of completion or correction ("Punch List Work") may be performed after Substantial Completion, provided that such items can and shall be performed at such times and in such manner that such Work does not unreasonably interfere with the Owner's occupancy and use of the Project. Substantial Completion shall not be deemed to exist until (a) the Owner receives a Certificate of Occupancy for the Project (or such portion as elected by Owner) if such Certificate of Occupancy is required, and any other permits, approvals, licenses and any other documents from governmental authorities having jurisdiction therefore necessary for the beneficial occupancy of the Project and (b) the Contractor, Construction Manager, Architect and Owner have agreed upon a schedule for final completion and to provide the Owner with all as-built drawings, operating manuals, warranties and other required closeout documents. Warranties called for by the Agreement or by the Drawings and Specifications shall commence on the date of Substantial Completion of the Project or designated portion thereof, or any later date that the parties agree. This date shall be established by a Certificate of Substantial Completion signed by the Owner, Contractor, Architect and Construction Manager.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall notify the Construction Manager, and the Contractor and Construction Manager shall jointly prepare and submit to the Architect a comprehensive list ~~of items to be completed or corrected prior to final payment.~~ which shall identify all non-conforming, defective and incomplete Work and establish the date of commencement of warranties in connection with any such Work. 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 list, the Architect, assisted by the Construction Manager, will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the list, which is not sufficiently complete in accordance with the requirements of 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 Construction Manager or Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect, assisted by the Construction Manager, to determine Substantial Completion. If the Architect and the Construction Manager are required to perform additional substantial completion inspections because the Work fails to be substantially complete, the amount of compensation paid to the Architect and the Construction Manager by the Owner for additional services shall be deducted from the final payment to the Contractor.

§ 9.8.4 When the Architect, assisted by the Construction Manager, determines that the Work ~~of all of the Contractors,~~ or designated portion ~~thereof,~~ thereof is substantially complete, the Construction Manager will prepare, and the Construction Manager and Architect shall ~~execute,~~ execute a Certificate of Substantial Completion that shall establish the date of Substantial ~~Completion;~~ Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and ~~insurance; and~~ insurance, and shall fix the time within which the Contractor shall finish all ~~items on the list accompanying the Certificate.~~ Punch List Work, which timeframe shall not exceed 30 days. 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~~ such Certificate. Upon such ~~acceptance,~~ acceptance and consent

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of ~~surety~~ surety, if any, the Owner shall make payment of retainage applying to ~~the~~ such 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.

§ 9.8.5.1 In conformance with New York General Municipal Law Section 106-b(1)(a), upon proper execution of Certificate of Substantial Completion of Work, the Contractor shall submit a requisition for payment of the remaining amount of the Contract Sum. Upon certification of payment by the Architect, the Owner will approve and promptly pay the remaining amount of the Contract Sum less two times value of any remaining items to be completed or corrected and less an amount necessary to satisfy any claims, liens or judgments against Contractor which have not been suitably discharged. Such payment shall be made under terms and conditions governing final payment except that the Owner's making of such payment shall not constitute the Owner's waiver of any objection to all or any portion of the Work performed by the Contractor or any claims the Owner may then have against the Contractor.

§ 9.8.5.2 Neither the requisition for payment stipulated in Section 9.8.5.1 nor any portion of retained percentage shall become due until the Contractor submits to the Construction Manager:

.1 an affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the work for which the Owner or the Owner's property might in any way be responsible, have been paid or otherwise satisfied, the form of which will be the currently authorized AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims";

.2 consent of all sureties, if any, to such payment, the form of which will be the currently authorized AIA Document G707A, "Consent of Surety to Reduction in or Partial Release of Retainage," but which will not be required if the amount withheld under Section 9.8.3.1 exceeds the amount of retainage; and

.3 if required by the Owner, other data establishing payment or satisfaction of all such obligations, such as receipts, releases, and waivers of liens arising out of contract to such extent and in such form as may be designated by the Owner.

§ 9.8.5.3 As the Punch List Work is satisfactorily completed or corrected, the Contractor may submit a requisition for payment of these items. The Contractor shall submit with each such requisition for payment affidavits, consents of surety, and other data as described in Section 9.8.5.2 covering work for which payment is requested. Upon certification of such requisitions by the Architect and Construction Manager, the Owner will approve and promptly pay the requisition less an amount two times that which is necessary to satisfy any claims, liens or judgments against the Contractor which have not been suitably discharged.

§ 9.8.5.4 Where the Project includes heating, air conditioning, electrical, communication, data or other systems which are not put into operation at the time of occupancy, a sum shall be withheld until these systems have operated to the general satisfaction of the Architect. The Contractor shall provide complete start up and commissioning of the systems with a detailed check list as recommended by the equipment or system manufacturer. The retained amount shall approximate five percent (5%) of the cost of the systems as determined by the cost breakdown submitted. The guaranty/warranty period for such systems will not commence until after such Architect approval.

§ 9.8.5.5 The Contractor shall complete the Punch List Work for the Project no later than 30 days after Substantial Completion of the Project. The Contractor shall be fully liable to the Owner for all damages suffered by the Owner as a result of delay in achieving final completion of the Work, including without limitation, additional architectural and construction management fees related to extended services.

§ 9.8.6 If the Architect or the Construction Manager is required to inspect the Work more than two (2) times prior to certifying the Work as being substantially complete on account of the discovery of one or more items that are not sufficiently complete, the Contractor shall be liable to the Owner for the amount of any costs, additional fees or compensation due from or paid by the Owner to the Architect and/or the Construction Manager for the additional inspections.

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§ 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 as required under Section 11.3.1.5 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,

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retainage if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor and Construction Manager shall jointly prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect after consultation with the Construction Manager.

...

§ 9.9.4 The Contractor shall cooperate with the Owner in order to make portions of the Project available as soon as possible.

§ 9.9.4.1 The Project site and buildings, whether work of the Contractor is partially or fully completed or not, are property of the Owner who shall have certain rights and privileges in connection with use of same.

§ 9.9.4.2 Should there be, in the opinion of the Architect or Construction Manager, unwarranted delay on part of any Contractor in completion of incomplete or defective work or other Contract requirements, and the Architect so certifies, the Owner may have full or partial use and occupancy of any or all portions of buildings as required for moving in or installing furniture, fixtures, supplies, or equipment and for general cleaning and maintenance work. In such event, the Contractor whose unfinished work is done subsequent to installation of furniture, fixtures, equipment, etc., shall be responsible for the prevention of any damage to such installation. Such use or occupancy by the Owner shall in no instance constitute acceptance of any of the Work.

§ 9.10.1 Upon completion of the Work, the Contractor shall forward to the Construction Manager a written notice that the Work is ready for final inspection and ~~acceptance,~~ acceptance and shall also forward to the Construction Manager a final Contractor's Application for Payment. Upon receipt, the Construction Manager ~~shall perform an inspection to confirm~~ will evaluate the completion of Work of the ~~Contractor. The Construction Manager shall make recommendations to the Architect when the Work of all of the Contractors is ready for final inspection, and shall then forward the Contractors' notices and Application for Payment or Project Application for Payment, to the Architect,~~ Contractor and then forward the notice and Application, with the Construction Manager's recommendations, to the Architect who will promptly make such inspection. When the ~~Architect~~ Architect, finds the Work acceptable under the Contract Documents and the Contract fully performed, the Construction Manager and Architect will promptly issue a final Certificate for Payment or Project Certificate for Payment stating that to the best of their knowledge, information and belief, and on the basis of their on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Construction Manager's and Architect's final Certificate for Payment or Project Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.1.1 If the Work is not accepted by the Owner after final inspection and additional time is required to complete items identified during the final inspection, the date starting the one-year correction period described in Article 12.2 shall be set by the Architect at his discretion, but not later than the date of the final Certificate for Payment.

§9.10.1.2 If the Architect and the Construction Manager are required to provide additional services, extend the duration of services to the Owner, and/or perform additional final inspections because the Work fails to comply with the requirements of the Contract Documents, or the Contractor did not complete the Work in accordance with the construction schedule or Project schedule, the amount of compensation paid to the Architect and the Construction Manager by the Owner for additional services shall be deducted from the final payment due to the Contractor.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect through the Construction Manager (1) all closeout documents required by the Contract Documents, including, without limitation, as-built drawings, attic stock, maintenance manual, operating instructions and other documents required to be delivered under the Contract in connection with the Work in the form required by the Owner, (2) 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)~~ (3) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in ~~effect, (3)~~ effect and will not be canceled or allowed to

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expire until at least 30 days' prior written notice has been given to the Owner, (4) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, ~~(4)~~ (5) consent of surety, if any, to final ~~payment (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and~~ payment, (6), if required by the Owner, other data establishing payment or satisfaction of obligations, such as ~~receipts and~~ receipts, releases and waivers of liens, claims, security ~~interests,~~ interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated ~~by the Owner.~~ by the Owner, and (7) all warranties and guarantees required by the Contract Documents. 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~~ lien. If such lien 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,~~ such lien, including all costs and reasonable attorneys' fees.

§ 9.10.2.1 In addition to the submittals required in Section 9.10.2 above, the Contractor shall submit separate final release or waivers of lien for each Subcontractor, material supplier, or others with lien rights against the Project, and shall submit a list of such parties.

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§ 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.~~by the Owner shall not constitute a waiver of claims, causes of action, damages or complaints by the Owner.

§ 9.10.5 Acceptance of final payment by the Contractor, a ~~Subcontractor, or a supplier,~~ Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing in accordance with Article 15 and identified by that payee in writing as unsettled at the time of the final Application for Payment.

§ 9.10.6 At any time a lien is filed against the Project funds, the Owner may demand that the Contractor discharge said lien, through bonding or otherwise, and the Contractor must obtain the discharge of said lien within seven (7) days of such demand at the Contractor's sole cost and expense, and at no cost to the Owner. If any lien or other encumbrance required to be removed at the Contractor's sole cost and expense pursuant to this Section is not discharged of record as aforesaid, the Owner shall have the right to take such action as the Owner shall deem appropriate (which shall include the right to cause such lien or other encumbrance to be canceled and discharged of record), and in such event, all costs and expenses incurred by the Owner in connection therewith (including, without limitation, premiums for any bond furnished in connection therewith, and reasonable attorneys' fees,
court costs and disbursements), shall be paid by the Contractor to the Owner on demand or, at the option of the Owner, deducted from any payment then due or thereafter becoming due from the Owner to the Contractor in accordance with the provisions of these General Conditions.

§ 9.10.7 Existing warranties shall not deprive the Owner of any cause of action, right, or remedy otherwise available for breach of any of the provisions of the Contract Documents. The periods referred to above shall not be construed as limitations on the time in which the Owner may pursue any such action, right or remedy.

§ 9.10.8 The Contractor shall achieve final completion of all Work, including, without limitation, correction of punch-list items, preparation and delivery of all manuals, presentation of training and completion of final paper submissions not later than 30 days following the date of Substantial Completion. In the event the Contractor shall fail to achieve final completion of the Work within such a period of time, the Contractor and the Contractor's surety, if any, shall be liable for and shall reimburse the Owner for any and all fees paid to the Architect and Construction Manager and other expenses made necessary by the Contractor's failure. Additional fees and expenses shall be charged by the Owner against any Final Payment due or which may become due to the Contractor, and the Contractor shall promptly pay or refund the Owner the excess, if any, upon the Owner's written request.

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The Contractor shall be responsible for initiating, implementing, directing, controlling, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract. The Contractor shall submit

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the Contractor's safety program to the Construction Manager for review and coordination with the safety programs of other Contractors. The Construction Manager's responsibilities for review and coordination of safety programs shall not extend to direct control over or charge of the acts or omissions of the Contractors, Subcontractors, agents or employees of the Contractors or Subcontractors, or any other persons performing portions of the Work and not directly employed by the Construction Manager. The Contractor's safety precautions and programs shall include specific steps designed to minimize the risk of contracting or spread of COVID-19, including provision of all appropriate personal protective equipment, social distancing, avoiding stacking of trades, and other reasonable precautions.

...

§ 10.2.1 The Contractor shall take ~~reasonable~~ necessary precautions for safety of, and shall provide reasonable protection to prevent damage, injury, infection or exposure to COVID-19, or loss to

...

.3 the Owner's real and personal property and other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, ~~structures,~~ structures and utilities not designated for removal, ~~relocation,~~ relocation or replacement in the course of construction;~~and~~

.4 construction or operations by the Owner, Separate Contractors, or other ~~Contractors.~~Contractors; and

.5 the existing buildings and premises in the vicinity of or affected by the Contractor's operations.

.6 the contractor agrees, in order that the work will be completed with the greatest degree of safety, to conform to the requirements of the NYS SED rescue regulations (excerpt of the constructors responsibilities section 155.5) and the Occupational Safety and Health Act of 1970 (OSHA) as amended and the Construction Safety Act of 1969 as amended, including all standard and regulations that have been since or shall be promulgated by the governmental authorities which administer such acts, and shall indemnify and hold harmless the owner, Construction Manager, the Architect, and all.

§ 10.2.1.6 Safe access to and egress from any building under construction as part of this Contract, or any existing building in which Work is being done under this Contract, shall be maintained and remain unencumbered by the Contractor in accordance with all applicable codes, rules and regulations of authorities having jurisdiction on the Work. The Contractor and its Subcontractors shall cooperate in maintaining this condition. Roadways, paths, walks, exits, service drives and other areas shall remain unobstructed and shall be maintained in a safe and satisfactory condition, for all persons using the building and premises. Materials shall not be stored promiscuously about the site or in the building, but shall be carefully stored in areas which will not interfere with pedestrian traffic or with access to and egress from adjacent properties and use of the building. The Contractor shall provide and maintain such temporary Work as may be required for the protection of its finished Work where liable to injury. The Contractor will be responsible for all of its Work, materials and equipment that may be damaged or stolen during the duration of the Contract and until the Work is accepted by the Owner. The Contractor shall make good any such damage or loss without expense to the Owner. The Contractor shall not permit unnecessary hazards to be created nor permit them to continue if they are discovered. The Contractor's storage and staging areas shall be only in locations assigned or approved by the Owner and Architect and may be required to be relocated by the Contractor as building occupancy or use changes during the course of the Work. This relocation will be done by the Contractor at no additional cost to the Owner.

§ 10.2.2 The Contractor shall comply with, and give notices required ~~by~~ 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.

§ 10.2.2.1 The Contractor acknowledges that the Labor Law of the State of New York, and regulations adopted thereunder, place upon both the Owner and the Contractor certain duties and that liability for failure to comply therewith is imposed on both the Owner and the Contractor regardless of their respective fault. The Contractor hereby agrees that, as between the Owner and the Contractor, the Contractor is solely responsible for compliance with all such laws and regulations imposed for the protection of persons performing the Contract. The Contractor shall indemnify and hold harmless the Owner of and from any and all liability for violation of such laws and regulations and shall defend any claims or actions which may be brought against the Owner as the result thereof. In the event that the Contractor shall fail or refuse to defend any such action, the Contractor shall be liable to the Owner for all costs of the

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Owner in defending such claim or action and all costs of the Owner, including attorney's fee, in recovering such defense costs from the Contractor.

§ 10.2.2.2 All laborers, workers, and mechanics employed in the performance of the Work of this Project shall be certified as having successfully completed a course in construction safety and health approved by the United States Department of Labor's Occupational Safety and Health Administration that is at least 10 hours in duration. The Contractor and its Subcontractors shall conduct their operation in accordance with the Safety Guides for Construction as issued by State Education Department, and the Contractor's safety program.

§ 10.2.2.3 All safety equipment including hard hats, weather protective gear and PPE required for the Contractor to perform its Work are to be supplied by the Contractor or its Subcontractors. Within the designated construction areas, the Contractor's employees, superintendents, or other agents, and its Subcontractors, employees, superintendents, or other agents are required to wear hard hats and other required or essential safety equipment. Each person seen without a hard hat, or otherwise failing to comply with this requirement, will be ordered to leave the Project. No prior warnings will be given by the Owner, Construction Manager or Architect. The Contractor and its Subcontractors shall be solely responsible for making up and paying for any loss of production or required progress resulting from the removal of personnel from the Project as set forth herein including any costs incurred by the Owner in connection with the work of other contractors.

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§ 10.2.5 The Contractor shall promptly remedy damage and loss ~~(other than damage or loss insured under property insurance required by the Contract Documents)~~ to property referred to in Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2, 10.2.1.3 and ~~10.2.1.4. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is~~ 10.2.1.4, except damage or loss attributable to acts or omissions of the Owner, Construction Manager or Architect or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section ~~3.18.~~3.18, and shall not be limited by such damage or loss being insured under property insurance required by the Contract Documents.

§ 10.2.6 The Contractor shall schedule weekly safety meetings and each of its Subcontractors must be properly represented at such meetings. The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner, Construction Manager and Architect.

§ 10.2.7 The Contractor shall not load or permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition. The Contractor shall not load any part of the Work with materials, equipment, shores, bracing, or other items which in any way could cause damage to the Work or to other Work or could endanger persons in or about the Work.

§ 10.2.8 ~~Injury or Damage to Person or Property~~If, during the construction, public or private property is damaged or destroyed as a consequence of its Work, the Contractor shall, at its own expense, restore such property to a condition equal to that existing before such damage or injury was done, by repairing, rebuilding or replacing it, or otherwise making good such damage or destruction in an acceptable manner.

§ 10.2.9 The Contractor shall be responsible for all breakage of glass, which has been furnished and installed as part of Contract and existing glass that is broken due to operations under the Contract for Work. No matter by whom or what cause glass was broken, the Contractor shall replace all broken glass before completion and acceptance of the Contractor's Work. The Contractor may claim damages, if applicable.

§ 10.2.10 In addition to all requirements set forth herein, the Contractor and its Subcontractors shall fully comply with the provisions of the federal Occupational Safety and Health Act of 1970, as amended, and with any rules and regulations pursuant to the Act. This requirement shall apply continuously and not be limited to normal working hours.

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§ 10.2.11 The Contractor shall also be responsible, at the Contractor's sole cost and expense, for all measures necessary to protect any property adjacent to the Project and improvements therein. Any damage to such property or improvements shall be promptly repaired by the Contractor at its sole expense.

§ 10.2.12 The Contractor shall immediately contact the Construction Manager and, within 24 hours, report, in writing, to the Owner, Architect and Construction Manager, all accidents arising out of or in connection with the Work which cause death, personal injury, or property damage, giving full details and statements of any witnesses. In addition, if death, serious personal injuries, or serious property damages are caused, the accident shall be reported immediately by telephone or messenger to the Owner, Construction Manager, and Architect.

§ 10.2.13 The Contractor shall be solely responsible for any conditions that develop during construction and in the event any structure is dislocated, over strained, or damaged so as to affect is usefulness, the Contractor shall be solely responsible. The Contractor shall take whatever steps necessary to strengthen, relocate or rebuild the structure to meet requirements at the sole expense of the Contractor.

§ 10.2.14 The Contractor is responsible for restoration or repair of utilities, private property, buildings, pavement, walkways, roads, etc. damaged by its activities under this Agreement to the satisfaction of the Owner, Construction Manager and Architect.

§ 10.2.15 From the commencement to the final completion of the Work, the Contractor shall keep the Work and the Owner's building(s) free from accumulation of water no matter the source or cause of water infiltration.

§ 10.2.16 During construction, the Contractor shall be responsible for maintaining a watertight structure. This responsibility shall include additions/alterations of existing buildings. The Contractor shall be responsible for temporary roofing, tarps and other protection at roofs, cavity walls, etc. Should the Contractor fail to provide adequate protection causing flooding, damage or other disturbance to the existing building(s), the Contractor shall be responsible for all costs associated with clean up, remediation and repairs. Inasmuch as flooding and water damage have safety implications to the general public, clean up, remediation and repairs may be made by the Owner without prior notice to the Contractor. Administration costs incurred by the Owner, Construction Manager and Architect will also be back charged to the Contractor. The Contractor, by entering into this Contract, agrees to be liable for these costs.

§ 10.2.17 Injury or Damage to Person or Property
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§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents ~~regarding hazardous materials or substances.~~ and all applicable laws, rules and regulations regarding hazardous materials. 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~~ 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~~ report the condition to the Owner, Construction Manager and Architect ~~of the condition.~~ in writing. The Owner shall arrange for the material to be tested and if the test reveals that the material is a hazardous material or substance which has not been rendered harmless, the Owner shall pay for the test; otherwise, the Contractor shall bear the cost of the test and the Contract Sum shall be reduced by the amount of that cost. The Contractor shall comply with the reasonable instructions of the Owner after the test is conducted. This Section shall not apply in the case of asbestos which is to be removed and disposed of as part of the Work of the Contract.

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify ~~the~~ a presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. ~~Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor, Construction Manager and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor, the Construction Manager and the Architect will promptly reply to the Owner in writing stating whether or not any of them has reasonable objection to the persons or entities proposed by the Owner. If the Contractor, Construction Manager or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the~~

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~~Contractor, the Construction Manager and the Architect have no reasonable objection.~~ When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased ~~by~~ in the amount of the Contractor's reasonable additional costs of ~~shutdown, delay,~~ shut-down, delay and start-up.

§ 10.3.3 To the fullest extent permitted by law, but only to the extent of available insurance proceeds, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Construction Manager, Architect, their consultants, ~~and agents~~ and employees of any of them from and against claims, damages, ~~losses,~~ losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that ~~such claim, damage, loss, or expense~~ the person seeking indemnification: (1) did not bring such material onto the Project site; (2) timely provided notice of the condition and stopped Work in the affected area as required by Section 10.3.1; and (3) has a claim, damage, loss or expense that is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work ~~itself), except~~ itself). The Owner shall have no indemnity obligation to the extent that such damage, ~~loss,~~ loss or expense is due to the fault or negligence of the party seeking ~~indemnity.~~ indemnity or the fault or negligence of a third party for whom the Owner is not responsible.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for ~~hazardous~~ materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for ~~hazardous~~ materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall ~~reimburse~~ indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of ~~hazardous materials or substances~~ 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 fault or negligence.

§ 10.3.6 If, without negligence or fault 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 (that was not brought to the site by the Contractor or those for whom the Contractor is responsible) 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.

§ 10.3.7 The Contractor shall notify the Owner of any storage, use, or discovery of hazardous material on the Project site which the Contractor knows or reasonably should know could cause bodily injury or death and of any injury or death attributable to any such hazardous material.

§ 10.3.8 The Contractor shall take all reasonable precautions and measures to prevent any contamination by or spread or disturbance of hazardous or potentially hazardous substances or materials stored, used, or discovered on the Project site.

§ 10.3.9 For the avoidance of any doubt, COVID-19 shall not be considered a Hazardous Material for purposes of this Article 10.3.

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~~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.~~ **§ 10.4.1** The Contractor shall provide at the site, such equipment and medical facilities as are necessary to supply first-aid service to anyone at the Work.

§ 10.4.2 The Contractor must promptly report in writing to the Construction Manager all emergencies whatsoever arising out of, or in connection with the performance of the Work, whether on, or adjacent to the site, which caused death, personal injury or property damages, giving full details and statements of witnesses. In addition, if death, injury, or damages are caused, the emergency shall be reported immediately to the Construction Manager, Owner, and Architect.

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§ 10.4.3 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.

§ 10.4.4 All fire and emergency access, including roads, rights-of-way, corridors, doors, and stairs, and all existing fire and smoke detection systems shall be maintained at all times in accordance with fire safety laws. If the Work requires the temporary obstruction of any fire and emergency access or existing fire and smoke detection systems, the Construction Manager shall be notified at least 72 hours in advance.

...

§ 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, Construction Manager and Construction Manager's consultants, and the Architect and Architect's consultants, shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.~~agrees to secure and maintain, at Contractor's own expense, all insurance coverage required in this Article 11 from one or more insurance companies licensed and admitted to write such insurance in New York State. Insurers must carry an A.M. Best Financial Strength rating of A- or higher. The Contractor's insurance must include the following, without limitation, and must be written with limits no less than specified in Section 11.1.2:

.1 claims under workers' compensation, disability benefit, and other similar employee benefit acts applicable to the Work to be performed, including, without limitation, claims by the employees of private entities performing Work at the site that are exempt from workers' compensation insurance coverage requirements on account of number of employees or occupation, which entities must maintain voluntary compensation coverage at the same limits specified for mandatory coverage for the duration of the Project;

.2 claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;

.3 claims for damages because of bodily injury, sickness, disease, or death of any person other than the Contractor's employees;

.4 claims for damages insured by usual personal injury liability coverage sustained (1) by a person as a result of an offense directly or indirectly related to employment of such person by the Contractor, or (2) by another person;

.5 claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including resulting loss of use resulting;

.6 claims for damages because of bodily injury, death of a person, or property damage arising out of ownership, maintenance, or use of a motor vehicle; and

.7 claims involving contractual liability applicable to the Contractor's obligations under Section 3.18.

.8 A fully completed New York Construction Certificate of Liability Insurance Addendum (Acord 855 2014/15) must be included with the certificates of insurance. For any "yes" answers on Items G through L on this Form – additional details must be provided in writing. No exclusions, restrictions and/or modifications to coverages will be accepted.

.9 Where the Contract or Subcontract involves asbestos, the insurance required by section 11.1 shall specifically include the words asbestos abatement work and shall specify any limitations on completed operation time. If there is a limitation it will be at the owner's discretion to accept or reject that limitation.

.10 Insurance must remain in effect at least until final payment and all items thereafter when the contractor may be correcting, removing or replacing defective work in accordance with this document, and

.11 Liability insurance shall include all major divisions of coverage and be on a comprehensive basis including:

.1 Premises operations without exclusion of x,c, and u coverage;

.2 Independent Contractors Protective;

.3 Products and completed operation;

.4 Personal Injury Liability;

.5 Owned, non-owned and owned motor vehicles

.7 Broad form property damage including completed operations

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§ 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.~~Coverages, whether written on an occurrence or claims-made basis, must be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment. Claims-made coverage will only be allowed when the Contractor demonstrates that occurrence-based coverage is not available for a specific type of required coverage. The insurance required by Section 11.1.1 must be written for not less than the following limits, or greater limits as may be required by law, and include the following terms:

.1 Commercial General Liability. Occurrence-based Commercial General Liability coverage to include bodily injury, personal injury, and property damage applicable to ongoing operations, products & completed operations, and contractual liability, all with a per-project aggregate endorsement. No XCU exclusion is allowed for explosion, collapse, and underground operations. Products and Completed Operations coverage must be maintained in force for a minimum of two (2) years following Final Completion of the Project. Minimum limits are:

$2,000,000 General Aggregate
$2,000,000 Products and Completed Operations Aggregate
$1,000,000 Personal and Advertising Injury
$1,000,000 Each Occurrence
$1,000,000 Personal and Advertising Injury
$ 100,000 Fire Damage (any one fire)
$ 10,000 Medical Expense (any one person)

.2 Automobile Liability. Bodily Injury and Property Damage coverage for the Contractor as the owner or lessee of automobiles, trucks, trailers, self-propelled Contractor's equipment, and all other owned and non-owned vehicles registered for use on the public highway and/or used in operations relating to the Contractor's Work, with a minimum Combined Single Limit of $1,000,000. If any such vehicles are to be used to transport hazardous materials, the Contractor shall also provide pollution liability broadened coverage evidenced by ISO Form CA 99 48 and MCS-90.

.3 Excess Liability and/or Umbrella Liability. Minimum limits are:

$5,000,000 each Occurrence and $5,000,000 for general construction and no work at elevation (1 story – 10 feet) or Project values less than or equal to $1,000,000.
$10,000,000 each Occurrence and $10,000,000 Aggregate for high risk construction, work at elevation (>1 story or 10 feet) or Project values greater than $1,000,000.

Umbrella/Excess coverage shall be on a follow-form basis.

.4 Workers' Compensation

.1 Workers' Compensation Requirements. To comply with the New York State Workers' Compensation Law, the Contractor must (1) be legally exempt from obtaining workers' compensation insurance coverage, or (2) obtain such coverage from insurance carriers, or (3) be self-insured or participate in an authorized group self-insurance plan. Minimum limitations are:

Bodily Injury by Accident: $500,000 Each Accident
Bodily Injury by Disease: $500,000 Each Employee
Bodily Injury by Disease: $500,000 Policy Limit

.2 Workers' Compensation Coverage Evidence. To demonstrate compliance with the New York State Workers' Compensation Law, the Contractor must provide **one** of the following forms to the Owner:

.1 Either CE-200, "Affidavit For New York Entities And Any Out Of State Entities With No Employees, That New York State Workers' Compensation And/Or Disability Benefits Insurance Coverage Is Not Required"; **or** CE-200, "Affidavit That An Out-Of-State Or Foreign Employer Working In New York State Does Not Require Specific New York State Workers' Compensation And/Or Disability Benefits Insurance Coverage" (either affidavit must be stamped as received by the New York State Workers' Compensation Board); **or**

.2 Either C-105-2, "Certificate of NYS Workers' Compensation Insurance Coverage" (for employers insured for workers' compensation through a private insurance carrier – the Contractor's insurance carrier must send this form to the Owner),**or** U-26.3, "New York State Insurance Fund Certificate of

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Workers' Compensation Coverage" (for employers insured for workers' compensation through the State Insurance Fund); **or**

.3 **Either** SI-12, "Certificate of Workers' Compensation Self-Insurance," **or** GSI-105-2, "Certificate of Participation in Workers' Compensation Group Self-Insurance (for employers participating in group self-insurance for workers' compensation – the Contractor's Group Self-Insurance Administrator must send this form to the Owner).

.5 **Employer's Liability/Disability**

.1 **Disability Benefits Requirements.** To comply with the New York State Disability Benefits Law, the Contractor must (1) be legally exempt from obtaining disability benefits insurance coverage, (2) obtain such coverage from insurance carriers, or (3) be self-insured.

.2 **Disability Benefits Coverage Evidence.** To demonstrate compliance with the New York State Disability Benefits Law, the Contractor must provide **one** of the following forms to the Owner:

.1 **Either** CE-200, "Affidavit For New York Entities And Any Out Of State Entities With No Employees, That New York State Workers' Compensation And/Or Disability Benefits Insurance Coverage Is Not Required" **or** CE-200, "Affidavit That An Out-Of-State Or Foreign Employer Working In New York State Does Not Require Specific New York State Workers' Compensation And/Or Disability Benefits Insurance Coverage" (either affidavit must be stamped as received by the New York State Workers' Compensation Board); **or**

.2 **Either** DB-120.1, "Certificate of Disability Benefits," **or** DB-820/829, "Certificate/Cancellation of Insurance" (the Contractor's insurance carrier must send either form to the Owner); **or**

.3 DB-155 (3/04), "Certificate of Disability Benefits Self-Insurance."

.6 **Hazardous Materials.** If the Contractor's Work involves handling or disturbance of asbestos or other hazardous materials, the Contractor shall provide bodily injury and property damage liability insurance applicable to such operations, covering both ongoing operations and products & completed operations. Products and Completed Operations coverage must be maintained in force for a minimum of two (2) years following Final Completion of the Project. Coverage must be for limits not less than:

.1 If covered by the Contractor's umbrella/excess liability policy:

$2,000,000 General Aggregate
$2,000,000 Each Occurrence or Incident:

.2 If not covered by the Contractor's umbrella/excess liability policy:

$6,000,000 General Aggregate
$6,000,000 Each Occurrence or Incident:

.7 **Owner's Protective Liability Policy.** The XCU exclusion must be deleted, and the Named Insureds will be "Nanuet Union Free School District." Minimum limits are:

$2,000,000 Each Occurrence
$4,000,000 Aggregate

OCP coverage must be written with licensed and admitted carriers, list the district as the name insured. No additional insureds will be on the OCP.

§ 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.~~Certificates of insurance acceptable to the Owner, together with copies of all insurance policies procured by the Contractor pursuant to this Article 11, including, without limitation, terms, conditions, declarations, riders, and endorsements, must be submitted to the Construction Manager for transmittal to the Owner, with copies to the Architect, prior to commencement of the Work. If any of the foregoing insurance coverages are required to remain in force after final payment, an additional certificate evidencing continuation of such coverage must be submitted with the final Application for Payment as required by Section 9.10.2.2. Information concerning reduction of coverage must be furnished by the Contractor with reasonable promptness. In addition to the Certificates of Insurance and accompanying documents, the Contractor shall provide to the Certificate Holders, on a timely basis, copies of any subsequently issued endorsements that amend any coverages or limits. In addition:

.1 "Certificate Holders" are the Nanuet Union Free School District, 101 Church Street, Nanuet, NY,10954

.2 Coverages reflected in certificates of insurance and underlying policies must comply with all requirements of this Article 11.

.3 All insurance documents must be executed with *authorized* signatures.

.4 All required liability policies must be endorsed to provide that any Notice of Cancellation or Notice of Non-Renewal given to the First Named Insured must also be given to the Additional Insureds identified in Section 11.1.4. **Copies of such endorsements must be furnished to the Certificate Holders.**

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.5 Failure of the Owner to object to the Contractor's failure to furnish a certificate or other evidence of required insurance coverages, or to object to any defect in such certificate or other evidence, or to demand receipt of such certificate or other evidence, is not a waiver of the Contractor's obligation to furnish the required insurance coverages. Furthermore, nothing contained in this Article 11 imposes on the Owner a duty or obligation to review any certificates or other evidence of insurance coverages or to issue any formal approval or acceptance of such evidence, the duty and obligation of the Contractor being to provide insurance meeting the requirements of this Article 11 regardless of any review or lack of review by the Owner of the Contractor's evidence of insurance.

.6 The Contractor's liability to and indemnification of the Owner is not relieved or diminished by the Contractor securing insurance coverage in accordance with this Article 11. Any acknowledgement of receipt of, or lack of objection by the Owner to, the Contractor's evidence of required insurance coverage is not acceptance in any way of any deficiencies in the Contractor's insurance coverage.

§ 11.1.4 ~~Notice of Cancellation or Expiration of Contractor's Required Insurance.~~ ~~Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice directly to the Owner, and separately to the Construction Manager, of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.~~

Additional Insureds

§ 11.1.4.1 Policies of insurance required under Sections 11.1.2.1 (Commercial General Liability), 11.1.2.2 (Automobile Liability), 11.1.2.3 (Excess Liability and/or Umbrella Liability), and 11.1.2.6 (Hazardous Materials – if applicable) must also apply to the following as Additional Insureds on a primary and non-contributory basis, with the following designation, unaltered:

> Nanuet Union Free School District and their respective employees, interim administrators, authorized volunteers, committee members, student teachers, auxiliary instructors, members of the Board of Education, and consultants (the "District Indemnitees"); KSQ Architects, PC and its consultants ("Designers"), and Jacobs ("Construction Manager"), during both ongoing and complete operations. The additional insured coverage provided shall not preclude coverage in favor of the any District Indemnitees, Designers, or Construction Manager, based on its lack of privity with Contractor or other third party additional insured. Further, such coverage shall not exclude or deny coverage to District Indemnitees, Designers, or the Construction Manager on the basis that the named insured Contractor's Work or operations are not performed directly for the District Indemnitees, Designers, or Construction Manager or other third party additional insured.

§ 11.1.4.2 Coverage Evidence. Additional Insured coverage must be effected through the use of **either** ISO Form CG CG 20 38 and CG 20 37 04 13 **together**. Form CG 20 38 alone is not acceptable. Certificates of Insurance must clearly state how coverage is effected in the Excess/Umbrella Liability layer. Certificates of Insurance must show the form numbers used to effect all of the Additional Insured coverages. A copy of the actual policy language or endorsement that effects this coverage in each policy must be provided to the Owner and Construction Manager with the Certificate of Insurance. In the event Contractor is unable to procure such coverage specifically naming the "District Indemnitees," "Designers," "Construction Manager," or any other third party as an additional insured as required above, Contractor shall notify the Owner and Construction Manager prior to commencing Work and shall not proceed with any Work until authorized by the Owner to do so.

§ 11.1.4.3 No Reliance on "Following Form." The Contractor acknowledges that "Following Form" wording generally does not meet the primary and non-contributory coverage requirement for Additional Insureds, and that the coverage primacy aspect of Additional Insured coverage is typically addressed in the "Other Insurance" provisions of a policy's "Conditions" section, and often requires an amending endorsement to effect coverage on a primary and non-contributory basis. The Contractor therefore must provide such endorsements to the Owner, or other documentation acceptable to the Owner evidencing that the primary and non-contributory coverage requirements are met as to all policies for which they are required under Section 11.4.1.1.

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§ 11.1.5 Normal Expiration/Renewal. When any required insurance is to expire due to a normal expiration or renewal date, the Contractor shall supply the Owner, at least ten (10) days prior to either such date, in addition to Certificates of Insurance, with either (1) copies of all renewed insurance policies, including, without limitation, terms, conditions, declarations, riders, and endorsements evidencing continuation of all coverages in the same manner, limits of protection, and scopes of coverage as was provided by the previous policy, or (2) if acceptable to the Owner, all declaration pages, mandatory riders, and/or endorsements that clearly evidence the continuation of all coverages in the same manner, limits of protection, and scope of coverage as provided by the previous policy.

§ 11.1.6 Subcontractors. The Contractor shall cause each Subcontractor to (1) procure insurance during the life of its Subcontract or Sub-subcontract the same insurances as are required of the Contractor as per this Article 11, and (2) cause the issuers of those insurance policies to name the Additional Insureds as Additional Insureds under each Subcontractor's comprehensive general, automobile, excess/umbrella, and hazardous materials liability policies. The Additional Insured endorsement included in each such Subcontractor's policies must state that coverage is afforded to all Additional Insureds with respect to any and all claims arising out of operations performed by or on behalf of the Contractor. If the Additional Insureds have other insurance otherwise applicable to a loss, such other insurance will only apply, if at all, on an excess or contingent basis. The amount of each Subcontractor's insurers' liability under each such insurance policy will not be reduced by the existence of such other insurance.

§ 11.1.7 Owner Insurer Loss Payments. In the event the Owner's insurer(s) make(s) any payment toward any loss covered under any policy of insurance the Contractor is required to procure under this Article 11, the Owner's insurer(s) are subrogated to all of the Contractor's rights of recovery against any person or organization including, but not limited to, the Contractor's insurer(s), and the Contractor shall execute and deliver all instruments, papers, and whatever else is necessary to secure those rights. The Contractor shall do nothing after the payment of any damages to prejudice those rights.

§ 11.2 ~~Owner's Insurance~~Owner's Liability Insurance

The Owner shall purchase and maintain the Owner's usual liability insurance. The Owner may also, at its sole option, purchase and maintain other insurance for protection against claims that may arise from operations under the Contract Documents. The Contractor is not responsible for purchasing and maintaining such optional Owner's liability insurance unless specifically required in the Contract Documents. Neither the Owner's usual liability insurance nor any other insurance obtained by the Owner reduces or otherwise affects the Contractor's insurance requirements under Section 11.1.

~~**§ 11.2.1** The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.~~

~~**§ 11.2.2 Failure to Purchase Required Property Insurance.** If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform both the Contractor and the Construction Manager, separately and in writing, prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.~~

~~**§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance.** Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice directly to the Contractor, and separately to the Construction Manager, of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted;~~

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~~and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.~~

§ 11.3 ~~Waivers of Subrogation~~Property Insurance

§ 11.3.1 ~~The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Construction Manager and Construction Manager's consultants; (3) the Architect and Architect's consultants; (4) other Contractors and any of their subcontractors, sub-subcontractors, agents, and employees; and (5) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Construction Manager, Construction Manager's consultants, Architect, Architect's consultants, other Contractors, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this Section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.~~Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the State of New York, property insurance on a replacement cost basis. Such property insurance will be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment is made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance will include interests of the Owner, Contractor, Subcontractors, and Sub-subcontractors in the Project.

§ 11.3.1.1 Property insurance will be on a builder's risk, "all-risk," or equivalent policy form and include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings, and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and will cover reasonable compensation for the Architect's, Contractor's, and Construction Manager's services and expenses required as a result of such insured loss. Coverage for other perils is not required unless otherwise provided in the Contract Documents. The form of policy for this coverage shall be Completed Value.

§ 11.3.1.1.1 Contractor is responsible for all tools, equipment, materials, Work, etc., until Substantial Completion and possession by Owner. The Contractor shall provide insurance for theft as he may require for himself, his subcontractors, and his employees' protection. The insurance coverage referred to in this subparagraph shall be in accordance with a standard Builder's Risk Policy used in the State of New York.

§ 11.3.1.2 The Contractor shall provide insurance coverage for portions of the Work stored off the site, in transit and stored on the site but not incorporated into the Work as full replacement cost basis without voluntary deductible. The Contractor shall provide Certificate copies to the Construction Manager showing the coverage for their materials in transit or stored off site.

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 11.3.1.4 The property insurance will cover portions of the Work stored off the site, and also portions of the Work in transit. The insurance required by this Section 11.3 will not, however, cover machinery, tools, equipment, vehicles, shanties, tool houses, trailers, or other temporary or permanent structures owned or rented by the Contractor, a Subcontractor, or a Sub-subcontractor, or their employees, utilized in performance of the Work but not incorporated into the permanent improvements. The Contractor is solely responsible for all such items of its own and any under its

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control. The Contractor shall, at the Contractor's own expense, provide insurance coverage for all of the items described in this Section 11.3.1.4, which is subject to the provisions of Section 11.3.7.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 may not commence until the insurance company or companies providing property insurance consent to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse, or reduction of insurance.

§ 11.3.1.6 The Owner shall not be responsible to or for the Contractor or Subcontractor against any loss by fire, lightning, extended coverage, all risk, theft or vandalism and malicious mischief, or any tools, equipment, vehicles, shanties, tool houses, trailers or other temporary or permanent structures wherever located and owned by the Contractor, Subcontractors, their employees or agents.

§ 11.3.1.7 The form of policy for the coverage required by 11.3.1 shall be Completed Value.

§ 11.3.2 ~~If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.~~ **Boiler and Machinery Insurance.** The Owner, if applicable to the Work and at its sole option, may purchase and maintain boiler and machinery insurance or shall do so if required by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner. This insurance will include interests of the Owner, Construction Manager, Contractor, Subcontractors and Sub-subcontractors in the Work.

§ 11.3.3 Intentionally omitted.

§ 11.3.4 If the Contractor requests in writing that insurance for risks other than those described in this Section 11.3 or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost for it will be charged to the Contractor by appropriate Change Order.

§ 11.3.5 Intentionally omitted.

§ 11.3.6 Upon the Contractor's request, the Owner will provide copies of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project.

§ 11.3.7 Waivers of Subrogation. The Owner and Contractor waive all rights against (1) each other and any of their respective subcontractors, sub-subcontractors, agents and employees, and (2) the Construction Manager, Construction Manager's consultants, Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their respective subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire or other causes of loss to the extent of proceeds under property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as the Owner and Contractor may have to the proceeds of such insurance held by the Owner. The Owner or Contractor, as appropriate, shall require of the Construction Manager, Construction Manager's consultants, Architect, Architect's consultants, Owner's separate contractors described in Article 6, if any, and any of their respective subcontractors, sub-subcontractors, agents, and employees, by appropriate written agreements, similar waivers each in favor of other parties enumerated in this Section 11.3.7. The policies must provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation is effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity has an insurable interest in the property damaged.

§ 11.3.8 A loss insured under the Owner's property insurance will be adjusted by the Owner and made payable to the Owner for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the

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Contractor, and by appropriate written agreements shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner shall, upon occurrence of an insured loss, give a bond for proper performance of the Owner's duties. The cost of the bond will be charged against proceeds received. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement. If after such loss no other special agreement is made, and unless the Owner terminates the Contract for convenience, replacement of damaged property will be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner will adjust and settle a loss with insurers unless one of the parties in interest objects in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute will be resolved in the manner selected as the method of binding dispute resolution in the Agreement. Nothing in this Agreement calls for the name of any party other than the Owner as loss payee on the Owner's insurance and no draft or other instrument in payment of any loss will name any other party as a joint payee.

§ 11.3.11 The Contractor's Insurance Company shall acknowledge in writing to the Construction Manager that they have read and will comply with all requirements under Indemnification Section 3.18 of the General Conditions.

§ 11.4 ~~Loss of Use, Business Interruption, and Delay in Completion Insurance~~

~~The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor, Architect, and Construction Manager for loss of use of the Owner's property, due to fire or other hazards however caused.~~

Performance Bond and Payment Bond

~~§ 11.5 Adjustment and Settlement of Insured Loss~~

~~§ 11.5.1~~ ~~A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Construction Manager, Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Construction Manager, Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.~~

~~§ 11.5.2~~ ~~Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.~~

§ 11.4.1 The Contractor shall furnish bonds covering faithful performance of the Contract and payment of obligations arising under it. Bonds must be obtained from a surety company or companies satisfactory to the Owner, licensed to do business in the State of New York, and listed in the latest issue of U.S. Treasury Circular 570. The amount of each bond will be equal to one hundred (100) percent of the Contract Sum. Each bond must be maintained throughout the duration of the Project, and subsequently to the extent the Contractor has ongoing performance and payment obligations following completion of the Project.

§ 11.4.1.1 No Performance or Payment Bond shall require, as a condition precedent to termination of a Contract or Contractor, that any notice be sent to or meeting be arranged or held with a Contractor (Principal) and/or surety, prior to such termination. Any such requirement(s) shall be void and unenforceable and the Owner shall have the

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right to reject any such bond(s) and/or ignore such condition. The exclusive method of termination of a Contract or Contractor is contained in the Contract Documents and a Contractor and surety expressly agreed to be bound thereby.

§ 11.4.1.2 Rider including the following provisions shall be attached to each Performance Bond: "Surety agrees that it consents to and waives notice of any addition, alteration, omission, change or other modification of the Contract Documents. Such addition, alteration, change extension of time or other modification of the Contract Documents or a forbearance on the part of either the Owner or the Contractor to the other, shall not relieve the surety of its obligations hereunder and notice to the surety of such matters is hereby waived"

§ 11.4.2 Bonds must be prepared on the forms of AIA Documents A312-2010 - Performance Bond and A312-2010 - Payment Bond, without modifications other than (1) a mandatory statement in Section 16 of the Performance Bond that it is given as a statutory or other legally required bond and that Section 13 of the Performance Bond applies in full, without exception, (2) a mandatory statement in Section 16 of the Performance Bond that it includes performance by the Contractor of any correction and warranty obligations in the Contract Documents, including such performance after the dates of Substantial and Final Completion, and (3) a mandatory statement in Section 18 of the Payment Bond that it is given as a statutory or other legally required bond and that Section 14 of the Payment Bond applies in full, without exception. The cost of the bonds is included in and will not increase the Contract Sum.

.1 The Contractor shall deliver the required bonds to the Owner not later than 7 days following the date the Agreement is entered into and before commencing any of the Work.

.2 The Contractor shall require any attorney-in-fact who executes the required bonds on behalf of the surety to affix to the bonds a certified and current copy of their power of attorney authorizing him or her to sign the bond.

.3 The bonds must specifically name the Nanuet Union Free School District as Obligee.

§ 11.4.3 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.

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§ 12.1.2 If a portion of the Work has been covered ~~that~~ which the Construction Manager or Architect has not specifically requested to ~~examine~~ observe prior to its being covered, the Construction Manager or Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, ~~the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate.~~ costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. 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.~~such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or one of the other Contractors in which event the Owner shall be responsible for payment of such costs.

...

§ 12.2.1 ~~Before Substantial Completion~~Before or After Substantial Completion

The Owner, through its Architect or Construction Manager, shall have the authority to reject Work performed by the Contractor that does not conform to the requirements of the Drawings, Specifications, or both. The Contractor shall promptly correct Work rejected by the Construction Manager or Architect or failing to conform to the requirements of the Contract Documents, ~~discovered before Substantial Completion,~~ whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Construction Manager's and Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

...

§ 12.2.2.1 ~~In addition to the Contractor's obligations under Section 3.5, if, within one year~~ If, within two years after the date of Substantial Completion of the Work or ~~designated portion thereof,~~ a designated portion of the Work, or the

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date of acceptance of a portion of the Work that is subject to correction or completion after the date of Substantial Completion of the Work, whichever is later, 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 obligation set forth hereunder shall survive acceptance by the Owner of the Work or termination of the Contract. The Owner shall give such notice promptly after discovery of the condition. ~~During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner, Construction Manager or Architect, the Owner may correct it in accordance with Section 2.5.~~

§ 12.2.2.2 The ~~one-year~~ two-year period for correction of the 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.~~Upon completion of any Work under or pursuant to this Section 12.2, the two-year period for correction of Work in connection with the Work requiring correction shall be renewed and recommence.

§ 12.2.2.4 The obligations shall cover any repair and replacement to any part of the Work or other property caused by the defective Work.

...

§ 12.2.3.1 If the Contractor fails to commence to correct, repair and make good any defects in its Work within a reasonable time, not to exceed ten (10) days from the date the Contractor received written notice from the Owner per Section 12.2.2.1, the Owner may correct it in accordance with Section 2.5 and the Contractor shall, upon demand, pay to the Owner all amounts which it expends for such corrective work.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner, Multiple Prime Contractors or Separate Contractors, ~~or other Contractors,~~ whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents. The Contractor shall also replace or repair to satisfaction of Owner any and all damage done to the building or its contents in consequence of work performed in fulfilling any applicable warranty. This clause is general in nature and will not operate to waive stipulations of other clauses that specify warranty periods in excess of two (2) years.

§ 12.2.5 Nothing contained in this ~~Section 12.2~~ 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~~ two-year period for correction of Work as described in ~~Section 12.2.2~~ 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.

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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.~~ determined by the Owner, with the advice of the Construction Manager and Architect. Such adjustment shall be effected whether or not final payment has been made. For this Section to apply, the Owner must accept non-conforming Work in writing specifying the non-conforming Work being accepted. Notwithstanding any acceptance by the Owner, if the Owner discovers non-conforming Work that the Owner has not expressly accepted in writing, the Owner may demand that the Contractor correct such Work as per the provisions of Article 12 hereof.

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...

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.~~State of New York, and the parties expressly agree that any claim, dispute, or other controversy of any nature arising out of the Contract or performance of the Work shall be commenced and maintained in New York State Supreme Court, **Rockland** County.

§ 13.1.2 The Contractor shall at all times observe and comply with all federal, state and local laws and all laws, ordinances and regulations of the Owner, in any manner affecting the Work and all such orders decreed as exist at present and those which may be enacted later, by bodies or tribunals having jurisdiction or authority over the Work, and the Contractor shall defend, indemnify and save harmless the Owner and its Board of Education, officers, agents, or servants against any claim or liability arising from, or based on, a violation of any such law, ordinances, regulation, order or decree, whether by himself or by his employee or agents. Historical lack of enforcement of any law, local or otherwise, shall not constitute a waiver of Contractor's responsibility for compliance with such law in a manner consistent with the Agreement unless and until the Contractor has received written consent for the waiver of such compliance from the Owner and the agency responsible for the enforcement of such law.

...

§ 13.3.2 ~~No action or failure to act by the Owner, Construction Manager, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.~~Neither the acceptance of all or any part of the work covered by the Contract; nor any payment therefore; nor any order or application for payment issued under the Contract or otherwise issued by the Owner, Architect, Construction Manager, or any board member, officer, agent or employee of the Owner; nor any permission or direction to continue with the performance of the Contract before or after its specified completion date; nor any performance by the Owner of any of the Contractor's duties or obligations; nor any aid lent to the Contractor by the Owner in its performance of such duties or obligations; nor any delay or omission by the Owner to exercise any right or remedy accruing to it under the terms of the Contract or existing at law or in equity or by statute or otherwise; nor any other thing done or omitted to be done by the Owner, its commissioners, officers, agents or employees; shall be deemed to be a release to the Contractor or its sureties from any obligations, liabilities or undertakings in connection with the Contract or the performance bond or a waiver of any provision of the Contract or of any rights or remedies to which the Owner may be entitled because of any breach thereof, excepting only a written instrument expressly providing for such release or waiver. No cancellation, rescission or annulment hereof, in whole or as to any part of the Contract, because of any breach hereof, shall be deemed a waiver of any money damages to which the Owner may be entitled because of such breach. No waiver by the Owner of any breach of the Contract shall be deemed to be a waiver of any other or any subsequent breach.

§ 13.3.3 The rights stated in these General Conditions and the Contract Documents are cumulative and not in limitation of any rights of the Owner at law or in equity.

§ 13.3.4 The Owner shall not be responsible for damages or for loss of anticipated profits on Work not performed on account of any termination of the Contractor by the Owner or by virtue of the Owner's exercise of its right to take over the Contractor's Work.

§ 13.3.5 The Owner shall not be liable to the Contractor for punitive damages on account of its termination of the Contractor or any other alleged breach of the Agreement and the Contractor hereby expressly waives its right to claim such damages against the Owner.

§ 13.3.6 The Contractor hereby expressly waives any rights it may have in law or in equity to lost bonding capacity as a result of any of the actions of the Owner, the Architect or the Construction Manager taken in connection with the Contractor's Work on the Project.

§ 13.3.7 The Contractor agrees that it waives the defense of privity of contract as between itself and each other Prime Contractor. In the event that an act or omission by a Prime Contractor or its Subcontractors of any tier causes impact, damage or loss in any form to the Contractor, then the Prime Contractor responsible in whole or in part for such impact, damage or loss agrees it is directly responsible and liable to the Contractor. The Contractor acknowledges and

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agrees that this waiver of the defense or privity of contract permits and requires it to commence an action or suit directly against the responsible Prime Contractor. The Owner, Architect and the Construction Manager shall not be parties to such suit. The Contractor waives and relinquishes any right and claim as against the Owner, to the extent such claim is caused, or contributed to, by a Prime Contractor or its Subcontractors of any tier.
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§ 13.4.1 Tests, ~~inspections,~~ 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,~~ rules and regulations or lawful orders of public authorities. Tests, inspections and approvals of portions of the Contractor's Work required by the Drawings or Specifications shall be made at an appropriate time. Unless otherwise provided, the Contractor shall ~~make arrangements~~ arrange for such tests, ~~inspections,~~ 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,~~ inspections and approvals. The Contractor shall give the Construction Manager and Architect timely notice of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. The Owner shall bear costs of ~~tests, inspections,~~ (1) 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,~~ concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations ~~so require.~~prohibit the Owner from delegating their cost to the Contractor.

§ 13.4.2 If the Construction Manager, Architect, ~~Owner,~~ Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, ~~inspection,~~ inspection or approval not included under Section 13.4.1, the Construction Manager ~~and Architect will,~~ or Architect shall, upon written authorization from the Owner, instruct the Contractor to ~~make arrangements~~ arrange for such additional testing, ~~inspection, or approval,~~ inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Construction Manager and Architect of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If such procedures for testing, ~~inspection,~~ 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,~~ failure including those of repeated procedures and compensation for the Construction Manager's and Architect's services and ~~expenses, shall be at the Contractor's expense.~~expenses shall be at the Contractor's expense, including the cost of retesting for verification of compliance if necessary until the Architect certifies that the Work in question does comply with the requirements of the Contract Documents, and none of such costs shall be included in computing the Contract Sum.

§ 13.4.4 Required certificates of testing, ~~inspection,~~ inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Construction Manager for transmittal to the Architect.
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§ 13.4.7 Any material to be furnished shall be subject to inspections and tests in the shop and field by the Architect. Shop inspection shall not relieve the Contractor of the responsibility to furnish satisfactory materials and the right is reserved to reject any material at any time before final acceptance of the Work, when in the opinion of the Architect the materials and/or workmanship do not conform to the Specification requirements.

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.~~legal rate as required in General Municipal Law Section 106-b.

§ 13.6 Time Limits on Claims
§ 13.6.1 No action or proceeding shall lie or be maintained by the Contractor, nor anyone claiming under or through the Contractor, against the Owner upon any claim arising out of or based on the Agreement or the Contract Documents or by reason of any act or omission or requirements relating to the giving of notices and information, unless such action or proceeding shall be commenced within one (1) year after submission to the Owner of the final Application for Payment. As to a claim based upon money required to be retained for any period after the date of the final Application for Payment, such action must be commenced within six (6) months after such money becomes due and payable under the terms of the Contract. Notwithstanding, if the Contract is terminated by the Owner, such action by

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the Contractor must be commenced within six (6) months after the date of such termination. The Contractor's acceptance of final payment shall constitute a release of all claims against the Owner. This provision shall not relieve the Contractor of the obligation to comply with the provisions of the law relating to notices of claim.

§ 13.6.2 Acts or failures to act occurring during the construction of the Project or following the issuance of the final certificate for payment, which give rise to a cause of action shall be deemed to have accrued in any and all events not later than the date of any act or failure to act by the Contractor pursuant to any warranty provided under Section 3.5, the date of any correction of the Work or failure to correct the Work by the Contractor under Section 12.2, or the date of actual commission of any other act or failure to perform any duty or obligation by the Contractor, whichever occurs last.

§ 13.7 No Oral Waiver or Constructive Changes

The provisions of the Contract Documents shall not be changed, amended, waived, or otherwise modified in any respect except by a writing signed by the Owner. No person is authorized on behalf of the Owner to orally change, amend, waive, or otherwise modify the terms of the Contract Documents or any of the Contractor's duties or obligations under or arising out of the Contract Documents. Any change, waiver, approval, or consent granted to the Contractor shall be limited to the specific matters stated in the writing signed by the Owner, and shall not relieve the Contractor of any other of the duties and obligations under the Contract Documents. No "constructive" changes shall be allowed.

§ 13.8 Notices Regarding Liens

The Contractor shall provide to the Owner copies of all notices of any type regarding liens received from Subcontractors, Sub-subcontractors, or suppliers to the Contractor.

§ 13.9 Wages Rates

The Contractor shall, and cause its Subcontractors to, comply with prevailing wage rate determinations as issued by the State of New York Department of Labor for the location and duration of this Project. Current wage rates for this Project are included in the Project Manual.

§ 13.10 General Provisions

Any specific requirement in this Contract that the responsibilities or obligations of the Contractor also apply to a Subcontractor is added for emphasis and is also hereby deemed to include a Subcontractor of any tier. The omission of a reference to a Subcontractor in connection with any of the Contractor's responsibilities or obligations shall not be construed to diminish, abrogate or limit any responsibilities or obligations of a Subcontractor of any tier under the Contract Documents or the applicable subcontract.

§ 13.11 Written Notice

All notices to be given hereunder shall be in writing and may be given, served, or made by (1) depositing the same in the United States mail addressed to the authorized representative (as specified below) of the party to be notified, postpaid and registered or certified, read receipt requested or (2) depositing the same for overnight delivery (prepaid by and billed to the party giving notice) with a nationally recognized overnight delivery service addressed to the authorized representative of the party being notified or (3) delivering the same in person to the authorized representative of the party being notified or (4) emails to the attention of the authorized representative of the party to be notified with the requirement of a email confirmation notices deposited in the United States mail shall be effective, unless otherwise state in the Contract Documents, from and after the fourth day next following the date deposited in a United States mail receptacle or when actually received, whichever is earlier. Notices transmitted by overnight delivery shall be effective immediately. Email notices shall be effective as of the time received, as shown on a printed email confirmation.

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§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of ~~30~~ 90 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; or

.2 An act of government, such as a declaration of national emergency, that requires all Work to be stopped; or

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.3 Because the Construction Manager has not certified or the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section ~~9.4,~~ 9.4 and 9.5, 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.~~after 14 days written notice of such failure to make payment provided that such failure is not due to a disputed amount, and except to the extent the Owner is excused from timely making all or part of any payment on a Certificate for Payment as per any other provisions of the Contract Documents.

Notwithstanding the preceding or anything else in the Contract Documents, the Contractor shall not cease or delay the progress of the Work for any reason other than one set forth in Section 9.7.1, it being agreed that monetary damages shall be an adequate remedy for the Contractor for any breach of this Agreement or the Contract Documents by the Owner.

§ 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.~~completion.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon ~~seven days' notice to the Owner, Construction Manager and Architect,~~ 30 days' written notice and opportunity to cure to the Owner, 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.~~such Work properly performed for which it has not otherwise been compensated, but in no event shall the Owner by liable to the Contractor for any prospective loss, including, but not limited to, termination expenses, loss of anticipated profits, impact damages, unabsorbed overhead, or the like. Notwithstanding the foregoing, any such payments to the Contractor shall be less any setoffs to which the Owner may be entitled as per any other provision of the Contract Documents.

§ 14.1.4 If the Work is stopped for a period of ~~60~~ 90 consecutive days through no act or fault of the ~~Contractor, a Subcontractor, a Sub-subcontractor,~~ Contractor or a Subcontractor or their agents or ~~employees,~~ employees or any other persons performing portions of the Work under contract with the Contractor 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~~ 30 additional days' written notice to the Owner, Construction Manager ~~and Architect,~~ and Architect (during which the Owner shall have the right and opportunity to cure), terminate the Contract and recover from the Owner as provided in Section 14.1.3.

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.1 ~~repeatedly~~ refuses or fails to supply enough properly skilled workers or proper ~~materials;~~materials or equipment to complete the Work in a diligent, efficient, timely, workmanlike, skillful, and careful manner;

.2 fails to make payment to Subcontractors ~~or suppliers~~ or Suppliers for materials or labor in accordance with the respective agreements between the Contractor and ~~the~~ its Subcontractors or ~~suppliers;~~Suppliers;

.3 ~~repeatedly~~ disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public ~~authority; or~~authority, or its health and safety plan;

.4 otherwise is guilty of substantial breach of ~~a provision of the Contract Documents.~~or default under a provision of the Contract Documents;

.5 cannot complete the Work within the Contract Time or within the time to which such completion may have been extended; provided, however, that the impossibility of timely completion is, in the Owner's opinion, attributable to conditions within the Contractor's control;

.6 breaches any warranty made by the Contractor under or pursuant to the Contract Documents;

.7 is or has been unnecessarily or unreasonably or willfully delaying the performance and completion of the Work, or the award of necessary subcontracts, or the placing of necessary material and equipment orders;

.8 fails to furnish the Owner with assurances satisfactory to the Owner evidencing the Contractor's ability to complete the Work in compliance with all requirements of the Contract Documents;

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.9 refuses to proceed with the Work or extra work when and as directed by the Owner, Construction Manager or Architect;

.10 fails after commencement of the Work to proceed continuously with the construction and completion of the Work for more than 10 days, except as permitted under the Contract Documents;

.11 fails or neglects to complete the Work within the Contract Time or in accordance with the Construction Schedule;

.12 refuses or fails to correct deficient Work performed by it;

.13 the Contractor's progress of the Work is such that the Owner reasonably believes that the Contractor shall not be able to achieve Substantial Completion by the Substantial Completion Date and the Contractor has not delivered and implemented a recovery plan required under the Contract or has not recovered the schedule sufficient to meet the respective Contract Time requirements as required by written notice to the Contractor by the Owner; or

.14 disregards the instructions of the Construction Manager, Architect or Owner (when such instructions are based on the requirements of the Contract Documents).

§ 14.2.2 When any of the ~~reasons described in Section 14.2.1 exist, after consultation with the Construction Manager, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner may,~~ above reasons exist, 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 (7) days' written notice, terminate employment of the Contractor at the expiration of such seven (7) day period, and may, subject to any prior rights of the surety:

...

.3 Finish the Work by whatever reasonable method the Owner may deem ~~expedient.~~ expedient utilizing for such purpose such of the Contractor's plant, materials, equipment, tools and supplies remaining on the site, and also such subcontractors as it may deem advisable, or if may call upon the Contractor's surety at its own expense to do so. 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. Such accounting shall be final, binding and conclusive upon the Contractor, its surety, and any person claiming under or through the Contractor, as to the amount thereof.

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§ 14.2.4.1 The costs of finishing the Work also include, without limitation, all reasonable attorneys' fees incurred in responding to the default and enforcing the Owner's rights under the Contract Documents (including costs and fees incurred in dispute resolution proceedings), additional title costs, insurance, additional interest because of any delay in completing the Work, loss of State Building Aid, and all other direct and consequential damages incurred by the Owner by reason of the termination of the Contractor as stated herein.

§14.2.4.2 It is recognized that: (1) if an order for relief is entered on behalf of Contractor pursuant to Title 11 of the United States Code, (2) if any other similar order is entered under any other debtor relief laws, (3) if Contractor makes a general assignment for the benefit of its creditors, (4) if a receiver is appointed for the benefit of its creditors, or (5) if a receiver is appointed on account of its insolvency, any such event could impair or frustrate Contractor's performance of the Contract. Accordingly, it is agreed that upon the occurrence of any such event, Owner shall be entitled to request of Contractor or its successor in interest adequate assurance of future performance in accordance with the terms and conditions of the Contract. Failure to comply with such request within ten (10) days of delivery of the request, or Owner's determination that the assurances are not adequate, shall entitle Owner to terminate the Contract and to the accompanying rights set forth in Subparagraphs 14.2.1 through 14.2.4 hereof. In all events pending receipt of adequate assurance of performance and actual performance in accordance therewith, Owner shall be entitled to proceed with the Work with its own forces or with other Contractors on a time and material or other appropriate basis, the cost of which will be back charged against the Contract Sum.

§ 14.2.5 If the Owner wrongfully terminates the Contract for cause, the rights, remedies and obligations of the parties will be the same as if the Owner had terminated the Contract for convenience under Section 14.4.

§ 14.2.6 In the event that the Contractor, or the Contractor's surety, challenges the Owner's termination of the Contract for cause, and the Owner prevails in litigation in connection with such challenge, whether initiated by the

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Owner or by the Contractor or the Contractor's surety, the Owner shall be entitled to its costs, including reasonable attorney's fees, incurred as a result of such litigation, as part of any judgment against the Contractor or the Contractor's surety. Such costs, including reasonable attorney's fees, shall be deemed a cost of finishing the Work.

§ 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. The Owner shall incur no liability by reason of such suspension, delay, or interruption except that the Contractor may request an extension of its time to complete its Work in accordance with Article 8 hereof.

...

§ 14.3.2 The Contract ~~Sum and the Contract~~ Time shall be adjusted for increases in ~~the cost and time caused by suspension, delay, or interruption under Section 14.3.1. Adjustment of the Contract Sum shall include profit.~~ time caused by suspension, delay or interruption as described in Section 14.3.1. No adjustment shall be made to the extent:

.1 that performance is, ~~was, or would have been, so suspended, delayed, or interrupted,~~ was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or

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§ 14.4.1 The Owner may, at any time, terminate the whole or any portion of the Contract for the Owner's convenience and without ~~cause.~~cause upon not less than seven (7) days' written notice to the Contractor. Notwithstanding any other provision to the contrary in the Contract, the Owner reserves the right at any time and in its absolute discretion to terminate the services of the Contractor or the Work by giving written notice to the Contractor. This termination for convenience of the Owner provision allows and authorizes the Owner to terminate this Contract at any time and for any reason whatsoever. This right may be exercised by the Owner in its complete discretion. Termination by the Owner under this Section shall be by Notice of Termination delivered to the Contractor specifying the extent of termination and the effective date.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall immediately and in accordance with instructions from the Owner:

...

.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.~~orders; and

.4 proceed to complete the performance of the Work required under portions of the Contract not terminated, if any.

§ 14.4.3 ~~In case of such termination for the Owner's convenience, the Owner shall pay the Contractor for Work properly executed; costs incurred by reason of the termination, including costs attributable to termination of Subcontracts; and the termination fee, if any, set forth in the Agreement.~~Upon receipt of written notice of the Owner's exercise of such termination, the Contractor shall, as the Contractor's sole and exclusive remedy, be paid for the Work properly executed in accordance with the Contract Documents prior to the effective date of termination and for items properly fabricated off-site, delivered and stored in accordance with the Owner's instructions or the Contract Documents before such effective date. The Contractor's entitlement to payment for all such work shall be predicated on its performance of such work in accordance with the Contract Documents as certified by the Architect and Construction Manager. The Contractor shall be entitled to no other payment and waives any claim for damages including, but not limited to, lost profits, any prospective loss, underutilization of personnel or equipment, unabsorbed overhead, and any and all items of consequential loss or damage. The Owner shall be entitled to credit against any payment to be made to the Contractor pursuant to this Section 14.4 the following: (1) payments previously made to the Contractor for the terminated portion of the Work; (2) claims which the Owner has against the Contractor under the Contract Documents; and (3) the value of the materials, supplies, equipment, or other items that are to be disposed of by the Contractor, the cost of which is included in the Contract Sum. Notwithstanding the foregoing, in the event of a termination under Section 14.4.1 prior to the issuance of a Notice to Proceed, the Contractor shall not be entitled to any compensation whatsoever.

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...

§ 15.1.1 Definition. A Claim is a demand or assertion by ~~one of the parties~~ the Contractor 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.~~Neither a Request for Information, nor a Construction Change Directive, nor a Change Order, nor a reservation of rights, nor minutes of a meeting, nor a daily report, nor any log entry, nor an Owner's request for or the Contractor's response to a Change Order proposal, nor notice of a potential or future claim shall constitute a Claim.

...

~~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.~~

§ 15.1.2.1 Claims by the Contractor must be initiated by written notice to the Owner and the Initial Decision Maker. Claims by the Contractor must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the Contractor first recognizes the condition giving rise to the Claim, whichever is earlier.

§ 15.1.3.1 Claims by ~~either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Initial Decision Maker with a copy sent to the Construction Manager and Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party under this Section 15.1.3.1 shall be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.~~the Contractor must be initiated by written notice to the Owner and to the Architect with a copy sent to the Construction Manager within the time limits set forth in Section 15.1.2.1 above. The purpose of the written notice is to give the Owner prompt opportunity: (a) to cancel or revise orders or directions, change plans, mitigate or remedy circumstances giving rise to the Claim or to take other action that may be desirable; (b) to monitor and verify the facts and circumstances as they occur; and (c) to verify any costs and expenses claimed by the Contractor contemporaneously as they are incurred. Written notice is required whether or not the Owner, Construction Manager or Architect is aware of the facts or circumstances that constitute the basis for the Contractor's Claim, and no action or conduct of the Owner, Construction Manager, Architect or any other person will be regarded as a waiver of such notice requirement except only a written statement to such effect signed by the Owner. Failure of the Contractor to give written notice as required by this Section shall be deemed conclusively to be a waiver and release of any Claim, and such written notice shall be a condition precedent to the Contractor's right to make any Claim arising out of, under or in connection with the Contract or its performance of the Work.

§ 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.~~Written notice shall contain a heading stating "Notice of Claim" to clearly identify it as such. Such notice shall set forth in detail the circumstances that form the basis for the Claim and shall include the following: (1) a clear statement of the claim, including background and chronology; (2) documentation in support of the claim; (3) documentation in support of claimed damages; and (4) certification by responsible officer of the Contractor. The responsibility to substantiate Claims shall rest with the Contractor. An additional Claim arising from the same occurrence or condition made after the Initial Claim has been implemented by Change Order shall not be considered.

§ 15.1.3.3 The Contractor agrees that it has and will make no claim for damages against the Owner by reason of any act or failure to act by any other Contractor, Separate Contractor or Subcontractors having contracts for performance of any portion of work of the Project or in connection with the Owner's, Architect's or Construction Manager's acts or omissions to act in connection with such other Contractors, Separate Contractors or Subcontractors.

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§ 15.1.4.1 Pending final resolution of a ~~Claim,~~ Claim by the Contractor, except as otherwise agreed in writing or as provided in Section ~~9.7 and Article 14,~~ 9.7, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments ~~in accordance with the Contract Documents.~~of undisputed amounts in accordance with the Contract Documents; provided, however, that the Contractor shall use its best efforts to furnish the Architect and Owner, as expeditiously as possible, with notice of any Claim including, without limitation, those in connection with concealed or unknown conditions, once such Claim is recognized, and shall cooperate with the Architect and the Owner in any effort to mitigate the alleged or potential damages, delay or other adverse consequences arising out of the condition which is the cause of such a Claim. The Construction Manager will prepare Change Orders and the Architect will issue a Certificate for Payment or Project Certificate for Payment in accordance with the decisions of the Initial Decision Maker.

~~**§ 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, written notice as provided ~~in Section 15.1.3~~ herein shall be given before proceeding to execute the ~~portion of the Work that is the subject of the Claim.~~ Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section ~~10.4.~~10.3. The Contractor agrees that an express condition precedent to the Contractor's entitlement to any increase in the Contract Sum shall be full and complete compliance to the satisfaction of the Owner with the requirements of Article 15. The Contractor acknowledges the no damages for delay provisions set forth in Sections 8.3.2 and 15.1.6.1.4 hereof.

§ 15.1.5.1 The Contractor shall not be entitled to any adjustment in the Contract Sum or Contract Time if:

.1 The Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner in respect of Contract Sum and Contract Times by the submission of a bid or becoming bound under a negotiated contract; or

.2 The existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test or study of the site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for the Contractor prior to Contractor's making such final commitment;

.3 The Contractor failed to give the written notice within the time and as required by Section 15.1.2; or

.4 If the Owner and the Contractor are unable to agree on entitlement to or as to the amount or length of any such equitable adjustment in the Contract Sum or Contract Times, a claim may be made therefore as provided in Article 15. However, the Owner, Construction Manager, and Architect shall not be liable to the Contractor for any claims, costs, losses or damages sustained by the Contractor on or in connection with any other project or anticipated project.

...

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in ~~Section~~ Sections 15.1.2 and 15.1.3 shall be given. The Contractor's Claim shall include an estimate of ~~cost and of~~ the probable effect of delay on progress of the Work. In the case of a continuing delay only one Claim is necessary.

§ 15.1.6.1.1 An application for extension of time must set forth in detail the circumstances that form the basis for the Claim, the date upon which each cause of delay began to affect the progress of the Work, the date upon which each cause of delay ceased to affect the progress of the Work and the number of days' increase in the Contract Time claimed as a consequence of each such cause of delay. The Contractor shall provide such supporting documentation as the Owner, Construction Manager or Architect may require including, where appropriate, a revised construction schedule indicating all the activities affected by the circumstances forming the basis of the Claim for an increase in the Contract Time.

§ 15.1.6.1.2 The Contractor shall not be entitled to a separate increase in the Contract Time for each one of the number of causes of delay which may have concurrent or interrelated effects on the progress of the Work, or for concurrent delays due to the fault of the Contractor.

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§ 15.1.6.1.3 The Contractor agrees that an express condition precedent to the Contractor's entitlement to any extension of the Contract Time shall be full and complete compliance to the satisfaction of the Owner with the requirements of Articles 8 and 15.

§ 15.1.6.1.4 The Owner shall not be liable to the Contractor or any of its Subcontractor for claims, impact costs, extended general conditions or delay damages of any nature caused by or arising out of delay, disruption, interference, inefficiencies, impedance, hindrance, acceleration, resequencing, schedule impacts, lack of timeliness by the Owner or its Architect or Construction Manager, and lack of coordination or scheduling, cumulative impact of multiple change orders, errors or omissions in the design of the Project, delay and other performance impacts. The sole remedy against the Owner for such delays shall be the allowance of additional time for completion of the Work, the amount of which shall be subject to the Claims procedure set forth herein. Except to the extent, if any, expressly prohibited by law, the Contractor expressly agrees not to make and hereby waives any claim for damages for delay, including, but not limited to, those resulting from increased labor or material costs, extended general conditions, directions given or not given by the Owner, Construction Manager, or Architect, including scheduling and coordination of the Work; the Architect's preparation of drawings and specifications or the Construction Manager's or Architect's review of shop drawings and requests for instructions; errors or omissions in the design of the Project; or, on account of any delay, disruption, interference, impedance, inefficiency, lack of productivity, obstruction or hindrance for any cause whatsoever by the Owner, Construction Manager, Architect or any other Contractor or Separate Contractor on the Project whether or not foreseeable or anticipated. The Contractor agrees that its sole right and remedy therefore shall be an extension of time, if appropriate. It is emphasized that no monetary recovery may be obtained by the Contractor for delay against the Owner, Construction Manager, Architect, other Contractor or Separate Contractor based on any reason and that the Contractor's sole remedy, if appropriate, is additional time.

§ 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. In planning his construction schedule within the agreed Contract Time, it shall be assumed that the Contractor has anticipated the amount of adverse weather conditions normal to the site of the Work for the season or seasons of the year involved. Only those weather delays attributable to other than normal weather conditions will be considered by the Architect.

§ 15.1.7 Waiver of Claims for Consequential Damages. The Contractor ~~and Owner waive Claims against each other for consequential damages~~ waives any and all claims for consequential damages of any kind and nature 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.~~waiver of consequential damages shall survive termination of the Contract.

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§ 15.2.1 ~~Claims,~~ Claims by the Contractor, 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 by the Contractor excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to ~~mediation~~ binding dispute resolution of any Claim. If an initial decision has not been rendered within 30 days after the Contractor's Claim has been referred to the Initial Decision Maker, the ~~party asserting the Claim may demand mediation and~~ Contractor may proceed with 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.

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§ 15.2.2 The Initial Decision Maker will review Claims by the Contractor 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,~~ Claims by the Contractor, 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 by the Contractor or to furnish additional supporting data, such party shall respond, within ~~ten~~ 10 days after receipt of ~~the~~ such 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,~~ 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 by the Contractor in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the ~~Claim,~~ Claim by the Contractor, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the ~~parties, the Construction Manager, and the Architect, if the Architect~~ parties and the Architect and Construction Manager, if the Architect or Construction Manager 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.~~Intentionally omitted.

§ 15.2.6.1 ~~Either party may, within 30 days from the date of receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation within 30 days of receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.~~Intentionally omitted.

§ 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.~~Intentionally omitted.

§ 15.2.8 If a Claim by the Contractor 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.

ARTICLE 16 SPECIAL CONDITIONS

§ 16.1 Equal Opportunity

§ 16.1.1 The Contractor shall maintain policies for equal employment opportunity for construction employment. During performance of the Agreement, the Contractor agrees as follows:

§ 16.1.2 The Contractor and its Subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex **(including trans-gender), sexual orientation,** or national origin. The Contractor shall take affirmative action to ensure that all applicants are employed, and that employees are treated during employment without regard to their race, religion, color, sex, **(including trans-gender), sexual orientation,** or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship and on-the-job training.

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§ 16.1.3 The Contractor will post and keep posted in conspicuous places, for employees and applicants for employment, notices obtained by the Contractor from the New York State Division of Human Rights as set forth in the General Regulations of that Division at 9 NYCRR 466.1(a), such conspicuous places to be as defined in 9 NYCRR 466.1(b), and such other postings as that Division may require with respect to New York State's laws, codes, rules, and regulations governing discrimination in employment.

§ 16.1.4 The Contractor will state in all solicitations or advertisements for employees placed by, or on behalf, of the Contractor, that all qualified applicants will be afforded equal employment opportunities without discrimination because of race, creed, color ,**sex, (including trans-gender), sexual orientation,** or national origin.

§ 16.1.5 The Contractor will comply with provisions of Sections 290-299 of the Executive Law and with the Civil Rights Law, will furnish all information and reports deemed necessary by the State Commissioner of Human Rights under these non-discrimination clauses and such sections of the Executive Law, and will permit access to the Contractor's books, records and accounts by the Owner, the State Commissioner of Human Rights, the Attorney General and the Industrial Commissioner for the purposes of investigation to ascertain compliance with these nondiscrimination clauses and such sections of the Executive Law and Civil Rights Law.

§ 16.1.6 The Contractor will send to each labor union, or representatives of workers, with which it has, or is bound by a collective bargaining or other Agreement or understanding notices obtained from the State Commissioner of Human Rights, advising such Labor Union or representative of the Contractor's Agreement under requirements of this Article. If the Contractor was directed to do so by Owner as part of the Bid, the Contractor shall request such labor union or representative to furnish him with a written statement that such labor union or representative will not discriminate because of race, creed, color, **sex, (including trans-gender), sexual orientation,** or national origin and that such labor union or representative either will affirmatively cooperate within the limits of its legal and contractual authority in the implementation of the policy and provisions of these non-discrimination clauses or that it consents and agrees that recruitment accordance with the purposes and provisions of these non-discrimination clauses. If such labor union or representative fails or refuses to comply with such a request that it furnish such a statement, the Contractor shall promptly notify the Owner and State Commissioner of Human Rights of such failure or refusal.

§ 16.1.7 The Agreement may be forthwith canceled, terminated or suspended in whole, or in part, by Owner upon the basis of a finding made by the State Division of Human Rights, that the Contractor has not complied with these non-discrimination clauses, and the Contractor may be declared ineligible for future Contracts made by, or in behalf of, the State, or Authority or Agency of the State, or Housing Authority or an Urban Renewal Agency, or Contracts requiring the approval of the Commissioner of Housing and Community Renewal, until it has satisfied the State Division of Human Rights, that it has established and is carrying out a program in conformity with the provisions of these non-discrimination clauses. Such findings shall be made by the State Division of Human Rights after conciliation efforts by the Division have failed to achieve compliance with these non-discrimination clauses and after a verified complaint has been filed with the Division, notice thereof has been given to the Contractor, and an opportunity has been afforded by the Contractor to be heard publicly in accordance with the Executive Law. Such sanctions may be imposed and remedies invoked immediately of, or in addition to sanction in remedies otherwise provided by law. If the Agreement is canceled or terminated under provisions of this Article, in addition to other rights of Owner provided in the Agreement upon its breach by the Contractor, the Contractor will hold Owner harmless against any additional expenses or costs incurred by Owner in completing the work or in purchasing the services, materials, equipment or supplies contemplated by Agreement and Owner may withhold payments from the Contractor in an amount sufficient for this purpose and recourse may be had against authority on the Performance Bond if necessary.

§ 16.1.8 The Contractor will include the provisions of this Article in every subcontract or purchase order in such a manner that such provisions will be binding upon each subcontractor or vendor as to operations to be performed within the State of New York. The Contractor will take such action in enforcing such provisions of such subcontractor or purchase order as the State Division of Human Rights or the Owner may direct, including sanctions or remedies for non-compliance. If the Contractor becomes involved in or is threatened with litigation with a subcontractor or a vendor, as a result of such direction by the State Division of Human Rights, the Contractor shall promptly so notify the Owner and the Attorney General, requesting the Attorney General to intervene and protect the interests of the State of New York.

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§ 16.2 Waiver of Immunity

§ 16.2.1 The Contractor hereby agrees to the provisions of Paragraph 139-a and l39-b of the New York State Finance Law and Section 103-a of the New York General Municipal Law, which require that upon the refusal of a person, when called before a grand jury, head of a State department, temporary State commission or other State agency, or the organized crime task force in the Department of Law, which is empowered to compel the attendance of witnesses and examine them under oath, to testify in an investigation concerning any transaction or contract had with the State, any political subdivision thereof, a public authority or with any public department, agency or official of the State or of any political subdivision thereof or of a public authority, to sign a waiver of immunity against subsequent criminal prosecution or to answer any relevant question concerning such transaction or contract.

§ 16.2.1.1 Such person, and any firm, partnership or corporation of which he is a member, partner, director or officer shall be disqualified from thereafter selling to or submitting bids to or receiving awards from or entering into any contracts with New York State or any public department, agency or official thereof for goods, work or services, for a period of five years after such refusal.

~~**§ 15.3 Mediation**~~

§ 16.2.1.2 Any and all contracts made with the State of New York, or any public department, agency or official thereof since the effective date of this law, by such person, and by an firm, partnership or corporation of which he is a member, partner, director or officer may be canceled or terminated by the State of New York without incurring any penalty or damages on account of such cancellation or termination, but any moneys owning by the State of New York for goods delivered or work done prior to the cancellation or termination shall be paid.

§ 16.3 Non-Collusive Clause as Required by NYS General Municipal Law Section 103-d

~~**§ 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.~~

§ 16.3.1 Every bid or proposal hereafter made to a political subdivision of the state or any public department, agency or official thereof where competitive bidding is required by statute, rule, regulation or local law, for work or services performed or to be performed or goods sold or to be sold, shall contain the following statement subscribed by the bidder and affirmed by such bidder as true under the penalties of perjury: Non-collusive bidding certification.

~~**§ 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.~~

§ 16.3.2 By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of knowledge and belief, the following:

~~**§ 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.~~

§ 16.3.2.1 The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competitions, as to any matter relating to such prices with any other bidder or with any competitor.

§ 16.3.2.2 Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly

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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.

~~**§ 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.~~

§ 16.3.2.3 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.

§ 16.3.3 A bid shall not be considered for award nor shall any award be made where requirements of this Article have not been complied with; provided however, that in any case the bidder cannot make the foregoing certification, the bidder shall so state and shall furnish with the bid a signed statement which set forth in detail the reasons therefore. Where requirements of this Article have not been complied with, the bid shall not be considered for award nor shall any award by made unless the head of the purchasing agent of the political subdivision, public department, agency or official thereof to which the bid is made, or his designee, determines that such disclosure was not made for the purpose of restricting competition.

~~**§ 15.4 Arbitration**~~

§ 16.3.4 The fact that a bidder (a) has published price lists, rates, or tariffs covering items being procured, (b) has informed prospective customers of proposed, or pending, publication of new or revised price list for such items, or (c) has sold the same items to other customers at the same prices being bids, does not constitute a disclosure within the meaning of this Article.

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

~~**§ 15.4.1** If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. The Arbitration shall be conducted in the place where the Project is located, unless another location is mutually agreed upon. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.~~

§ 16.4 Assignment of Public Contracts

As provided in Section 109 of the General Municipal Law, the Contractor is prohibited from assigning, transferring, conveying, subletting or otherwise disposing of the same, or of his right title, or interest therein, or his power to execute such contract or any other person or corporation without the previous consent in writing of the officer, board or agency awarding the contract. If any contractor, to whom any contract is let, granted and awarded, as required by law, by any officer, board or agency in a political subdivision, or of any district therein, shall without the previous written consent specified in subdivision one of this section, assign, transfer, convey, sublet or otherwise dispose of such contract, or his right, title or interest therein, or his power to execute such contract, to any other person or corporation, the officer, board or agency which let, made, granted, or awarded such contract shall revoke and annul such contract, and the political subdivision or district therein, as the case may be, and such officer, board or agency shall be relieved and discharged form any and all liability and obligations growing out of such contract to such contractor, and to the person or corporation to which such contract shall have been assigned, transferred, conveyed, sublet or otherwise disposed of, and such contractor, and his assignees, transferees or sublessees shall forfeit and lose all moneys, theretofore earned under such contract, except so much as may be required to pay his employees. The provisions of this section shall not hinder, prevent, or affect an assignment by any such contractor for the benefit of his creditors made pursuant to the laws of this state.

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§ 16.5 Fingerprinting

Pursuant to the Safe Schools Against Violence in Education Act ("SAVE" legislation) and Part 87 of the Regulations of the Commissioner of Education, any individual who, as a result of their work on this capital project, will move (or migrate) in and out of student occupied areas for more than five (5) days a year, must be fingerprinted. The Contractor shall be responsible to ensure that it (and its employees) are in full compliance with the fingerprinting provisions New York's SAVE Legislation and Part 87 of the Regulations of the Commissioner of Education at the Contractor's sole cost and expense.

~~**§ 15.4.1.1** A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.~~

ARTICLE 17 NEW YORK STATE LABOR LAW REQUIREMENTS

§ 17.1 Working Hours

~~**§ 15.4.2** The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.~~

§ 17.1.1 The Contractor specifically agrees as required by the New York State Labor Law ("Labor Law"), Sections 220 and 220-d, as amended, that:

.1 No laborer, worker, or mechanic in the employ of the Contractor, Subcontractor or other person doing or contracting to do the whole or any part of the work included in the Contract Documents shall be permitted or required to work more than eight hours in any one calendar day or more than five (5) days in any one week, except to the extent permitted in the case of extraordinary emergencies described in the Labor Law.

.2 The wages to be paid to each laborer, worker, or mechanic in the employ of the Contractor, Subcontractor, or other person doing or contracting to do all or any part of the work included in the Contract Documents for a legal day's work shall be not less than the prevailing rate of wages as defined by the Labor Law.

.3 Each laborer, workman or mechanic employed by the Contractor, a Subcontractor, or other person doing or contracting to do all or any part of the work included in the Contract Documents shall be provided the supplements required by Article 8 of the Labor Law.

.4 The minimum hourly rate of wage to be paid shall be not less than that stated in the General Conditions, and shall be as designated by the industrial Commissioner.

.5 The Contractor's and any Subcontractor's or other person's filing of payrolls in a manner prescribed by subdivision 3-a of Section 220 of the Labor Law shall be a condition precedent to the to the Owner's payment of any sums due and owing to the Contractor, Subcontractor or other party for work done on or with respect to the Project.

§ 17.2 Wage Rates

~~**§ 15.4.3** The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement, shall be specifically enforceable under applicable law in any court having jurisdiction thereof.~~

§ 17.2.1 The Contractor specifically agrees, as required by the Labor Law, that the Contract may be forfeited and no sum paid for any work done thereunder on a second conviction for willfully paying less than:

.1 the prevailing wage rates as provided in Labor Law Section 220(3) as amended, or,

.2 the minimum wage rates as provided in Labor Law Section 220-d, as amended.

§ 17.2.2 The Contractor shall comply with Prevailing Wage Rates as issued by the State of New York Department of Labor for the location and duration of this Project. Current wage rates for this project are included in the Project Manual as part of the Contract Documents. The Contractor is responsible to regularly review "Prevailing Wage Schedules/Updates" available on the "Prevailing Wage/Public Work" link on State of New York Department of Labor "Business in New York" web page (www.labor.state.ny.gov) to identify and implement any applicable changes to Prevailing Wage Rates during the Project.

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~~**§ 15.4.4 Consolidation or Joinder**~~

§ 17.2.3 The Contractor shall comply with all the requirements of the Labor Law Section 220-a, as amended, regarding mandatory submission of certified payroll records, which shall be included with each application for payment.

~~**§ 15.4.4.1** Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).~~

~~**§ 15.4.4.2** Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.~~

§ 17.3 Anti-Discrimination

§ 17.3.1 The Contractor specifically agrees, as required by the provisions of Section 220-e of the Labor Law, as amended, that:

.1 In the hiring of employees for the performance of work under the Contract or any subcontract hereunder, no contractor, subcontractor, nor any person acting on behalf of such contractor or subcontractor, shall be reason of race, creed, color, **sex (including transgender),** sexual orientation, or national origin discriminate against any citizen of the State of New York who is qualified and available to perform the work to which the employment relates;

.2 No contractor, subcontractor, nor any person on its behalf, shall in any manner, discriminate or intimidate any employee hired for the performance of work under the contact on account of race, creed, color, sexual orientation, or national origin.

.3 There may be deducted from the amount payable to the Contractor by the Owner under the contract a penalty at fifty dollars for each person for each calendar day during which such person was discriminated against or intimidated in violation of the provisions of the contract; and

.4 The Contract may be canceled or terminated by the Owner, and all monies due or to become due thereunder may be forfeited for a second or any subsequent violation of the terms or conditions of this section of the Contract.

ARTICLE 18 GENERAL MUNICIPAL LAW REQUIREMENTS OF THE STATE OF NEW YORK

§ 18.1 Payment of Contractors and Subcontractors

§ 18.1.1 The Contractor specifically agrees it is bound by Section 106-b of the New York General Municipal Law.

ARTICLE 19 SPECIFIC CONFORMANCE TO THE LAWS OF THE STATE OF NEW YORK

§ 19.1 Statutory Requirements

§ 19.1.1 The parties agree that each is bound to the provisions of the laws of the State of New York governing bidding and contracting for public improvement projects, including but not limited to applicable provisions of the General Obligations Law, Labor Law, and General Municipal Law. To the extent any provisions in the Contract Documents conflict with any provisions of New York Law, the statutory provisions shall prevail and the conflicting provisions in the Contract Documents shall be deemed to conform to the statutory provisions.

§ 19.1.2 To the extent the laws of the State of New York governing bidding and contracting for public improvement projects mandate inclusion of specific terms in contracts for such improvements, but which are not already included in these General Conditions, such terms shall be deemed and hereby are incorporated into these General Conditions.~~**§ 15.4.4.3** The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as those of the Owner and Contractor under this Agreement.~~

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Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, David Short, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 15:08:42 ET on 02/07/2024 under Order No. 2114442937 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A232™ – 2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, other than those additions and deletions shown in the associated Additions and Deletions Report.

_____

(Signed)

_____

(Title)

_____

(Dated)

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Insurance Certification

Bid or Project No. #_____Name of Project:_____

Your insurance representative must complete the form below in order to be considered for the award of this bid or project, and it is important that you complete the Bidder's Acknowledgement section of this form. Please note that a certificate of insurance must accompany your bid submission in order for your bid to be considered.

Insurance Representative's Acknowledgement:

We have reviewed the insurance requirements set forth in the bid and are capable of providing such insurance to our insured in accordance with such requirements in the event the contract is awarded to our insured and provided our insured pays the appropriate premium.

Insurance Representative:

_____

Address:

_____

Are you an agent for the companies providing the coverage?

Yes_____No_____

Date:_____

Insurance Representative Signature:_____

Bidder's Acknowledgement:

I acknowledge that I have received the insurance requirements of this bid and have considered the costs, if any, of procuring the required insurance and will be able to supply the insurance required in accordance with the bid, if it is awarded. I understand that a certificate of insurance must be submitted with my bid: and if it is not, the Nanuet Union Free School District may reject my bid and award to the next lowest bidder.

Firm name:_____

Address:

_____

_____

Date:_____

_____
Bidders Signature

AIA® Document G716™ – 2004

Request for Information ("RFI")

TO:
Ofe Pearson:
opearson@ksq.design
KSQ Design

FROM:

PROJECT:
Nanuet UFSD
Nanuet Bond Projects Phase 4

ISSUE DATE:

RFI No.

REQUESTED REPLY DATE:

PROJECT NUMBERS: 2111003.00 /

COPIES TO:

RFI DESCRIPTION: *(Fully describe the question or type of information requested.)*

REFERENCES/ATTACHMENTS: *(List specific documents researched when seeking the information requested.)*
SPECIFICATIONS: **DRAWINGS:** **OTHER:**

SENDER'S RECOMMENDATION: *(If RFI concerns a site or construction condition, the sender may provide a recommended solution, including cost and/or schedule considerations.)*

RECEIVER'S REPLY: *(Provide answer to RFI, including cost and/or schedule considerations.)*

BY	DATE	COPIES TO

Note: This reply is not an authorization to proceed with work involving additional cost, time or both. If any reply requires a change to the Contract Documents, a Change Order, Construction Change Directive or a Minor Change in the work must be executed in accordance with the Contract Documents.

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Labor Rate Sheet

PROJECT Nanuet Union Free School District – Phase 4 Projects	**DATE** **CONTRACT NO.**
KSQ PROJ. # 2211003.00	**CONTRACTOR**

LABOR RATES

DIRECTIONS
All contractors are requested to submit a schedule of labor rates to be used for the duration of this project. Please provide a separate rate for each trade classification for the work of this contract. These rates will be used to determine labor charges on any additional work of this contract. (Submit a separate sheet for each wage period).

WAGE PERIOD

LABOR CLASSIFICATION

	Straight Time	Over Time	Double Time
Base Rate	$		
'Benefits	$		
Subtotal	$		
All Payroll Taxes _____ % of Base Rate	$		
Total Straight Time (Rate/Hour)	$		

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AIA® Document A312® – 2010

Performance Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)
Nanuet Union Free School District
101 Church Street
Nanuet, NY 10954

CONSTRUCTION CONTRACT
Date:
Amount: $
Description:
(Name and location)
Contractor to input below information
Project Name: NANUET BOND PROJECTS PHASE 4
Nanuet HS School: 50-01-08-03-0-003-036
Barr Middle School: 50-01-08-03-0-004-021
Miller Elementary School: 50-01-08-03-0-001-025

Project Address:
Various

BOND
Date:
(Not earlier than Construction Contract Date)

Amount: $
Modifications to this Bond: [X] None [ ] See Section 16

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	

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

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or **BROKER:**

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

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.

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

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

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

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

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

.2 the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

.3 the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

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

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

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

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

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

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

.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

§ 6 If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 5.4, and the Owner refuses the payment

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or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

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

.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

.2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and

.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

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

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

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

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

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

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

§ 14 Definitions

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

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

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

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

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

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

§ 16 Modifications to this bond are as follows:

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

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	
Address:		Address:	

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Payment Bond

CONTRACTOR *(Name and Address)*:

SURETY *(Name and Principal Place of Business)*:

OWNER *(Name and Address)*:

CONSTRUCTION CONTRACT
Date:
Amount:
Description *(Name and Location)*:

BOND
Date *(Not earlier than Construction Contract Date)*:
Amount:
Modifications to this Bond: [X] None [ ] See Last Page

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	

(Any additional signatures appear on the last page)

(FOR INFORMATION ONLY - Name, Address and Telephone)

AGENT or **BROKER**:

OWNER'S REPRESENTATIVE *(Architect, Engineer or other party)*:

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

§ 2 With respect to the Owner, this obligation shall be null and void if the Contractor:
§ 2.1 Promptly makes payment, directly or indirectly, for all sums due Claimants, and

§ 2.2 Defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity whose claim, demand, lien or suit is for the payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, provided the Owner has promptly notified the Contractor and the Surety (at the address described in Section 12) of any claims, demands, liens or suits and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety, and provided there is no Owner Default.

§ 3 With respect to Claimants, this obligation shall be null and void if the Contractor promptly makes payment, directly or indirectly, for all sums due.

§ 4 The Surety shall have no obligation to Claimants under this Bond until:
§ 4.1 Claimants who are employed by or have a direct contract with the Contractor have given notice to the Surety (at the address described in Section 12) and sent a copy, or notice thereof, to the Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.

§ 4.2 Claimants who do not have a direct contract with the Contractor:

- **.1** Have furnished written notice to the Contractor and sent a copy, or notice thereof, to the Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials were furnished or supplied or for whom the labor was done or performed; and
- **.2** Have either received a rejection in whole or in part from the Contractor, or not received within 30 days of furnishing the above notice any communication from the Contractor by which the Contractor has indicated the claim will be paid directly or indirectly; and
- **.3** Not having been paid within the above 30 days, have sent a written notice to the Surety (at the address described in Section 12) and sent a copy, or notice thereof, to the Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to the Contractor.

§ 5 If a notice required by Section 4 is given by the Owner to the Contractor or to the Surety, that is sufficient compliance.

§ 6 When the Claimant has satisfied the conditions of Section 4, the Surety shall promptly and at the Surety's expense take the following actions:
§ 6.1 Send an answer to the Claimant, with a copy to the Owner, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.

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

§ 7 The Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

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

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

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

§ 11 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the work or part of the work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Section 4.1 or Section 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the signature page. Actual receipt of notice by Surety, the Owner or the Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

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

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

§ 15 DEFINITIONS

§ 15.1 Claimant: An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

§ 15.2 Construction Contract: The agreement between the Owner and the Contractor identified on the signature page, including all Contract Documents and changes thereto.

§ 15.3 Owner Default: Failure of the Owner, which has neither been remedied nor waived, to pay the Contractor as required by the Construction Contract or to perform and complete or comply with the other terms thereof.

§ 16 MODIFICATIONS TO THIS BOND ARE AS FOLLOWS:

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

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	
Address:		Address:	

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Additions and Deletions Report for

AIA® Document A312® – 2010

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PAGE 1

Nanuet Union Free School District
101 Church Street
Nanuet, NY 10954

...

Contractor to input below information
Project Name: NANUET BOND PROJECTS PHASE 4
Nanuet HS School: 50-01-08-03-0-003-036
Barr Middle School: 50-01-08-03-0-004-021
Miller Elementary School: 50-01-08-03-0-001-025

Project Address:
Various

...

Modifications to this Bond: [X] None [ ] See Section 16

PAGE 2

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Payment Bond

CONTRACTOR *(Name and Address)*:

SURETY *(Name and Principal Place of Business)*:

OWNER *(Name and Address)*:

CONSTRUCTION CONTRACT
Date:
Amount:
Description *(Name and Location)*:

BOND
Date *(Not earlier than Construction Contract Date)*:
Amount:
Modifications to this Bond: [X] None [ ] See Last Page

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	

(Any additional signatures appear on the last page)

(FOR INFORMATION ONLY - Name, Address and Telephone)

AGENT or **BROKER**:

OWNER'S REPRESENTATIVE *(Architect, Engineer or other party)*:

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User Notes: (2038059378)

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

§ 2 With respect to the Owner, this obligation shall be null and void if the Contractor:
§ 2.1 Promptly makes payment, directly or indirectly, for all sums due Claimants, and

§ 2.2 Defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity whose claim, demand, lien or suit is for the payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, provided the Owner has promptly notified the Contractor and the Surety (at the address described in Section 12) of any claims, demands, liens or suits and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety, and provided there is no Owner Default.

§ 3 With respect to Claimants, this obligation shall be null and void if the Contractor promptly makes payment, directly or indirectly, for all sums due.

§ 4 The Surety shall have no obligation to Claimants under this Bond until:
§ 4.1 Claimants who are employed by or have a direct contract with the Contractor have given notice to the Surety (at the address described in Section 12) and sent a copy, or notice thereof, to the Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.

§ 4.2 Claimants who do not have a direct contract with the Contractor:

- **.1** Have furnished written notice to the Contractor and sent a copy, or notice thereof, to the Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials were furnished or supplied or for whom the labor was done or performed; and
- **.2** Have either received a rejection in whole or in part from the Contractor, or not received within 30 days of furnishing the above notice any communication from the Contractor by which the Contractor has indicated the claim will be paid directly or indirectly; and
- **.3** Not having been paid within the above 30 days, have sent a written notice to the Surety (at the address described in Section 12) and sent a copy, or notice thereof, to the Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to the Contractor.

§ 5 If a notice required by Section 4 is given by the Owner to the Contractor or to the Surety, that is sufficient compliance.

§ 6 When the Claimant has satisfied the conditions of Section 4, the Surety shall promptly and at the Surety's expense take the following actions:
§ 6.1 Send an answer to the Claimant, with a copy to the Owner, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.

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

§ 7 The Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

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

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

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

§ 11 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the work or part of the work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Section 4.1 or Section 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the signature page. Actual receipt of notice by Surety, the Owner or the Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

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

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

§ 15 DEFINITIONS

§ 15.1 Claimant: An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

§ 15.2 Construction Contract: The agreement between the Owner and the Contractor identified on the signature page, including all Contract Documents and changes thereto.

§ 15.3 Owner Default: Failure of the Owner, which has neither been remedied nor waived, to pay the Contractor as required by the Construction Contract or to perform and complete or comply with the other terms thereof.

§ 16 MODIFICATIONS TO THIS BOND ARE AS FOLLOWS:

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

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	
Address:		Address:	

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Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, David Short, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 15:06:34 ET on 02/07/2024 under Order No. 2114442937 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A312™ – 2010, Performance Bond, other than those additions and deletions shown in the associated Additions and Deletions Report.

_____

(Signed)

_____

(Title)

_____

(Dated)

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SECTION 00 90 00 - NY SED REGULATIONS 155.5

PART 1 - GENERAL

1.1 NYSSED 155.5 REGULATIONS - Uniform Safety Standards for School Construction and Maintenance Projects

A. These regulations are the responsibility of each contractor and his/her subcontractor(s)

PART 2 - Section 155.5 Uniform Safety Standards for School Construction and Maintenance Projects

PART 3 - (a) Monitoring of construction and maintenance activities.

PART 4 - The occupied portion of any school building shall always comply with the minimum requirements necessary to maintain a certificate of occupancy and shall be monitored during construction or maintenance activities for safety violations by school district personnel. It is the responsibility of the board of education or board of cooperative educational services to assure that these standards are continuously maintained when the building or any portion thereof is occupied.

PART 5 - (b) Investigation and disposition of complaints relating to health and safety received as a result of construction and maintenance activities.

PART 6 - Boards of education and boards of cooperative educational services shall follow procedures established under section 155.4(d)(7) of this Part.(c) Pre-construction testing and planning for construction projects.

PART 7 - (1) Boards of education and boards of cooperative educational services shall assure that proper planning is made for safety of building occupants during construction. For all construction projects for which bids are issued on or after September 30, 1999, such boards shall assure that safety is addressed in the bid specifications and contract documents before contract documents are advertised for bid. All school areas to be disturbed during renovation or demolition shall be tested for lead and asbestos. Appropriate procedures to protect the health of building occupants shall be included in the final construction documents for bidding.

PART 8 - (2) Boards of education and boards of cooperative educational services shall establish procedures for involvement of the health and safety committee to monitor safety during school construction projects. The health and safety committees in school districts other than in cities with one million inhabitants or more shall be expanded during construction projects to include the project architect, construction manager, and the contractors. Such committee shall meet periodically to review issues and address complaints related to health and safety resulting from the construction project. In the case of a city school district in a city of one million inhabitants or more, the board of education shall submit procedures for protecting health and safety during construction

to the commissioner for approval. Such procedures shall outline methods for compliance with this section.

PART 9 - (3) The district emergency management plan shall be updated to reflect any changes necessary to accommodate the construction process, including an updated emergency exit plan indicating temporary exits required due to construction. Provisions shall be made for the emergency evacuation and relocation or release of students and staff in the event of a construction incident.

PART 10 - (4) Fire drills shall be held to familiarize students and staff with temporary exits and revised emergency procedures whenever such temporary exits and revised emergency procedures are required.

PART 11 - (d) Pre-construction notification of construction projects.

PART 12 - The board of education or board of cooperative educational services shall establish procedures for notification of parents, staff and the community in advance of a construction project of $10,000 or more to be conducted in a school building while the building is occupied. Such procedures shall provide notice at least two months prior to the date on which construction is scheduled to begin, provided that in the case of emergency construction projects, such notice shall be provided as far in advance of the start of construction as is practicable. Such notice shall include information on the district's obligations under this section to provide a safe school environment during construction projects. Such notice requirement may be met by publication in district newsletters, direct mailings, or holding a public hearing on the project to inform parents, students, school personnel and community members.

PART 13 - (e) General safety and security standards for construction projects.

PART 14 - (1) All construction materials shall be stored in a safe and secure manner.

PART 15 - (2) Fences around construction supplies or debris shall be maintained.

PART 16 - (3) Gates shall always be locked unless a worker is in attendance to prevent unauthorized entry.

PART 17 - (4) During exterior renovation work, overhead protection shall be provided for any sidewalks or areas immediately beneath the work site or such areas shall be fenced off and provided with warning signs to prevent entry.

PART 18 - (5) Workers shall be required to wear photo identification badges at all times for identification and security purposes while working at occupied sites.

PART 19 - (f) Separation of construction areas from occupied spaces.

PART 20 - Construction areas which are under the control of a contractor and therefore not occupied by district staff or students shall be separated from occupied areas. Provisions shall be made to prevent the passage of dust and contaminants into occupied parts of the building. Periodic inspection and repairs of the containment barriers must be made to prevent exposure to dust or contaminants. Gypsum board must be used in exit ways or other areas that require fire rated separation. Heavy duty plastic sheeting may be used only for a vapor, fine dust or air infiltration barrier, and shall not be used to separate occupied spaces from construction areas.

PART 21 - (1) A specific stairwell and/or elevator should be assigned for construction worker use during work hours. In general, workers may not use corridors, stairs or elevators designated for students or school staff.

PART 22 - (2) Large amounts of debris must be removed by using enclosed chutes or a similar sealed system. There shall be no movement of debris through halls of occupied spaces of the building. No material shall be dropped or thrown outside the walls of the building.

PART 23 - (3) All occupied parts of the building affected by renovation activity shall be cleaned at the close of each workday. School buildings occupied during a construction project shall maintain required health, safety and educational capabilities at all times that classes are in session.

PART 24 - (g) Maintaining exiting and ventilation during school construction projects.

PART 25 - The following information shall be included in all plans and specifications for school building projects:

PART 26 - (1) A plan detailing how exiting required by the applicable building code will be maintained during construction. The plan shall indicate temporary construction required to isolate construction equipment, materials, people, dust, fumes, odors, and noise during the construction period. Temporary construction details shall meet code-required fire ratings for separation and corridor enclosure. At a minimum, required exits, temporary stairs, ramps, exit signs, and door hardware shall be provided at all times.

PART 27 - A plan detailing how adequate ventilation will be maintained during construction. The plan shall indicate ductwork which must be rerouted, disconnected, or capped in order to prevent contaminants from the construction area from entering the occupied areas of the building. The plan shall also indicate how required ventilation to occupied spaces affected by construction will be maintained during the project.

PART 28 - (h) Fire and hazard prevention.

PART 29 - Areas of buildings under construction that are to remain occupied shall maintain a certificate of occupancy. In addition, the following shall be strictly enforced:

PART 30 - (1) No smoking is allowed on public school property, including construction areas.

PART 31 - (2) During construction daily inspections of district occupied areas shall be conducted by school district personnel to assure that construction materials, equipment or debris not block fire exits or emergency egress windows.

PART 32 - (3) Proper operation of fire extinguishers, fire alarm, and smoke/fire detection systems shall be maintained throughout the project.

PART 33 - (i) Noise abatement during construction and maintenance activities.

PART 34 - Construction and maintenance operations shall not produce noise in excess of 60 dba in occupied spaces or shall be scheduled for times when the building or affected building spaces are not occupied or acoustical abatement measures shall be taken. Noise level measurements (dba) shall be taken with a type 2 sound level meter in the occupied space in a location closest to the source of the noise. Complaints regarding excessive noise shall be addressed through the health and safety committee. The district should anticipate those times when construction noise is unacceptable and incorporate "no work" periods into the bid specifications.

PART 35 - (j) Control of chemical fumes, gases, and other contaminants during construction and maintenance projects.

PART 36 - The bid specifications and construction contracts for each construction project shall indicate how and where welding, gasoline engine, roofing, paving, painting or other fumes will be exhausted. Care must be taken to assure fresh air intakes do not draw in such fumes.

PART 37 - (1) The bid specifications shall require schedules of work on construction and maintenance projects which include time for off-gassing of volatile organic compounds introduced during construction before occupancy is allowed. Specific attention is warranted for activities including glues, paint, furniture, carpeting, wall coverings, and drapery. Manufacturers shall be contacted to obtain information regarding appropriate temperatures and times needed to cure or ventilate the product during use and before safe occupancy of a space can be assured. Building materials or furnishings which off-gas chemical fumes, gases, or other contaminants shall be aired out in a well ventilated heated warehouse before it is brought to the project for installation or the manufacturer's recommended off-gassing periods must be scheduled between installation and use of the space. If the work will generate toxic gases that cannot be contained in an isolated area, the work must be done when school classes and programs are not in session. The building must be properly ventilated and the material must be given proper time to cure or off-gas before re-occupancy.

PART 38 - (2) Manufacturer's material safety data sheets (MSD) shall be maintained at the site for all products used in the project. MSDS must be provided to anyone who requests them. MSDS indicate chemicals used in the product, product toxicity, typical side effects of exposure to the product and safe procedures for use of the product.

PART 39 - (k) Asbestos abatement protocols.

PART 40 - All asbestos abatement projects shall comply with all applicable Federal and State laws including but not limited to the New York State Department of Labor industrial code rule 56 (12 NYCRR 56), and the Federal Asbestos Hazard Emergency Response Act (AHERA), 40 CFR part 763 (Code of Federal Regulations, 1998 Edition, Superintendent of Public Documents, U.S. Government Printing Office, Washington, DC 20402; 1998; available at the Office of Facilities Planning, Education Building Annex, Room 1060, State Education Department, Albany, NY 12234). Large and small asbestos projects as defined by 12 NYCRR 56 shall not be performed while the building is occupied. Minor asbestos projects defined by 12 NYCRR 56 as an asbestos project involving the removal, disturbance, repair, encapsulation, enclosure or handling of 10 square feet or less of asbestos or asbestos material, or 25 linear feet or less of asbestos or asbestos material may be performed in unoccupied areas of an occupied building in accordance with the above referenced regulations.

PART 41 - (l) Lead paint.

PART 42 - Any construction or maintenance operations which will disturb lead based paint will require abatement of those areas pursuant to protocols detailed in the "Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing" (June 1995; U.S. Department of Housing and Urban Development, Washington, D.C. 20410; available at the Office of Facilities Planning, Education Building Annex, Room 1060, State Education Department, Albany, NY 12234). All areas scheduled for construction as well as areas of flaking and peeling paint shall be tested for the presence of lead and abated or encapsulated in accordance with the above noted guidelines.

PART 43 - (m) Radon.

PART 44 - Districts shall take responsibility to be aware of the geological potential for high levels of radon and to test and mitigate as appropriate. This information is available from the New York State Department of Health Radon Measurement Database.

PART 45 - (n) Post construction inspection.

PART 46 - The school district or board of cooperative educational services shall provide the opportunity for a walk-through inspection by the health and safety committee members to confirm that the area is ready to be reopened for use.

END OF SECTION 00 90 00

SECTION 00 90 01 - RESCUE REGULATIONS (EXCERPT OF CONTRACTORS RESPONSIBILITIES)

PART 1 - GENERAL

1.1 NYSSED RESCUE REGULATIONS - Uniform Safety Standards for School Construction and Maintenance Projects

A. These regulations are the responsibility of each contractor and his/her subcontractor(s)

1. The occupied portion of any school building shall always comply with the minimum requirements necessary to maintain a certificate of occupancy."
2. All building areas to be disturbed during this construction project have been tested for lead and asbestos. All pertinent information has been included in this project specification and/or in the drawings
3. General safety and security standards for construction projects.

    a. All construction materials shall be stored in a safe and secure manner.
    b. Fences around construction supplies or debris shall be maintained.
    c. Gates shall always be locked unless a worker is in attendance to prevent unauthorized entry.
    d. During exterior renovation work, overhead protection shall be provided for any sidewalks or areas immediately beneath the work site or such areas shall be fenced off and provided with warning signs to prevent entry.
    e. Workers shall be required to wear photo-identification badges at all times for identification and security purposes while working at occupied sites."

4. Separation of construction areas from occupied spaces. Construction areas which are under the control of a contractor and therefore not occupied by district staff or students shall be separated from occupied areas. Provisions shall be made to prevent the passage of dust and contaminants into occupied parts of the building. Periodic inspection and repairs of the containment barriers must be made to prevent exposure to dust or contaminants. Gypsum board must be used in exit ways or other areas that require fire rated separation. Heavy duty plastic sheeting may be used only for a vapor, fine dust or air infiltration barrier, and shall not be used to separate occupied spaces from construction areas.

    a. A specific stairwell and/or elevator should be assigned for construction worker use during work hours. In general, workers may not use corridors, stairs or elevators designated for students or school staff.
    b. Large amounts of debris must be removed by using enclosed chutes or a similar sealed system. There shall be no movement of debris through halls of occupied spaces of the building. No material shall be dropped or thrown outside the walls of the building.
    c. All occupied parts of the building affected by renovation activity shall be cleaned at the close of each workday. School buildings occupied during a construction project shall maintain required health, safety and educational capabilities at all times that classes are in session."

5. Each prime contractor shall develop a plan detailing how exiting required by the applicable building code will be maintained throughout the duration of the construction project. Refer to Summary of Work for scheduling and phasing. Provide site logistics plan indicating

temporary partitions separating areas of work from the rest of the school building. Temporary partitions affecting building egress and exiting shall be submitted to the architect for review and approval.

6. Each prime contractor shall develop a plan detailing how adequate ventilation will be maintained throughout the duration of the construction project.

7. Construction and maintenance operations shall not produce noise in excess of 60 dba in occupied spaces or shall be scheduled for times when the building or affected building spaces are not occupied or acoustical abatement measures shall be taken."

8. The contractor shall be responsible for the control of chemical fumes, gases, and other contaminates produced by welding, gasoline or diesel engines, roofing, paving, painting, etc. to ensure they do not enter occupied portions of the building or air intakes."

9. The contractor shall be responsible to ensure that activities and materials which result in "off-gassing" of volatile organic compounds such as glues, paints, furniture, carpeting, wall covering, drapery, etc. are scheduled, cured or ventilated in accordance with manufacturers recommendations before a space can be occupied."

10. Large and small asbestos abatement projects as defined by 12NYCRR56 shall not be performed while the building is occupied". Note, It is our interpretation that the term "building", as referenced in this section, means a wing or major section of a building that can be completely isolated from the rest of the building with sealed non combustible construction. The isolated portion of the building must contain exits that do not pass through the occupied portion and ventilation systems must be physically separated and sealed at the isolation barrier.

11. Exterior work such as roofing, flashing, siding, or soffit work may be performed on occupied buildings provided proper variances are in place as required and complete isolation of ventilation systems and at windows is provided. Care must be taken to schedule work so that classes are not disrupted by noise or visual distraction.

12. All areas scheduled for work have been examined for lead-containing materials. Results of these tests are available by contacting Croton Harmon Union Free School District, Paul Gibbons, Director of School Facilities, Operations & Maintenance, at 914.271-6109. No work of this contract anticipates disturbance to any surrounding materials that may have been identified as “lead-containing”.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 00 90 01

SECTION 01 10 00 - MULTIPLE PRIME CONTRACT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 PROJECT/WORK IDENTIFICATION

A. General – GC-01 - Project name is Nanuet Phase 4 Projects in the Nanuet Union Free School District as shown in Contract Documents prepared by KSQ Architects. The site location for this contract is: Nanuet High School, Barr Middle School and Miller Elementary School.

B. Electrical – EC-01 - Project name is Nanuet Phase 4 Projects in the Nanuet Union Free School District as shown in Contract Documents prepared by KSQ Architects. The site location for this contract is: Nanuet High School, Barr Middle School and Miller Elementary School.

C. Mechanical – MC-01 - Project name is Nanuet Phase 4 Projects in the Nanuet Union Free School District as shown in Contract Documents prepared by KSQ Architects. The site location for this contract is: Nanuet High School, Barr Middle School and Miller Elementary School.

D. Plumbing – PC-01 - Project name is Nanuet Phase 4 Projects in the Nanuet Union Free School District as shown in Contract Documents prepared by KSQ Architects. The site location for this contract is: Barr Middle School & Nanuet High School

E. Prime Contracts, in the context used in this Section, are separate contracts that represent significant elements of work that are performed concurrently with and in close coordination with work performed on the project under other Prime Contracts and Owner. Each is recognized to be a major part of the project (See Section 01 12 XX).

1.3 CONTRACT DOCUMENTS

A. Contract Documents indicate the work of each Prime Contract and related requirements and conditions that have an impact on the project. Related requirements and conditions that are indicated on the Contract Documents include, but are not necessarily limited to the following:

1. Existing site conditions and restrictions on use of the site.
2. Work performed prior to work under these Prime Contracts.
3. Alterations and coordination with existing work.
4. Other work to be performed concurrently by the Owner.
5. Work to be performed subsequent to work under these Prime Contracts.
6. Alternates.
7. Allowances.

1.4 SUMMARY, PRIME CONTRACT WORK

A. The work of each Prime Contract, as defined in greater detail by other provisions of the Contract Documents, is summarized in Section 01 12 XX.

B. Definition of the extent of Prime Contract Work

1. The extent of the work of each Contract is indicated in the Contract Documents. General names and terminology on the drawings and in the specification, sections controls the determination of which Contract includes a specific element of required work, except where no other more specific definition is contained in the Contract Documents.
2. Local custom and trade-union jurisdictional settlements do not control the scope-of-work in each Contract. When a potential jurisdictional dispute or similar potential work interruption is first identified or threatened, affected parties of the Contracts shall promptly negotiate a reasonable settlement which will avoid or minimize such pending interruption and its delays or losses.

1.5 SCHEDULE

A. Within Ten (10) calendar days of award of its Contract by the Owner, the Prime Contractor shall submit a construction schedule to the Construction Manager for the work to be performed under its Contract with the Owner. The construction schedule shall be in a detailed precedence style critical path (CPM) of Primavera type format satisfactory to the Owner, Construction Manager, which shall also:

1. Provide a graphic representation of all activities and events that will occur during the performance of the work.
2. Identify each phase of construction and occupancy.
3. Set forth dates that are critical in ensuring the timely and orderly completion of the Work in accordance with the requirements of the Contract Documents (hereinafter referred to as Milestone Dates).
4. Conform to the Construction Schedule included in the Drawings for each Prime Contractor's Work.
5. Coordinate with and include other primes milestone dates in relation to their portion of work.

B. The Construction Manager & Architect shall review such schedule and shall advise the Prime Contractor if its schedule is acceptable for incorporation into the Master Schedule of work to be performed by the Prime Contractor engaged by the Owner. If the schedule is unacceptable, the Construction Manager will advise the Prime Contractor that its schedule will be revised in the Master Schedule. The Prime Contractor shall monitor the progress of its work for conformance with the requirements of the Construction Schedule and shall promptly advise the Owner and Construction Manager of any delays or potential delays. In the event any progress report indicates any delays, each Prime Contractor shall propose an affirmative plan to correct the delay, including overtime and/or additional labor, if necessary. In no event shall any progress report constitute an adjustment in the Contract Time, the Milestone Dates, or the Contract Sum unless any such adjustment is agreed to by the Owner and authorized pursuant to a Change Order.

C. If the Schedule is not submitted by the Prime Contractor in a timely fashion, such Prime Contractor shall accept the Master Schedule prepared by the Construction Manager as the Construction Schedule to be used in carrying out its work and that prime Contractor shall waiver its rights to claim damage or delay associated with the time requirements set forth in the Master Schedule. Such schedule will become the product and ownership of that Prime Contractor and that Prime Contractor will be back-charged all costs pertaining to the service of producing the schedule.

D. The Prime Contractor shall provide revised schedules at appropriate intervals as required by the conditions of the work and Project or as directed by the Construction Manager.

E. The Prime Contractor will perform all work in the existing building in the evening or on weekends, except during summer breaks, or when the school is closed. Contractor shall obtain approval from the Construction Manager prior to performing the work.

1.6 **PROOF OF ORDERS, DELIVERY DATES AND SUPPLY CHAIN TRACKING**

A. Within 2 weeks after the approval of shop drawings, samples, product data, and any other documents requiring approval before purchasing. The contractor shall provide copies of purchase orders for all equipment and materials which are not available in local stock. The contractor shall submit written statements from suppliers confirming the orders and stating promised delivery dates. Failure to provide this critical information will result in owner holding monthly requisition payments until received or liquidated damages for delay.

Due to ongoing supply chain disruptions, the contractors may be required to obtain all materials for the project and store them onsite in their individually provided Conex boxes. This includes general material items typically readily available (piping, conduits, wire, metal studs, CMU, drainage structures, light fixtures, etc.) The owner will pay for these stored items delivered to the jobsite in accordance with section 012900.

END OF SECTION 011200

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SECTION 01 11 00 - MILESTONE SCHEDULE

PART 1 - GENERAL

1.1 Milestone

The following milestone schedule serves as a basis for bidding. A Master Schedule will be developed at a general meeting of all successful bidders within 21 days of Letter of Intent to Award the Contracts. This sequence and time frame has been coordinated with the school program, no acceleration or changes will be permitted. Each prime contractor will coordinate activities, forward submittals, deliver materials and provide necessary manpower to meet the milestones listed below.

1.2 Milestone Schedule - Building Envelope Projects Miller Elementary School (Roofing): BE-01, EC-01

Start of Construction:	April 1, 2024
Equipment Submittals & Approvals:	April 2024
Substantial Completion:	May 7, 2024

1.2 Milestone Schedule - Miller Elementary School Projects: GC-01, MC-01, EC-01, PC-01

Start of Construction Exterior Site Work and Masonry:	June 26, 2024
Start of Construction Doors and Window Shades:	June 26, 2024
Start of Construction Roof Fans & FA:	June 26, 2024
Start of Construction Security Vestibule:	June 26, 2025
Start of Construction Fire Alarm Upgrades:	July 8th, 2024
Equipment Submittals & Approvals:	April-May 2024
Substantial Completion Exterior Site Work and Masonry:	July 29th, 2024
Substantial Completion Doors and Window Shades:	July 29th, 2024
Substantial Completion Roof Fans & FA:	July 30th, 2024
Substantial Completion Security Vestibule:	August 28th, 2025
Substantial Completion Fire Alarm Upgrades	August 28th, 2025

1.4 Milestone Schedule - High School Projects: GC-01, MC-01, EC-01, PC-01

Start of Construction Door and Window Shades:	June 26th, 2024
Start of Construction Admin Wing Renovations:	June 26th, 2025
Start of Construction Hydronics & AC Ceiling Projects:	July 5th, 2024
Start of Construction HVAC, Hydronics, & AC Building-Wide Projects:	June 26th, 2025
Start of Construction Electrical Panel Replacements:	June 26th, 2024
Start of Construction Fume Hood:	June 26th, 2025
Equipment Submittals & Approvals:	April-May 2024
Substantial Completion Door and Window Shades:	August 28th, 2024
Substantial Completion Admin Wing Renovations:	August 27th, 2025
Substantial Completion Hydronics & AC Ceiling Projects:	August 30th, 2024
Substantial Completion HVAC, Hydronics, & AC Building-Wide Projects:	August 28th, 2025
Substantial Completion Electrical Panel Replacements:	August 12th, 2025
Substantial Completion Fume Hood Replacement:	August 5th, 2025

1.4 Milestone Schedule - Barr Middle School Projects: GC-01, MC-01, PC-01, EC-01

Equipment Submittals & Approvals:	April-May 2024
Start of Construction Door and Window Shades:	July 29th, 2024
Start of Construction Fire Alarm Upgrades:	June 25th, 2025
Start of Construction Toilet Room Renovations:	June 25th, 2025
Substantial Completion Door and Window Shades:	August 21st, 2024
Substantial Completion Fire Alarm Upgrades:	August 27th, 2025
Substantial Completion Toilet Room Renovations:	August 26th, 2025

Note: Second shift/double shift work will be required to meet substantial completion dates. Second shift/ double shift work is expected to take place as required to meet the milestone schedule if necessary. The contractor will have blackout dates during school days where work may not take place. It is the contractor's responsibility to request in writing any blackout dates prior to commencement of work to coordinate schedule.
Second shift hours are before 6AM or after 3:30 pm.
Failure to meet the milestone schedule will result in a per day financial penalty as indicated in the AIA A232/A132

All work required by any of the Owner's representatives and consultants, including the Architect, Construction Manager and their consultants, Owner's Attorneys, etc., to execute final close-out of contract after 60 days beyond Milestone dates if determined to be caused by contractor, shall result in payment(s) to the Owner's representatives and consultants, including the Architect, Architect's consultants, Owner's Attorneys, etc., in the form of a change order deduct to the base contract.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 011100

SECTION 01 12 02 – CONTRACT SUMMARY – GC-01

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

This Section includes a summary of each Prime Contract, including responsibilities for coordination and temporary facilities and controls. One set of Construction Documents is issued covering the Work of multiple Prime Contracts. Each Prime Contract is responsible to review all drawings and specifications for specific requirements indicated, and for a general understanding and knowledge of the work of other Prime Contracts. All Prime Contracts are responsible for all Work of their Contract no matter what drawing on which the Work appears. All Prime Contracts are responsible to coordinate their work related to the complete set of drawings and specifications, not limited to each prime contractor scope. **All Bidders should acknowledge that for each contract listed below, each contractor is their own General Contractor and subject to all General Contractor requirements.**

General Contract: The Interior Contractor shall be selected based on the bid procedure as described in the Bid Documents. Contract Bidders are responsible for (a) trade work coordination, (b) the scope contained in drawings listed below and (c) any and all additional scope specifically identified to be performed by the Interior Contractor in other Bid Packages in the Contract.

a. Interior & Exterior Contract: All work related to Interior and exterior construction includes but is not limited to the following items: (Refer to the Contract Documents for full scope of work.

1) Abatement, Demolition, ACT, GWB, Plaster Ceiling, Painting, Patching, tiling, epoxy flooring, Flooring, interior steel framing, exterior site work, and Casework.
2) Work related to drawings: (*In addition to these drawings, the contractor is required to review all specifications included in the overall*

contract that may contain related scope or detail for this specific contract.)

a) Nanuet Senior High School
- Door Replacements and window treatments
- Admin wing renovations
- New Ceilings

b) Barr Middle School
- Door Replacements and window treatments
- Toilet Room Renovations

c) Miller Elementary School
- Door Replacements and window treatments
- Security Vestibule Renovations
- Masonry restoration and sitework

B. Applicable Drawings : All drawings itemized below are to be provided complete by this Prime Contract, unless noted otherwise. In addition to these drawings, the contractor is required to review all drawings included in the overall contract that may contain related scope or detail for this specific contract.
1. All "G" drawings – All Schools
2. Nanuet High School
   a. HS-ASB-2
   b. All demo door & storefront scope "AD" drawings
   c. HS-AD401.1
   d. All new door & storefront scope "A" drawings
   e. HS-A401.1, HS-A601,
   f. All new ACT ceilings "A drawings"
3. Barr Middle School:
   a. MS-ASB-1, MS-ASB-2
   b. BM-AD000, BM-AD101, BM-AD-102
   c. BM-A101, BM-A102, BM-A401, BM-A601, BM-A801
4. Miller Elementary School:
   a. ME-S001, ME-S101, ME-S102
   b. ME-AD000, ME-AD101
   c. ME-A101, ME-401, ME-A601,ME-A801

1.3 **This GC-01 contract requires the awarded entity to self-perform the largest scope of work shown in the contract documents. There are no provisions within this contract to solely subcontractor ALL trade scope required to complete the project and its design intent. All other work in this contract is**

allowed to be subcontracted other than as stated herein. It is further required to clearly present what scope your own forces will be doing with your bid submission. Failure to present this at time of bid will be subject to disqualification.

1.4 It is the GC's responsibility to review the MEP drawings to coordinate the GC's portion of the work with MEP.

1.5 Related Sections include, but are not limited to, the following:

A. Division 01 Section "Work Restrictions" for use of the Project site and for requirements for continued Owner occupancy of premises.

B. Division 01 Section "Project Management and Coordination" for general coordination requirements.

C. Division 01 Section "Project Forms" for documents required for Testing and Coordination.

D. Division 01 Section "Temporary Facilities and Controls" for specific requirements for temporary facilities and controls

E. Applicable Specification Sections: All specification Sections itemized below are to be provided complete by this Prime Contract, unless noted otherwise. In addition to these specifications, the contractor is required to review all specifications included in the overall contract that may contain related scope or detail for this specific contract.
   1. Divisions 00 and 01 – Procurement and Contracting Requirements & General Requirements.
   2. Division 02- Existing Conditions
   3. Division 03 – Concrete
   4. Division 04 Masonry
   5. Division 05 – Metals
   6. Division 06 – Wood and Plastics
   7. Division 07 – Thermal and Moisture Protection
   8. Division 08 – Openings
   9. Division 09 – Finishes
   10. Division 10 – Specialties
   11. Division 11 – Equipment
   12. Division 12 – Furnishings
   13. Division 14 – Elevators and lifts

1.6 DEFINITIONS

1.7 MANAGEMENT AND COORDINATION

A. The Owner shall provide a Construction Manager.

1. The Construction Manager shall provide a full time construction site representative recognized as the Construction Manager.

1.8 CONSTRUCTION MANAGER

A. The construction manager shall provide on-site administration of the Contracts for Construction in cooperation with the Architect as set in AIA Document A232 ™ – 2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, as modified.

B. The Construction Manager shall provide administrative, management and related services to coordinate scheduled activities and responsibilities of the Multiple Prime Contractors with each other and with those of the Construction Manager, the Owner and the Architect. The Construction Manager shall coordinate the activities of the Multiple Prime Contractors in accordance with the latest approved Project Schedule and the Contract Documents.

C. Utilizing the construction schedules provided by the Prime Contractors, the Construction Manager shall update the Project schedule, incorporating the activities of the Owner, Architect, and Multiple Prime Contractors on the Projects, including activity sequences and durations, allocation of labor and materials, processing of Shop Drawings, Product Data and Samples, and delivery and procurement of products, including those that must be ordered will in advance of construction. The Project schedule shall include the Owner's occupancy requirements showing portions of the Project having occupancy priority.

D. Utilizing information from the Multiple Prime Contractors, the Construction Manager shall schedule and coordinate the sequence of construction and assignment of space in areas where the Multiple Prime Contractors are performing Work, in accordance with the Contract Documents and the latest approved Project Schedule.

1.9 GENERAL REQUIREMENTS OF PRIME CONTRACTS

A. Prime Contracts: The context used in this Section are separate Prime Contracts that represent significant elements of work that is to be performed concurrently and in close coordination with the work of other Prime Contracts for the benefits of the Owner. Each Prime Contract is recognized to be a major part of the Work.

B. Assignment of Work: Should a conflict be indicated, Section 011200 shall take precedence over all scope of work assignments that may be indicated elsewhere within the Construction Documents.

C. Layout and Installation: Each Prime Contractor shall schedule, layout and install their Work in such manner as not to delay or interfere with, but to compliment the execution of the work of other Prime Contracts, utility companies and Owner's operations.

D. Extent of Contract: The Contract Documents, drawings and specifications each contain more specific descriptions of the Work facilitating which Prime Contract includes specific elements of the Project.

1. Work provided by each Prime Contract shall mean complete and operable systems and assemblies, including products, components, accessories and installations required by the Construction Documents or indicated otherwise.
2. Prime Contractors shall exercise good judgment and perform all work according to related industry standards.
3. The Owner is exempt from payment of Federal, State and local taxes, including sales and compensating use taxes on all materials and supplies incorporated in completing the Work; these taxes are not to be included in the Bid. This exemption does not apply to tools, machinery, equipment or other property leased by, or to, the Contractor or sub-contractor, or to supplies and materials, which even though consumed are not incorporated into the completed work. Prime Contractors, and their sub-contractors, shall be responsible for paying any and all applicable taxes on said tools, machinery, equipment or property, and upon all said unincorporated supplies and materials, whether purchased or leased.
4. Prime Contracts shall understand that time is of the essence, and will adequately staff the Project by employing the appropriate trade's people to perform the Work; these people shall be experienced in their respective trades. A shortage of labor in the industry shall not be accepted as an excuse for not properly staffing the Project; all efforts shall be made to meet or exceed the schedule, including additional staff and/or labor hours necessary. All cost associated with this item shall be included within the Bid.
5. Local custom and trade union jurisdictional settlements will not control the scope of the Work of each Prime Contract.
    a. When a potential jurisdictional dispute or similar interruption of Work is first identified, or threatened, the affected Prime Contracts shall promptly negotiate

a reasonable settlement to avoid or minimize the pending interruption and delays.

b. Contractor's trade-related issues shall not be grounds for modification or extension of scheduled completion date(s).

6. The Work of all Prime Contracts requires close coordination with other Prime Contracts and construction personnel. Maintain flexibility and cooperation through the Project. "Out of Sequence" and "Delay" claims will only be considered when requirements of Division 01 "Administrative Requirements" have been adhered to. Delay claims must be in writing and forwarded to the Architect, per the requirements of the General Conditions of the Contract. Claims not submitted per these requirements will be rejected and/or denied.
7. The intention of the Work is to follow a logical sequence, however, a Prime Contractor may be required by the Architect or Construction Manager, to temporarily install, omit or leave out a section(s) of Work, out of sequence. All such out of sequence work, and come back time, at these areas shall be performed at no additional cost to the Owner.

E. Substitutions: Per Division 01 Section "Substitution Procedures", each Prime Contractor shall cooperate with the other Prime Contractors involved, to coordinate approved substitutions with remainder of the Work. Contractors shall submit all "Substitutions" at least ten (10) days prior to the date for receipt of Bids as specified in the Instructions to Bidders 002113 Section 3.3 Equivalents or bid will be considered per "basis of design".

F. Construction Schedules: Refer to Divisions 01 Section "Construction Progress Documentation", "Preliminary Schedule" and "Project Management and Coordination" for requirements related to meetings and schedules.

G. Construction Sequencing and Phasing: Prime Contractor shall understand that Sequencing and/or Phasing Plans are contingent upon the work areas being complete/occupied, prior to the next area of Work beginning. Should an area of construction not be complete per the Project Preliminary Schedule, the Project Master Construction Schedule/Sequencing Plans will be adjusted accordingly. The Owner will not be responsible for delay claims due to adjustments being no fault of their own.

1. Prime Contracts may be required to re-sequence the phasing of the project as a result of changes to the schedule. Prime Contracts shall provide these adjustments at no additional cost to the Owner.

H. Existing Conditions: Each Prime Contract shall verify existing conditions in the field prior to work commencing in that area and immediately report conditions to the Architect that are not represented correctly by the Construction Documents.

1. Each Prime Contract is responsible for familiarizing himself with Project Site Logistics and provide a "site logistics plan locating storage area, scaffolds, rubbish areas, stock piles and egress related to all work, included phased construction within 30 days of award.
2. Each Prime Contract has been given ample opportunity to review Existing Conditions related to the Project. Existing Conditions not noted in the Construction Documents that could be easily recognized during pre-bid review that interfere with the respective Prime Contract's work, shall be the responsibility of the respective Prime Contract. This includes all costs associated with removal, patching, relocation or re-fabrication of installations.

I. Hazardous Materials: Each Prime Contract shall familiarize themselves with the Hazardous Materials Sections/Drawings of the Construction Documents and follow DOL/OSHA/EPA/SED regulations while performing their respective Work in these areas. Discovery of non-identified or concealed hazardous materials shall be reported to the Construction Manager immediately and followed up with written documentation of the event.

J. Protection of Installations: Each Prime Contract is responsible for protecting their installations at all times. All costs incurred to repair, replace or clean insufficiently protected materials/installations shall be the responsibility of the installing Prime Contract.

1. Architect shall be notified, in writing, immediately upon material/installation being damaged; notification shall indicate responsible party.
2. Owner will not be liable for damaged materials and/or installations by "others", when "others" cannot be identified.
3. Repair damaged work, clean exposed surfaces or replace construction installations that cannot be repaired.
4. Each Prime Contract shall be responsible for removing all labels not required to remain from their installations.
5. Installations shall be wiped clean and proper protection then installed.
6. Each Prime Contract is responsible to protect another primes work in the event that prime has to work over or on top of that other primes work being complete. The prime working over the completed work takes full responsibility of that other primes completed work both in condition and operation.
7. Gc shall install hevy duty "Ram Board" or equivalent to protect new floor surfaces from damage until final cleaning and acceptance by owner.

K. Daily Cleaning: All Prime Contracts are responsible for any and all debris caused by their Work, including the Work of their subcontractors. A daily clean up and disposal is

required by each Prime Contract for the periods which that Prime Contract, or its sub-contractors, are performing Work on site.

1. Assign at least one person for a daily clean and sweep of the work area(s). Prime Contractor shall allot sufficient manpower and time for this to be completed by the end of each shift. Submit name of this person(s) to Construction Manager.
    a. Construction Manager shall have the authority to give direction to person(s) on the Project Site identified by the Prime Contract as designated for cleanup tasks. This shall include the safety review/securing of the site-work zone after each shift.
    b. This person has check that no construction debris was dumped in any district dumpers during this end of shift site review, if found the contractor must remove immediately the next morning to avoid back charges costs of $1500 per day not removed.
2. Any Prime Contract not providing personnel for Daily Cleaning will be Back Charged for labor provided by the Owner to complete this task.
3. Contractor working solely in an area shall be responsible for clean/sweep of that area.
4. Daily cleaning will not mean any one Prime Contract is responsible for assisting another Prime Contract with removing major quantities of debris created by a particular Prime Contract's Work.
5. Daily cleaning will be mandated to remove from the building any debris created by day-to-day activities. All Prime shall assist in sweeping shared work areas and shared corridors while working on site. Each Prime shall assist in mopping of shared corridors while working on site or as required by the Owner.
6. All prime contractors and subcontractors are required to provide sweeping compound for daily cleaning in their respective exterior and interior work areas. Each Prime Contract shall provide a sufficient number of brooms or other necessary tools, for use by their personnel to adequately fulfill their obligations.
7. All prime contractors shall provide and maintain garbage cans/refuse containers with liners for each construction area of their respective contracts as directed by the Construction Manager and shall be responsible for disposing of these materials to a dumpster.
8. All prime contractors provide the necessary equipment/containers (lull/skip-box) to move daily clean/sweep debris from the building to a dumpster on a daily basis, for each construction area of their respective contracts. Skip-box shall be emptied to a dumpster by 9:00 a.m. the following day.
9. Cleaning shall be deemed a Safety & Health issue, with Prime Contracts being held accountable for fulfilling their contractual obligations.

L. Final Cleaning: At Substantial Completion of each area of construction, each Prime Contract shall wipe/vacuum clean all of their respective installations; All interior contracts performing work inside the buildings shall mop clean all building surrounding areas and finish flooring and remove all marks/blemishes to the finish, for each construction area of their respective contracts. Each area of construction shall be wiped clean of all construction dust and debris prior to turnover to the Owner.

M. Cutting and Patching: All Primes are responsible for cutting and patching required to complete their Work. All repair of existing finish Work (including finish floors) shall be performed by contract requiring work, meeting or exceeding minimum contract requirements for that particular section, specification, or type of work. All concealed openings (piping, ductwork, conduit, etc.) must be repaired to comply with specified wall or deck conditions as well as required fire and sound ratings. All corridor penetrations require fire safing. If contractor elects to install their new work in an existing unrated wall or floor opening, whereas the wall/floor is a fire rated condition, that contractor is responsible to fire rate that opening to match the wall/floor fire rating with new and all other existing wire, piping, ducts etc. Other areas are noted in drawings and specifications.

1.10 Project Schedule. The nature of this project is to complete all the work listed as Phase 1A in the schedule by **the Project Closeout Dates specific to each Prime Contract as listed below**. Each Prime Contractor shall include in their bid proper allowances for foul weather.

A. Bids Received: 4/3/2024

B. Notice to Proceed: 4/16/2024

C. Submittals: The following items are to be submitted within 60 business days after Notice to Proceed:
   1. Submittal List and Submission Schedule – **15 days after NTP**
   2. Field Investigations
   3. Shop Drawings
   4. Long Lead Items – **30 days after NTP**
   5. Schedule of Values and Key Submittal List – **15 days after NTP**

D. Mobilization: 6/26/2024

E. Substantial Completion and Project Closeout:

   1. **General Contract 01**

a. Substantial Completion: See Milestone Schedule
b. Project Closeout: See milestone Schedule

1.11 TEMPORARY FACILITIES AND CONTROLS OF PRIME CONTRACTS

A. Conditions of Use: Keep temporary services or conditions clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary facilities as required as work progresses; do not overload facilities or permit them to interfere with progress. Take necessary fire prevention measures; do not allow hazardous, dangerous, or unsanitary conditions to develop or persist on the Project site.

1. Installation, operation, maintenance, and removal of each temporary service or condition are considered part of the respective Prime Contract's own construction activity, as are costs and use charges associated with each facility.
2. Locate service or condition where they will serve the Project adequately and with minimum interference of the Work, coordinate with the Construction Manager and the other Prime Contracts prior to installation.

B. Temporary Use of Permanent Facilities: Prime Contract, as installer of each permanent service or condition, shall assume responsibility for its operation, maintenance and protection during use as a construction facility prior to the Owner's acceptance, regardless of previously assigned temporary facilities and controls responsibility.

C. Owner's Facilities: Contractors are not allowed to use the Owner's facilities (toilets, telephones, food service, etc.) for their own benefit or convenience. Prime Contract Superintendents shall enforce this policy with their respective work forces.

1. Construction personnel parking will be restricted to area as directed and agreed to by the Owner, and to facilitate the completion of the work. Owner reserves the right to remove from their property, unauthorized vehicles occupying unauthorized areas, at respective vehicle owner's expense.

D. Storage on the Project Site: Each Prime Contract shall provide sufficient secure weather-tight storage facilities for their materials and equipment. These storage containers are required to be located on the "site logistics plan." The Owner's facilities and the Project's building areas shall <u>not</u> be used for storage unless agreed upon, in writing, with the Owner via the Construction Manager.

1. Until permanently incorporated into the Work, all materials on the Project site are considered to be the Prime Contract's responsibility for security and protection.
2. Prime contractor is required to check on their onsite stored material periodically to ensure that all material continues to be located in the stored location and that it remains protected from all damage, theft, and endangerment to others and ready

to be used on notice for coordination with other contractors. Failure to arrange for materials to be on site to complete coordinated work with other Prime Contractors will result in back charges for delays resulting therefrom.

3. Temporary long-term storage facilities are not available to Prime Contracts by the Owner.
4. Prime Contractors and their subcontractors, shall coordinate deliveries with the Construction Manager to ensure that disruptions and Owner inconvenience are avoided.

E. Tools and Equipment: Each Prime Contractor shall provide all tools and equipment necessary for its own activities; this includes secure lock-up and storage for all items on the Project Site.

1. Provide all construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities; this shall include any additional supplementary power, ventilation, lighting requirements and weather protection.

F. Project Site Communication: Each Prime Contractor shall provide their Project a full time on site at all times Superintendent with a mobile phone for the duration of the Project, as indicated in their Scope of Work. Construction Manager shall be furnished with contact numbers associated with each phone.

G. Safety: Prime Contracts, not the Architect or Construction Manager, are responsible for Project Site Safety, as related to their operations (refer to Section 013150 "Special Procedures" for further requirements).

1. Each Prime Contract shall correct safety hazards and violations immediately. If safety issues are not immediately rectified, the Owner shall secure outside sources to correct the deficiency and back charge the responsible Prime Contract.
2. Maintain unobstructed access/egress to fire extinguishers, fire hydrants, stairways, corridors, ladders and other safety routes/devices.

H. Fire Extinguishers: All Prime Contracts provide and maintain "general use" fire extinguishers for each construction area of their respective contracts; comply with applicable codes for quantities required. Use of the Owner's fire extinguishers to meet this requirement is not permitted. Comply with NFPA for recommended classes for exposure; extinguishers shall be inspected and appropriately tagged prior to being brought on site. Provide stands, painted bright orange, sturdy enough to carry the extinguisher, and built as not to create a tipping hazard.

1. Each Prime Contract shall supplement this requirement by providing additional fire extinguishers specifically related to their work activity (e.g., welding, soldering, abrasive cutting, etc.).

2. Each Prime Contract shall provide and maintain proper fire extinguishers at/in their respective on site office and storage facilities.
3. Store combustible materials in approved containers in fire-safe locations.

I. Welding: Any Prime Contract performing welding, cutting or other activities with open flames or producing sparks shall at a minimum:

1. Coordinate interruption/shutdown of detection system(s) to avoid creating false alarms.
2. Protect the area and surrounding areas from fire and damage.
3. Maintain fire extinguishers, compatible with activity, at the location of the activity.
4. Provide a continuous Fire Watch during the activity and one-half hour beyond the completion of the activity.
5. Provide all necessary fans and ventilation required for the activity.
6. Any welding, burning and or use of flame the contractor is required to provide all required "hot work permit" to use such equipment prior to start of work. Its mandatory that no "hot work" shall start without these permits issued to the CM and Owner. Failure to this requirement will result to the removal of the project super of that company from all district projects.

J. Remove each temporary facility when it can be replaced by the authorized permanent facility no later than Substantial Completion, or as directed by the Architect and/or Construction Manager. Complete or restore permanent facilities that may have been delayed due to interim use of a temporary barrier or condition.

K. Temporary Power: Each Prime Contractor shall provide for their own temporary power needs for any scheduled electrical utility shut downs. Each Prime Contractor shall provide for their own temporary generators, power cords and temporary lighting as needed during these periods to continue to perform their work and maintain adherence to the Preliminary Schedule and approved Project Master Schedules. All temporary power equipment shall comply with all applicable codes and regulations.

L. Waste Disposal Facilities:

1. General debris/refuse/construction waste containers (dumpsters) shall be provided by each prime contractor and secured as specified herein this contract.
2. It shall be the responsibility/requirement of each Prime Contract to bring their waste to the dumpsters, including but not limited to all equipment, demolition debris, discarded materials with further identification including the following; construction and demolition debris refers to discarded materials generally considered non-hazardous in nature, including but not limited to steel, glass, brick, concrete, asphalt material, pipe, gypsum wallboard, and lumber, from the construction or destruction of a structure as part of a construction or demolition

project or from the renovation of a structure, including such debris from construction of structures at a site remote from the construction or demolition project site.

3. It shall be the responsibility and requirement of each Prime Contract to recycle metals generated by its Work, and the Work of its subcontracts.
4. Joint-effort recycling by all Prime Contracts is encouraged.

M. Temporary Sanitary Facilities: Provide temporary self-contained toilets units for duration of the project.
   1. Temporary Sanitary Facilities:
      a. Each prime contractor is required to provide their own Temporary Sanitary Facilities and secured behind fencing and/or locked after work hours and weekends.
   2. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.
   3. Provide separate facilities (minimum of one ea.) for male and female personnel in proportion required by OSHA.
   4. Shield toilets to ensure privacy.
   5. Coordinate mobilization and demobilization of units with Construction Manager.
   6. Toilets shall be cleaned at least once per week, with additional facilities or cleanings provided if requested by Construction Manager.
   7. Provide and maintain adequate supply of toilet tissue and hand sanitizer for each facility.

1.12 WORK HOURS & SEQUENCE

A. Unless otherwise approved by the Construction Manager, During the school days, Work is to be performed in this contract during the hours of 3:30pm to 10:00pm on weekdays, and Saturdays and Sundays from 7:00am to 3:30pm. During School breaks, work is to be performed from 7:00am to 10:00pm. There is no additional cost to the owner for working the hours of 3:30pm through 10:00pm, or weekend work during the school year. Any work done during these times MUST BE COMPLETED, CLEANED, AND TESTED AS NECESSARY FOR STUDENT OCCUPANCY BEFORE THE START OF THE NEXT SCHOOL DAY. Contractors are required to schedule work during school breaks, school days off, and school holidays.

B. Summer work starts June 28th through August 23rd for 2024. The Summer working hours are from 7:00am to 9:30pm. There is no additional cost to the owner for working the hours of 3:30pm through 9:30pm or on weekends and holidays during the Summer.

C. As approved by the CM. Working hours during the school day will be 7:00am-3:30pm

D. Contractors are required to start working on site within 30 days of execution of contract, to the extent permitted by contract. Contractors are required to coordinate and perform work simultaneously with other Contractors. Contractors are required to complete their contract work by the designated Substantial Completion and Final Completion end dates as indicated on the Invitation to Bid.

E. Mandatory clean up periods - From August 24th, 2024 to August 31st , 2024 and August 30th , 2024 to September 6th, 2024, contractors shall clean up all interior and exterior areas.

F. Contractors are required per contract to fully staff the project during the work shifts stated above with the required manpower to complete their work within the allowed scheduled time frame. Contractors are required to provide a 72-hour advanced request to the Owner via the Construction Manager for any Saturday and Sunday work. If a project schedule delay has been caused by the fault of the contractor, the contractor is required to provide 3rd shift work from 9pm to 6am to make up the project schedule. All costs for CM, Architect and district personal related to this 3rd shift request will be charged to the contractor at a combined rate for all at $3,000 per 8hr shift.

G. The shifts noted above are not considered overtime or premium time hours.

H. Contract summaries will provide start and end dates for each contractor.

I. Additional requirements:

1. Multiple Crews: Each Prime Contract shall provide multiple crews, supervision, cranes, scaffold and other means necessary to perform the Work, and maintain the Project Master Schedules.
2. Interruption of any utility and/or power must be coordinated with the Owner, via the Construction Manager.
3. Any and all overtime, weekend and/or holiday work required to meet the Project Master Schedules shall be incorporated in the respective Prime Contract's bid.
4. Should a Contractor's progress fall behind, as to schedule, Prime Contractor shall employ additional – 3rd shift and/or overtime and/or weekend workforce until situation is rectified, to the satisfaction of the Architect and Construction Manager, at no additional cost to the Owner, however subject to charges as stated in section 1.10 E for lack of maintaining schedule
5. Should a Prime Contract feel another Prime Contract is delaying them sufficient time to complete their installations, per the schedule, the Architect and Construction Manager shall be notified in writing immediately of the situation (refer to Conditions of the Contract for protocol). A Prime Contract creating such a delay, that causes a proven burden upon another Prime Contract to maintain schedule, shall bear all costs incurred by the delayed Prime Contract to maintain

the schedule.

6. The Architect and Construction Manager shall not be overburdened as to overtime cost, to monitor the work, due to no cause of his or her own. Owner will compensate the Architect and Construction Manager for all additional cost related to the issue of a Prime Contractor's failing to execute the Contract by fully staffing per the work hours and days noted herein. The Owner reserves the right to back charge the responsible Prime Contract for these fees if incurred.
7. All Asbestos and/or Lead Abatement shall take place to meet the requirements of the Preliminary Schedule and Project Master Schedules and shall be coordinated with the other Prime Contractors prior to commencement.

J. The Work shall be conducted to provide the least possible interference to the activities of the Owner's personnel and the surrounding property owners (neighbors).

1. Prime Contracts are hereby notified that: All Prime Contractors and their subcontractors shall limit excessive noise during 2nd shift known as work extending to 10PM weekdays upon approval by owner and city work hour restrictions. These operations shall not create a disturbance to neighboring properties.

K. Construction access to the site shall be limited to personnel, equipment and deliveries by suppliers relative to the Work of Prime Contractors and their subcontractors. Prime Contracts shall keep the Construction Manager advised of persons accessing the site and shall seek assistance with coordinating parking and storage facility locations for all Prime Contracts.

1. Where applicable, Contractors shall provide Building Site perimeter barricades as described herein the project and all temporary exit doors/lockable gates on the Project, securing these doors, fencing and/or gates at the end of each work shift.
2. When a Prime Contract engages in overtime, weekend or 2nd shift work, during the summer months and or during the normal school year, the respective Prime Contract shall notify Construction Manager of such and be responsible for securing the Project Site at the end of that work shift and perform site walk around the outside of construction area/work zone ensuring all debris is pickup up and there are no construction related hazards of any kind present once the responsible person leaves the site for the evening or weekend. This includes that all materials and equipment are fenced in and keys are removed. All interior projects have the same requirement to ensure that outside the work zone is clean from dust-dirt and that no materials are left outside the work area at any time.

1.11 RELATED DOCUMENTS

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

1.12 DRAWINGS AND SPECIFICATIONS

A. Construction Documents indicate the sum total of the Contract that make up the complete work for the Project. Through this Section "Summary of Work", the intent of the Contractor's scope of Work and responsibility is generally described. Related requirements and conditions that are indicated in the Contract Documents include but are not limited to the following:

1. General Conditions and Requirements.
2. Referenced and applicable Codes, Regulations and Standards.
3. Scheduling and phasing requirements.
4. Existing conditions and restrictions on use of the site and facilities.

B. Drawings and Specifications are cooperative and supplementary. Portions of the Work, which can best be illustrated by Drawings, are not included in the Specifications and portions best described by Specifications are not depicted on Drawings.

1. All items necessary to complete the work shall be furnished whether written or illustrated.
2. All primes shall exercise good judgment and perform all work according to related industry standards.

PART 2 - SCOPE OF WORK

2.1 PRIME CONTRACTS

A. Scope of Work: Work includes but is not limited to, the following:
1. Provide all work identified in the Contract Documents.
2. All Specification Sections provided.
3. All abatement drawings provided for reference.
4. GC is responsible to install all required access hatches. GC to coordinate with MEP trades for locations and hatches.
5. GC is responsible to install sleeves in foundation walls for penetrations by other prime contractors, MEP contractors to provide GC a written sketch showing exact height/locations with distance from column line and depth below finished slab within sufficient time for GC to install. If information is not

provided in a timely manner by MEP, then core drilling is the responsibility of the affected contractor.

6. GC will coordinate MEP opening sizes and locations (HVAC units, louvers, vents, etc) with MEP trades. Lintels for these openings are provided and installed by the GC.
7. Fire alarm mag holds furnished and wired by EC, and will be installed on doors by GC.

PART 3 - EXECUTION

3.1 WORK SEQUENCE

A. The Work shall be conducted to provide the least possible interference to the activities of the Owner's personnel, per the Project Preliminary Schedule.

B. Work required during overtime, extended shifts or holidays due to failure of contractor to maintain schedule, will be monitored by Architect/Construction Site representative, and may be monitored by Owners' personnel. Additional costs for Architect/Construction Site Representative and/or Owner personnel will be borne by the Contractor.

C. Coordination of any utility and power interruption must be done with approval of the Architect/Construction Site Representative. Shutdowns must occur during non-occupied timeframes only.

D. Construction access to the site shall be limited to those designated for personnel, equipment and deliveries by the Owner. All contractor staging, parking and storage shall be coordinated with the Construction Site Representative and subject to change.

E. Payments: Each bid that covers more than one school (i.e. one SED project) shall provide completed AIA G732 & G703 by building (for each SED project).

F. No work shall be installed without approved shop drawings. Any work in place without approved shop drawings will be rejected and removed by that contractor at their expense and backed charge all other costs related to.

G. Any work deemed by CM, Architect and District not properly installed by a contractor per the contract drawings and specifications shall be removed immediately and corrected, with all associated costs to be borne solely by that contractor.

H. All prime contractors shall coordinate their contract work with other primes to meet the project schedule and for a complete operational system or area or work.

I. All contractors are to provide within 3 weeks of award a "base line" construction schedule for their work from commencement to completion including all phasing. This schedule is to be updated monthly to show percentage progress of each item listed. This schedule shall be revised to provide a recovery schedule in the event of a delay for any reason. The recovery schedule shall include the "base line" item and the recovery to show how the delay is affecting the overall project schedule. This schedule is to be provided in MS Project or Primavera. Excel schedules are not accepted.

J. Prime contractor "base line" schedules are to be reviewed by each prime contractor and coordinated where work is related and that each prime's work shall be included in each "base line" contractor's schedule as necessary for coordination.

K. All contractors are to provide 2-week look ahead schedules showing work related to the base line and shall be coordinated with other prime 2-week look ahead schedules. These schedules will be Excel format. Format will be provided by the CM.

L. Contractors to provide a full-time supervisor on site 100% of the time. This is not a working foreman. Supervisors are not working with tools they are supervising their workers and coordinating with other contractors and district/ CM. Failure to provide will be default of your contract and subject costs related to and termination.

M. All prime contractors are the provide a project manpower structure showing names and telephone numbers of each responsible person on the project. This shall be updated as needed if personal changes are made.

N. All site equipment and dumpsters are to be behind temporary chain link fence when stored on site and or within the construction work zone where temporary chain link fence has been providing and installed by the prime. Each prime contractor is responsible to provide and install temporary chain link fence around their own stored equipment and dumpsters on site.

O. No equipment, panels or any services shall be turned off for any reason without written request and approval by the district. Project form shall be used for all shutdowns and required a 3-day notice. Other shutdowns may require more time.

3.5 CONTRACT No. 2 GENERAL CONTRACT (GC-01)– GENERAL CONSTRUCTION PRIME CONTRACT FOR INTERIOR WORKS AT CONTRACT AT NANUET SENIOR HIGH SCHOOL & BARR MIDDLE SCHOOL & MILLER ELEMENTARY SCHOOL

A. Project Site Superintendent: GC shall provide one (1) full time, non-working Project Site Superintendent while any work related to this Contract is being

performed. Superintendent shall be responsible for the daily activities of this Contract and work closely with the Construction Manager and the other Prime Contract Superintendents/Foremen, in a manner that best promotes the objectives of the Project.

B. Superintendent shall be on-site while Contractor's own forces, and/or subcontractors are performing work on the Project Site; also while other Prime Contracts are installing work, or require the coordination of work related to this Prime Contract, and/or as requested by the Construction Manager.

1. Superintendent shall be the same individual throughout the duration of the Project.
2. Project Site Superintendent shall be an individual with minimum of five (5) years' experience in this field of work.
3. Refer to Section 013100 "Project Management and Coordination" for further requirements.

B. Project Foreman: GC shall provide at least one (1) full time Project Foreman during each shift of work at each school; Foreman shall be able to make binding decisions, as they relate to the daily activities of their crew, as related to achieving the goals of the Project.

C. Site Communications: GC shall provide Project Superintendent with a mobile phone; all costs and service charges shall be paid for by GC; provide Construction Manager with contact number(s).

D. Project Site Field Office: Provide site office facilities for this Contract's Project Superintendent. Site Office shall be equipped with telephone with answering machine, fax and e-mail. Contact information shall be provided to the Construction Manager.

1. The Owner reserves the right to seek reimbursement for temporary facilities not provided by this Prime Contract.

E. Scope of Work: Work of the GC includes, but is not limited to, the following:

1. Coordination with other Prime Contracts, Owner and Construction Manager as required to adhere to and maintain approved Project Master Schedules. Prior to first payment, this includes developing and submitting the Project Master Schedule for Interior works
2. Provide all interior demolition as indicated in the Construction Documents, or required for Work of this Prime Contract:
    a. Coordinate all demolition with Hazardous Materials documents. Coordinate with all other Prime Contracts regarding removals required for the Project. Demolition of a system shall mean any and all components removed in their entirety, to the point of origin, source or substrate.

3. **GC is to provide temporary panels as required for abatement work. All connections of temporary panels is by the GC own electrician. The district is not responsible for providing temporary power or connecting temporary power/panels.**
4. Provide all new ceiling systems and patching of existing ceilings, complete where indicated in Contract Documents.
5. Contractor access doors furnished by the prime trade requiring access; installation of all access doors will be by contract GC. General contractor is to coordinate with other primes as to location and quantity of access doors to be installed at the appropriate time. Framing for all access doors is by GC.
6. The GC shall provide and install flooring protection at all schools prior to demolition to protect the owner's property, and to accommodate storage of Owner property Flooring protection shall be 6 Mil plastic sheeting covered by Masonite hardboard of 1/8" thickness installed so as to cover entire floor area of designated spaces, with joints abutting one another and each joint fully taped with duct tape. At the conclusion of interior work, all interior work areas shall be cleaned and Masonite hardboard and plastic sheeting removed in order for the district to restore the classroom(s) and/or corridors. After the removal of Masonite and plastic sheeting, the exposed existing flooring shall be swept clean by the GC.
7. The GC shall provide one (1) 45' storage containers for the Owner's use, to be placed as directed by the Owner. GC shall provide a Schedule of Values line item in the base bid for storage trailers. If Owner chooses not to utilize this provision, the value of the storage trailers shall be credited back to the Owner at the end of the project.
8. This prime contractor shall provide ALL demolition and new construction of housekeeping pads for MEP contractors for all schools as shown on the contract documents.
9. GC shall conform to phasing and sequencing of interior work as coordinated with the Owner. See Milestone Schedule
10. Environmental Protection: Provide protection, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
    a. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms on or near the Project site.
11. Provide dust control within delineated building site while the Work of this Contract is being performed. Limit situations that may create dust contamination while Work of this Contract is idle.
12. Provide all Control Lines and Elevations as required. GC shall transfer lines and elevations to other locations as necessary.

13. Provide cut and patch work related to that of this Prime Contract, and at those areas specifically identified in the Construction Documents, regardless of trade creating the area to be patched.
    a. Each Prime Contract is responsible for all other respective cutting and patching required of their installations (refer to Section 01 73 29 for further information).
14. Provide all access panels indicated, and those not indicated whereas inaccessible installations have been provided by this Prime Contract, located above hard ceilings or in walls. Access panels required for MEP equipment accessibility are to be provided by the MEP contractors and installed by the interior contractor. Coordinate locations for panels with MEP contracts.
15. Provide all prep/paint finishes as indicated in the Construction Documents.
16. Provide finishes including, but not limited to; CMU, gypsum board assemblies, plaster, suspended ceiling systems, and all paint and finish systems including those on all surfaces adjacent to and damaged by renovation work during the Project.
    a. Provide all associated surface preparation for each finish included in this Prime Contract.
    b. Provide all plaster wall patch at all removal locations and any locations shown on the contract documents
17. Provide all miscellaneous wood blocking, shimming and supports for items or equipment installed under this Prime Contract, and as coordinated with other Prime Contracts for metal strapping and/or wood blocking for installation of MEP for interior Work.
18. Provide through-penetration fire stop systems in unit masonry assemblies, gypsum wall construction, floor penetrations, and at all structural member penetrations as per contract documents. Contractor shall coordinate with all MEP contractors to complete the scope of work.
19. GC is specifically reminded that there may be miscellaneous asbestos pipe insulation/fittings above some ceilings and inside wall areas. Contractor will investigate above the ceiling and walls prior to demolition and carefully perform the work as necessary to not disturb any insulation/fittings.
20. GC will provide all necessary patching/self-leveling/grinding of flooring substrate to insure a smooth flat floor finish prior to installation of new VCT or urethane flooring.
21. Substantial Completion: Clean all GC installations and provided equipment at the time of Substantial Completion or as directed by Construction Manager.
22. GC to provide negative air machines to properly exhaust all work areas of any odors, dust, fumes.
23. Refer to Division 00 Section “Project Forms” and make use of these forms for the installation and coordination of the Work. These forms are included to assist this Prime Contract with coordinating the installation of Work by others prior to enclosing and/or finishing work. Owner will not compensate Prime Contract for

work not properly coordinated that result in added work, or removal of work. Secure the proper signatures or acknowledgements, as indicated, prior to installing/completing the Work.

24. Coordinate all the preceding requirements, accordingly, with all applicable Alternates indicated in Section 01 23 00 "Alternates".

F. Supplemental Temporary Facilities and Controls by GC include, but are not limited to:

1. Waste Disposal Facilities: Provided by each contractor.
2. Temporary Interior Barricades: Provide, maintain and eventually remove all temporary barricades per OSHA Regulations, Industry Standards, or as indicated in the Construction Documents. These include, but are not limited to, the following areas:
    a. To isolate new construction areas.
    b. To isolate renovation areas.
    c. Floor openings/penetrations, including stairwells.
        1) Horizontal Openings: close openings in floors and horizontal surfaces with load bearing, wood and/or steel framed construction per applicable regulations.
3. Temporary Doors, Frames & Wall Assemblies: Provide, maintain and eventually remove all temporary installations per OSHA Regulations, Industry Standards, or as indicated in the Construction Documents. Provide fire rated assemblies as required. Provide exit (panic bar/crash bar) devices at locations of egress. Coordinate locations with Construction Exiting Plan, Sequencing/Phasing Plans, and the Construction Manager. Temporary doors shall be constructed using ½" plywood and 2x construction, equipped with hasps, locks, handle and latch mechanism, and spring or counter weight installed to allow door to close after opening. Permanent doors will not be used in temporary conditions.
4. Temporary Sanitary Facilities: Provided by each contractor.
5. Existing Stair Usage: Use of Owner's existing stairs in unoccupied areas will be permitted, provided that at Substantial Completion, stairs are restored to conditions existing before initial use.
    a. Provide photo documentation of existing stair conditions prior to use by all Prime Contracts. Document during use, and at completion of the Renovation Project in order to document any and all damage to the Owner's property.
    b. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If, despite such protection, stairs become damaged, restore damaged areas so no evidence remains of correction work.

6. Indoor air quality management at all areas of Construction, once building is enclosed.
    a. Provide all necessary dust partitions, fans, temporary ducts, and barricades to properly contain and ventilate all work area fumes and odors, created by demolition and new construction or alterations, directly to the outside. Ventilate to an area outside the building, sufficiently away from the building, as not to contaminate other areas. There will be no additional claims honored if the Construction Manager requests additional ventilation or requirements.
    b. Provide and exhaust air system for the project indoor areas that could produce fumes, VOC's, off gasses, dusts, mists, or other emissions.
    c. System Operation:
        1) A sufficient quantity of exhaust fans in existing window openings or other approved locations shall be operated.
        2) Exhaust air system shall operate for a minimum of 72 hours after work is completed or until all materials have cured sufficiently so as to stop out – gassing of fumes or odors and area has been ventilated to remove all detectable traces of odors and fumes.
        3) Maintain 25 feet clearance from all temporary exhaust outlets to all active building outdoor air intakes.
        4) Refer to Division 01 Section "Work Restrictions" for further information.
7. Provide all shoring required for Work of this Prime Contract, including but not limited to;
    a. Cutting or altering of existing construction.
    b. Provide protection of all new and existing surfaces during the Work. Do not stand, walk, or work off of any unprotected finished surface above the floor.
8. Maintain temporary fencing and barricading to keep unauthorized persons away from dangerous and hazardous areas for which this Prime Contract is responsible.
9. Traffic Controls: Provide flagman while any operation of this Prime Contract interferes with traffic flow on adjacent roadways.

END OF SECTION 01 12 02

SECTION 01 12 03 –CONTRACT SUMMARY – MC-01

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes a summary of each Prime Contract, including responsibilities for coordination and temporary facilities and controls. One set of Construction Documents is issued covering the Work of multiple Prime Contracts. Each Prime Contract is responsible to review all drawings and specifications for specific requirements indicated, and for a general understanding and knowledge of the work of other Prime Contracts. All Prime Contracts are responsible for all Work of their Contract no matter what drawing on which the Work appears. All Prime Contracts are responsible to coordinate their work related to the complete set of drawings and specifications, not limited to each prime contractor scope. **All Bidders should acknowledge that for each contract listed below, each contractor is their own General Contractor and subject to all General Contractor requirements.**

1. **Mechanical Contract:** The Mechanical Contractor shall be selected based on the bid procedure as described in the Bid Documents. Contract Bidders are responsible for (a) trade work coordination, (b) the scope contained in drawings listed below and (c) any and all additional scope specifically identified to be performed by the Mechanical Contractor in other Bid Packages in the Contract.

2. **MC-01 contract requires the awarded entity to self-perform the largest scope of work shown in the contract documents. There are no provisions within this contract to solely subcontract ALL trade scope required to complete the project and its design intent. All other work in this contract is allowed to be subcontracted other than as stated herein. It is further required to clearly present what scope your own forces will be doing with your bid submission. Failure to present this at time of bid will be subject to disqualification.**

B.

1) Work related to drawings: (*In addition to these drawings, the contractor is required to review all specifications included in the overall contract that may contain related scope or detail for this specific contract.)*

Nanuet Senior High School

a) HVAC & Hydronic Upgrades
b) Kitchen Hood Replacements

Barr Middle School

c) Toilet Room Renovations

Miller Elementary School

d) Security Vestibule Renovation
e) HVAC Upgrades

1.3 Related Sections include, but are not limited to, the following:

A. Division 01 Section "Work Restrictions" for use of the Project site and for requirements for continued Owner occupancy of premises.

B. Division 01 Section "Project Management and Coordination" for general coordination requirements.

C. Division 01 Section "Project Forms" for documents required for Testing and Coordination.

D. Division 01 Section "Temporary Facilities and Controls" for specific requirements for temporary facilities and controls

1.4 DEFINITIONS

1.5 MANAGEMENT AND COORDINATION

A. The Owner shall provide a Construction Manager.

1. The Construction Manager shall provide a full time construction site representative recognized as the Construction Manager.

1.6 CONSTRUCTION MANAGER

A. The construction manager shall provide on-site administration of the Contracts for Construction in cooperation with the Architect as set in AIA Document A232 ™ – 2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, as modified.

B. The Construction Manager shall provide administrative, management and related services to coordinate scheduled activities and responsibilities of the Multiple Prime Contractors with each other and with those of the Construction Manager, the Owner and the Architect. The Construction Manager shall coordinate the activities of the Multiple Prime Contractors in accordance with the latest approved Project Schedule and the Contract Documents.

C. Utilizing the construction schedules provided by the Multiple Prime Contractors, the Construction Manager shall update the Project schedule, incorporating the activities of the Owner, Architect, and Multiple Prime Contractors on the Projects, including activity sequences and durations, allocation of labor and materials, processing of Shop Drawings, Product Data and Samples, and delivery and procurement of products, including those that must be ordered will in advance of construction. The Project schedule shall include the Owner's occupancy requirements showing portions of the Project having occupancy priority.

D. Utilizing information from the Multiple Prime Contractors, the Construction Manager shall schedule and coordinate the sequence of construction and assignment of space in areas where the Multiple Prime Contractors are performing Work, in accordance with the Contract Documents and the latest approved Project Schedule.

1.7 GENERAL REQUIREMENTS OF PRIME CONTRACTS

A. Prime Contracts: The context used in this Section are separate Prime Contracts that represent significant elements of work that is to be performed concurrently and in close coordination with the work of other Prime Contracts for the benefits of the Owner. Each Prime Contract is recognized to be a major part of the Work.

B. Assignment of Work: Should a conflict be indicated, Section 011200 shall take precedence over all scope of work assignments that may be indicated elsewhere within the Construction Documents.

C. Seismic Requirements: Prime Contracts are to be aware that the building(s) is located within a Seismic Zone indicated in the documents and shall provide installations in compliance with all related code requirements.

D. Layout and Installation: Each Prime Contractor shall schedule, layout and install their Work in such manner as not to delay or interfere with, but to compliment the execution of the work of other Prime Contracts, utility companies and Owner's operations.

E. Extent of Contract: The Contract Documents, drawings and specifications each contain more specific descriptions of the Work facilitating which Prime Contract includes specific elements of the Project.

1. Work provided by each Prime Contract shall mean complete and operable systems and assemblies, including products, components, accessories and installations required by the Construction Documents or indicated otherwise.
2. Prime Contractors shall exercise good judgment and perform all work according to related industry standards.
3. The Owner is exempt from payment of Federal, State and local taxes, including sales and compensating use taxes on all materials and supplies incorporated in completing the Work; these taxes are not to be included in the Bid. This exemption does not apply to tools, machinery, equipment or other property leased by, or to, the Contractor or sub-contractor, or to supplies and materials, which even though consumed are not incorporated into the completed work. Prime Contractors, and their sub-contractors, shall be responsible for paying any and all applicable taxes on said tools, machinery, equipment or property, and upon all said unincorporated supplies and materials, whether purchased or leased.
4. Prime Contracts shall understand that time is of the essence, and will adequately staff the Project by employing the appropriate trade's people to perform the Work; these people shall be experienced in their respective trades. A shortage of labor in the industry shall not be accepted as an excuse for not properly staffing the Project; all efforts shall be made to meet or exceed the schedule, including additional staff and/or labor hours necessary. All cost associated with this item shall be included within the Bid.
5. Local custom and trade union jurisdictional settlements will not control the scope of the Work of each Prime Contract.
    a. When a potential jurisdictional dispute or similar interruption of Work is first identified, or threatened, the affected Prime Contracts shall promptly negotiate a reasonable settlement to avoid or minimize the pending interruption and delays.
    b. Contractor's trade-related issues shall not be grounds for modification or extension of scheduled completion date(s).
6. The Work of all Prime Contracts requires close coordination with other Prime Contracts and construction personnel. Maintain flexibility and cooperation through

the Project. "Out of Sequence" and "Delay" claims will only be considered when requirements of Division 01 "Administrative Requirements" have been adhered to. Delay claims must be in writing and forwarded to the Architect, per the requirements of the General Conditions of the Contract. Claims not submitted per these requirements will be rejected and/or denied.

7. The intention of the Work is to follow a logical sequence, however, a Prime Contractor may be required by the Architect or Construction Manager, to temporarily install, omit or leave out a section(s) of Work, out of sequence. All such out of sequence work, and come back time, at these areas shall be performed at no additional cost to the Owner.

F. Substitutions: Per Division 01 Section "Substitution Procedures", each Prime Contractor shall cooperate with the other Prime Contractors involved, to coordinate approved substitutions with remainder of the Work. Contractors shall submit all "Substitutions" at least ten (10) days prior to the date for receipt of Bids as specified in the Instructions to Bidders 002113 Section 3.3 Equivalents or bid will be considered per "basis of design".

G. Construction Schedules: Refer to Divisions 01 Section "Construction Progress Documentation", "Milestone Phasing Schedule" and "Project Management and Coordination" for requirements related to meetings and schedules.

H. Construction Sequencing and Phasing: Prime Contractor shall understand that Sequencing and/or Phasing Plans are contingent upon the work areas being complete/occupied, prior to the next area of Work beginning. Should an area of construction not be complete per the Project Preliminary Schedule, the Project Master Construction Schedule/Sequencing Plans will be adjusted accordingly. The Owner will not be responsible for delay claims due to adjustments being no fault of their own.

1. Prime Contracts may be required to re-sequence the phasing of the project as a result of changes to the schedule. Prime Contracts shall provide these adjustments at no additional cost to the Owner.

I. Existing Conditions: Each Prime Contract shall verify existing conditions in the field prior to work commencing in that area and immediately report conditions to the Architect that are not represented correctly by the Construction Documents.

1. Each Prime Contract is responsible for familiarizing himself with Project Site Logistics and provide a "site logistics plan locating storage area, scaffolds, rubbish areas, stock piles and egress related to all work, included phased construction within 30 days of award.
2. Each Prime Contract has been given ample opportunity to review Existing Conditions related to the Project. Existing Conditions not noted in the Construction

Documents that could be easily recognized during pre-bid review that interfere with the respective Prime Contract's work, shall be the responsibility of the respective Prime Contract. This includes all costs associated with removal, patching, relocation or re-fabrication of installations.

J. Hazardous Materials: Each Prime Contract shall familiarize themselves with the Hazardous Materials Sections/Drawings of the Construction Documents and follow DOL/OSHA/EPA/SED regulations while performing their respective Work in these areas. Discovery of non-identified or concealed hazardous materials shall be reported to the Construction Manager immediately and followed up with written documentation of the event.

K. Protection of Installations: Each Prime Contract is responsible for protecting their installations at all times. All costs incurred to repair, replace or clean insufficiently protected materials/installations shall be the responsibility of the installing Prime Contract.

1. Architect shall be notified, in writing, immediately upon material/installation being damaged; notification shall indicate responsible party.
2. Owner will not be liable for damaged materials and/or installations by "others", when "others" cannot be identified.
3. Repair damaged work, clean exposed surfaces or replace construction installations that cannot be repaired.
4. Each Prime Contract shall be responsible for removing all labels not required to remain from their installations.
5. Installations shall be wiped clean and proper protection then installed.
6. Each Prime Contract is responsible to protect another primes work in the event that prime has to work over or on top of that other primes work being complete. The prime working over the completed work takes full responsibility of that other primes completed work both in condition and operation.

L. Daily Cleaning: All Prime Contracts are responsible for any and all debris caused by their Work, including the Work of their subcontractors. A daily clean up and disposal is required by each Prime Contract for the periods which that Prime Contract, or its sub-contractors, are performing Work on site.

1. Assign at least one person for a daily clean and sweep of the work area(s). Prime Contractor shall allot sufficient manpower and time for this to be completed by the end of each shift. Submit name of this person(s) to Construction Manager.
    a. Construction Manager shall have the authority to give direction to person(s) on the Project Site identified by the Prime Contract as designated for cleanup tasks. This shall include the safety review/securing of the site-work zone after each shift.

b. This person has check that no construction debris was dumped in any district dumpers during this end of shift site review, if found the contractor must remove immediately the next morning to avoid back charges costs of $1500 per day not removed.

2. Any Prime Contract not providing personnel for Daily Cleaning will be Back Charged for labor provided by the Owner to complete this task.
3. Contractor working solely in an area shall be responsible for clean/sweep of that area.
4. Daily cleaning will not mean any one Prime Contract is responsible for assisting another Prime Contract with removing major quantities of debris created by a particular Prime Contract's Work.
5. Daily cleaning will be mandated to remove from the building any debris created by day-to-day activities. All Prime shall assist in sweeping shared work areas and shared corridors while working on site. Each Prime shall assist in mopping of shared corridors while working on site or as required by the Owner.
6. All prime contractors and subcontractors are required to provide sweeping compound for daily cleaning in their respective exterior and interior work areas. Each Prime Contract shall provide a sufficient number of brooms or other necessary tools, for use by their personnel to adequately fulfill their obligations.
7. All prime contractors shall provide and maintain garbage cans/refuse containers with liners for each construction area of their respective contracts as directed by the Construction Manager and shall be responsible for disposing of these materials to a dumpster.
8. All prime contractors provide the necessary equipment/containers (lull/skip-box) to move daily clean/sweep debris from the building to a dumpster on a daily basis, for each construction area of their respective contracts. Skip-box shall be emptied to a dumpster by 9:00 a.m. the following day.
9. Cleaning shall be deemed a Safety & Health issue, with Prime Contracts being held accountable for fulfilling their contractual obligations.

M. Final Cleaning: At Substantial Completion of each area of construction, each Prime Contract shall wipe/vacuum clean all of their respective installations; All interior contracts performing work inside the buildings shall mop clean all building surrounding areas and finish flooring and remove all marks/blemishes to the finish, for each construction area of their respective contracts. Each area of construction shall be wiped clean of all construction dust and debris prior to turnover to the Owner.

N. Cutting and Patching: All Primes are responsible for cutting and patching required to complete their Work. All repair of existing finish Work (including finish floors) shall be performed by contract requiring work, meeting or exceeding minimum contract requirements for that particular section, specification, or type of work. All concealed openings (piping, ductwork, conduit, etc.) must be repaired to comply with specified wall

or deck conditions as well as required fire and sound ratings. All corridor penetrations require fire safing. If contractor elects to install their new work in an existing unrated wall or floor opening, whereas the wall/floor is a fire rated condition, that contractor is responsible to fire rate that opening to match the wall/floor fire rating with new and all other existing wire, piping, ducts etc. Other areas are noted in drawings and specifications.

1.8 Project Schedule. The nature of this project is to complete all the work listed as Phase 4 in the schedule by **the Project Closeout Dates specific to each Prime Contract as listed below**. Each Prime Contractor shall include in their bid proper allowances for foul weather.

A. Bids Received: 4/3/2024

B. Notice to Proceed: 4/16/2024

C. Submittals: The following items are to be submitted within 60 business days after Notice to Proceed:
   1. Submittal List and Submission Schedule - **15 days after NTP**
   2. Field Investigations
   3. Shop Drawings
   4. Long Lead Items – **30 days after NTP**
   5. Schedule of Values and Key Submittal List – **15 days after NTP**

D. Mobilization: 6/26/2024

   1. **Mechanical Contract 01**
      a. Substantial Completion: See Milestone Schedule
      b. Project Closeout: See Milestone Schedule

1.9 TEMPORARY FACILITIES AND CONTROLS OF PRIME CONTRACTS

A. Conditions of Use: Keep temporary services or conditions clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary facilities as required as work progresses; do not overload facilities or permit them to interfere with progress. Take necessary fire prevention measures; do not allow hazardous, dangerous, or unsanitary conditions to develop or persist on the Project site.

1. Installation, operation, maintenance, and removal of each temporary service or condition are considered part of the respective Prime Contract's own construction activity, as are costs and use charges associated with each facility.
2. Locate service or condition where they will serve the Project adequately and with minimum interference of the Work, coordinate with the Construction Manager and the other Prime Contracts prior to installation.

B. Temporary Use of Permanent Facilities: Prime Contract, as installer of each permanent service or condition, shall assume responsibility for its operation, maintenance and protection during use as a construction facility prior to the Owner's acceptance, regardless of previously assigned temporary facilities and controls responsibility.

C. Owner's Facilities: Contractors are not allowed to use the Owner's facilities (toilets, telephones, food service, etc.) for their own benefit or convenience. Prime Contract Superintendents shall enforce this policy with their respective work forces.

1. Construction personnel parking will be restricted to area as directed and agreed to by the Owner, and to facilitate the completion of the work. Owner reserves the right to remove from their property, unauthorized vehicles occupying unauthorized areas, at respective vehicle owner's expense.

D. Storage on the Project Site: Each Prime Contract shall provide sufficient secure weather-tight storage facilities for their materials and equipment. These storage containers are required to be located on the "site logistics plan." The Owner's facilities and the Project's building areas shall <u>not</u> be used for storage unless agreed upon, in writing, with the Owner via the Construction Manager.

1. Until permanently incorporated into the Work, all materials on the Project site are considered to be the Prime Contract's responsibility for security and protection.
2. Prime contractor is required to check on their onsite stored material periodically to ensure that all material continues to be located in the stored location and that it remains protected from all damage, theft, and endangerment to others and ready to be used on notice for coordination with other contractors. Failure to arrange for materials to be on site to complete coordinated work with other Prime Contractors will result in back charges for delays resulting therefrom.
3. Temporary long-term storage facilities are not available to Prime Contracts by the Owner.
4. Prime Contractors and their subcontractors, shall coordinate deliveries with the Construction Manager to ensure that disruptions and Owner inconvenience are avoided.

E. Tools and Equipment: Each Prime Contractor shall provide all tools and equipment necessary for its own activities; this includes secure lock-up and storage for all items on the Project Site.

1. Provide all construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities; this shall include any additional supplementary power, ventilation, lighting requirements and weather protection.

F. Project Site Communication: Each Prime Contractor shall provide their Project a full time on site at all times Superintendent with a mobile phone for the duration of the Project, as indicated in their Scope of Work. Construction Manager shall be furnished with contact numbers associated with each phone.

G. Safety: Prime Contracts, not the Architect or Construction Manager, are responsible for Project Site Safety, as related to their operations (refer to Section 013150 "Special Procedures" for further requirements).

1. Each Prime Contract shall correct safety hazards and violations immediately. If safety issues are not immediately rectified, the Owner shall secure outside sources to correct the deficiency and back charge the responsible Prime Contract.
2. Maintain unobstructed access/egress to fire extinguishers, fire hydrants, stairways, corridors, ladders and other safety routes/devices.

H. Fire Extinguishers: All Prime Contracts provide and maintain "general use" fire extinguishers for each construction area of their respective contracts; comply with applicable codes for quantities required. Use of the Owner's fire extinguishers to meet this requirement is not permitted. Comply with NFPA for recommended classes for exposure; extinguishers shall be inspected and appropriately tagged prior to being brought on site. Provide stands, painted bright orange, sturdy enough to carry the extinguisher, and built as not to create a tipping hazard.

1. Each Prime Contract shall supplement this requirement by providing additional fire extinguishers specifically related to their work activity (e.g., welding, soldering, abrasive cutting, etc.).
2. Each Prime Contract shall provide and maintain proper fire extinguishers at/in their respective on site office and storage facilities.
3. Store combustible materials in approved containers in fire-safe locations.

I. Welding: Any Prime Contract performing welding, cutting or other activities with open flames or producing sparks shall at a minimum:

1. Coordinate interruption/shutdown of detection system(s) to avoid creating false alarms.
2. All burning and or welding (all hot work) is to be done from 3:30pm to 10:00pm when the public is not in the building.
3. Protect the area and surrounding areas from fire and damage.
4. Maintain fire extinguishers, compatible with activity, at the location of the activity.
5. Provide a continuous Fire Watch during the activity and one-half hour beyond the completion of the activity.

6. Provide all necessary fans and ventilation required for the activity.
7. Any welding, burning and or use of flame the contractor is required to provide all required "hot work permit" to use such equipment prior to start of work. Its mandatory that no "hot work" shall start without these permits issued to the CM and Owner. Failure to this requirement will result to the removal of the project super of that company from all district projects.

J. Temporary Power: Each Prime Contractor shall provide for their own temporary power needs for any scheduled electrical utility shut downs. Each Prime Contractor shall provide for their own temporary generators, power cords and temporary lighting as needed during these periods to continue to perform their work and maintain adherence to the Preliminary Schedule and approved Project Master Schedules. All temporary power equipment shall comply with all applicable codes and regulations.
    1. All other schools in this phase, have local electrical work, therefore each prime contractor and their sub-contractors are required to provide their own generator power for equipment and lighting to perform their work during these times with no additional cost to the owner.

K. Waste Disposal Facilities:

    1. General debris/refuse/construction waste containers (dumpsters) shall be provided by each prime contractor and secured as specified herein this contract.
    2. It shall be the responsibility/requirement of each Prime Contract to bring their waste to the dumpsters, including but not limited to all equipment, demolition debris, discarded materials with further identification including the following; construction and demolition debris refers to discarded materials generally considered non-hazardous in nature, including but not limited to steel, glass, brick, concrete, asphalt material, pipe, gypsum wallboard, and lumber, from the construction or destruction of a structure as part of a construction or demolition project or from the renovation of a structure, including such debris from construction of structures at a site remote from the construction or demolition project site.
    3. It shall be the responsibility and requirement of each Prime Contract to recycle metals generated by its Work, and the Work of its subcontracts.
    4. Joint-effort recycling by all Prime Contracts is encouraged.

L. Temporary Sanitary Facilities: Provide temporary self-contained toilets units for duration of the project.
    1. Temporary Sanitary Facilities:
        a. Each prime contractor is required to provide their own Temporary Sanitary Facilities and secured behind fencing and/or locked after work hours and weekends.

2. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.
3. Provide separate facilities (minimum of one ea.) for male and female personnel in proportion required by OSHA.
4. Shield toilets to ensure privacy.
5. Coordinate mobilization and demobilization of units with Construction Manager.
6. Toilets shall be cleaned at least once per week, with additional facilities or cleanings provided if requested by Construction Manager.
7. Provide and maintain adequate supply of toilet tissue and hand sanitizer for each facility.

1.10 WORK HOURS & SEQUENCE

A. During the school days, Work is to be performed in this contract during the hours of 3:30pm to 10:00pm on weekdays, and Saturdays and Sundays from 7:00am to 3:30pm. During School breaks, work is to be performed from 7:00am to 10:00pm. There is no additional cost to the owner for working the hours of 3:30pm through 10:00pm, or weekend work during the school year. **Any work done during these times MUST BE COMPLETED, CLEANED, AND TESTED AS NECESSARY FOR STUDENT OCCUPANCY BEFORE THE START OF THE NEXT SCHOOL DAY. Contractors are required to schedule work during school breaks, school days off, and school holidays**.

B. Summer work starts June 28th through August 23rd for 2024. The Summer working hours are from 7:00am to 9:30pm. There is no additional cost to the owner for working the hours of 3:30pm through 9:30pm or on weekends and holidays during the Summer.

C. Contractors are required to start working on site within 30 days of execution of contract, to the extent permitted by contract. Contractors are required to coordinate and perform work simultaneously with other Contractors. Contractors are required to complete their contract work by the designated Substantial Completion and Final Completion end dates as indicated on the Invitation to Bid.

D. Mandatory clean up periods - From August 24th, 2024 to August 31st, 2024 and August 30th , 2024 to September 6th, 2024, contractors shall clean up all interior and exterior areas.

E. As approved by the CM. Working hours during the school day will be 7:00am-3:30pm.

F. Contractors are required per contract to fully staff the project during the work shifts stated above with the required manpower to complete their work within the allowed scheduled time frame. Contractors are required to provide a 72-hour advanced request to the Owner via the Construction Manager for any Saturday and Sunday work. If a project schedule delay has been caused by the fault of the contractor, the contractor is

required to provide 3rd shift work from 9pm to 6am to make up the project schedule. All costs for CM, Architect and district personal related to this 3rd shift request will be charged to the contractor at a combined rate for all at $3,000 per 8hr shift.

G. The shifts noted above are not considered overtime or premium time hours.

H. Contract summaries will provide start and end date for each contractor.

I. Additional requirements:

1. Multiple Crews: Each Prime Contract shall provide multiple crews, supervision, cranes, scaffold and other means necessary to perform the Work, and maintain the Project Master Schedules.
2. Interruption of any utility and/or power must be coordinated with the Owner, via the Construction Manager.
3. Any and all -3rd shift, overtime, weekend and/or holiday work required to meet the Project Master Schedules shall be incorporated in the respective Prime Contract's bid.
4. Should a Contractor's progress fall behind, as to schedule, Prime Contractor shall employ additional – 3rd shift and/or overtime and/or weekend workforce until situation is rectified, to the satisfaction of the Architect and Construction Manager, at no additional cost to the Owner, however subject to charges as stated in section 1.8 C for lack of maintaining schedule
5. Should a Prime Contract feel another Prime Contract is delaying them enough time to complete their installations, per the schedule, the Architect and Construction Manager shall be notified in writing immediately of the situation (refer to Conditions of the Contract for protocol). A Prime Contract creating such a delay, that causes a proven burden upon another Prime Contract to maintain schedule, shall bear all costs incurred by the delayed Prime Contract to maintain the schedule.
6. The Architect and Construction Manager shall not be overburdened as to overtime cost, to monitor the work, due to no cause of his or her own. Owner will compensate the Architect and Construction Manager for all additional cost related to the issue of a Prime Contractor's failing to execute the Contract by fully staffing per the work hours and days noted herein. The Owner reserves the right to back charge the responsible Prime Contract for these fees if incurred.
7. All Asbestos and/or Lead Abatement shall take place to meet the requirements of the Preliminary Schedule and Project Master Schedules and shall be coordinated with the other Prime Contractors prior to commencement.

J. The Work shall be conducted to provide the least possible interference to the activities of the Owner's personnel and the surrounding property owners (neighbors).

1. Prime Contracts are hereby notified that: All Prime Contractors and their subcontractors shall limit excessive noise during 2nd shift known as work extending to 10PM weekdays upon approval by owner and city work hour restrictions. These operations shall not create a disturbance to neighboring properties.

K. Construction access to the site shall be limited to personnel, equipment and deliveries by suppliers relative to the Work of Prime Contractors and their subcontractors. Prime Contracts shall keep the Construction Manager advised of persons accessing the site and shall seek assistance with coordinating parking and storage facility locations for all Prime Contracts.

1. Where applicable, Contractors shall provide Building Site perimeter barricades as described herein the project and all temporary exit doors/lockable gates on the Project, securing these doors, fencing and/or gates at the end of each work shift.
2. When a Prime Contract engages in overtime, weekend or 2nd shift work, during the summer months and or during the normal school year, the respective Prime Contract shall notify Construction Manager of such and be responsible for securing the Project Site at the end of that work shift and perform site walk around the outside of construction area/work zone ensuring all debris is pickup up and there are no construction related hazards of any kind present once the responsible person leaves the site for the evening or weekend. This includes that all materials and equipment are fenced in and keys are removed. All interior projects have the same requirement to ensure that outside the work zone is clean from dust-dirt and that no materials are left outside the work area at any time.

1.11 RELATED DOCUMENTS

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

1.12 DRAWINGS AND SPECIFICATIONS

A. Construction Documents indicate the sum total of the Contract that make up the complete work for the Project. Through this Section “Summary of Work”, the intent of the Contractor’s scope of Work and responsibility is generally described. Related requirements and conditions that are indicated in the Contract Documents include but are not limited to the following:

1. General Conditions and Requirements.
2. Referenced and applicable Codes, Regulations and Standards.
3. Scheduling and phasing requirements.
4. Existing conditions and restrictions on use of the site and facilities.

B. Drawings and Specifications are cooperative and supplementary. Portions of the Work, which can best be illustrated by Drawings, are not included in the Specifications and portions best described by Specifications are not depicted on Drawings.

1. All items necessary to complete the work shall be furnished whether written or illustrated.
2. All primes shall exercise good judgment and perform all work according to related industry standards.

PART 2 - SCOPE OF WORK

2.1 PRIME CONTRACTS

A. Scope of Work: Work includes but is not limited to, the following:
1. Provide all work identified in the Contract Documents.
2. All Specification Sections provided.
3. All abatement drawings provided for reference.

PART 3 - EXECUTION

3.1 WORK SEQUENCE

A. The Work shall be conducted to provide the least possible interference to the activities of the Owner's personnel, per the Project Preliminary Schedule.

B. Work required during overtime, extended shifts or holidays due to failure of contractor to maintain schedule, will be monitored by Architect/Construction Site representative, and may be monitored by Owners' personnel. Additional costs for Architect/Construction Site Representative and/or Owner personnel will be borne by the Contractor.

C. Coordination of any utility and power interruption must be done with approval of the Architect/Construction Site Representative. Shutdowns must occur during non-occupied timeframes only.

D. Construction access to the site shall be limited to those designated for personnel, equipment and deliveries by the Owner. All contractor staging, parking and storage shall be coordinated with the Construction Site Representative and subject to change.

E. Payments: Each bid that covers more than one school (i.e. one SED project) shall provide completed AIA G732 & G703 by building (for each SED project).

F. No work shall be installed without approved shop drawings. Any work in place without approved shop drawings will be rejected and removed by that contractor at their expense and backed charge all other costs related to.

G. Any work deemed by CM, Architect and District not properly installed by a contractor per the contract drawings and specifications shall be removed immediately and corrected, with all associated costs to be borne solely by that contractor.

H. All prime contractors shall coordinate their contract work with other primes to meet the project schedule and for a complete operational system or area or work.

I. All contractors are to provide within 3 weeks of award a "base line" construction schedule for their work from commencement to completion including all phasing. This schedule is to be updated monthly to show percentage progress of each item listed. This schedule shall be revised to provide a recovery schedule in the event of a delay for any reason. The recovery schedule shall include the "base line" item and the recovery to show how the delay is affecting the overall project schedule. This schedule is to be provided in MS Project or Primavera. Excel schedules are not accepted.

J. Prime contractor "base line" schedules are to be reviewed by each prime contractor and coordinated where work is related and that each prime's work shall be included in each "base line" contractor's schedule as necessary for coordination.

K. All contractors are to provide 2-week look ahead schedules showing work related to the base line and shall be coordinated with other prime 2-week look ahead schedules. These schedules will be Excel format. Format will be provided by the CM.

L. Contractors to provide a full-time supervisor on site 100% of the time. This is not a working foreman. Supervisors are not working with tools they are supervising their workers and coordinating with other contractors and district/ CM. Failure to provide will be default of your contract and subject costs related to and termination.

M. All prime contractors are the provide a project manpower structure showing names and telephone numbers of each responsible person on the project. This shall be updated as needed if personal changes are made.

N. All site equipment and dumpsters are to be behind temporary chain link fence when stored on site and or within the construction work zone where temporary chain link fence has been providing and installed by the prime. Each prime contractor is

responsible to provide and install temporary chain link fence around their own stored equipment and dumpsters on site.

O. No equipment, panels or any services shall be turned off for any reason without written request and approval by the district. Project form shall be used for all shutdowns and required a 3-day notice. Other shutdowns may require more time.

P. **CONTRACT MC-01 – MECHANICAL WORK (MC)** — MECHANICAL PRIME CONTRACT AT, NANUET SENIOR HIGH SCHOOL, MILLER ELEMENTARY SCHOOL, & BARR MIDDLE SCHOOL, FOR (BUT NOT LIMITED TOO), MECHANICAL PIPING, DUCTING, CONTROLS,HYDRONIC PIPING, ANY WORK RELATED TO ROOFING SHALL BE COORDINATED WITH ROOFING CONTRACT INSTALLATION. ALL INTERIOR WORK SHALL BE COORDINATED WITH GENERAL CONTRACTS. SEE MILESTONE & PHASING SCHEDULED FOR MORE DETAILS.

Q. All roof top and under roof steel support/dunnage is by MC-01. BE-01 will flash all steel penetrations. Review S drawings for scope.

R. All abatement of piping & flooring in relation to mechanical scope is by MC-01. MC-01 shall be responsible for abatement of VAT under all unit ventilators. See ASB drawings for scope.

S. MC-01 is responsible for all casework removals, modifications, & installs of casework associated with all unit ventilator replacements. See "A" drawings for scope.

T. MC-01 is responsible for all ceiling removal and replacement associated with HVAC work. See "A" drawings for scope. ALL CEILINGS SCHEDULED TO BE NEW, ARE REMOVED AND INSTALLED BY GC.

U. MC is to provide temporary panels as required for abatement work. All connections of temporary panels is by MC's electrician. The district is not responsible for providing temporary power or connecting temporary power/panels.

V. MC-01 shall provide any chases required for HVAC risers through stories of the buildings. All slab penetrations are to be fire-stopped. All chase's to have eased edges.

W. All HVAC louvers/vents are supplied by MC-01. Coordinate opening with other primes.

X. HVAC control wiring is provided and installed by MC-01. Power wiring by EC-01. Low voltage controls are by MC-01.

Y. Housekeeping pads for new HVAC equipment are by MC-01.

Z. MC-01 is responsible for making their own through wall or through floor piping penetrations and is responsible for associated patching and firestopping as required.

AA. Access doors for piping, dampers, or any HVAC access is provided by MC-01 and installed by GC-01. MC is to coordinate at time of bid all locations required for access panels and shall include these costs in their prespective bid.

BB. To allow sufficient time for install, MC-01 is to provide BE-01 with any roof top curbs or rails for mechanical equipment and a coordinated sketch showing exact locations with distance

from column line. If information and material is not provided in a timely manor, MC will then be responsible for all flashings of rooftop equipment or additional costs incurred for roofer to remobilize.

CC. All duct detectors are furnished by EC and installed by MC.

DD. All fire and or fire/smoke dampers are installed by MC.

EE. ALL CONTROL WIRING IS BY MC

FF. MC shall provide coordinated shop drawings for approval for all piping, ducting, and other HVAC equipment.

GG. The second-floor HS wing HVAC scope shall be expedited for summer 2024. MC will coordinate the schedule with GC. Please request from CM all GC scope for this space as it has been awarded in a previous phase to commence summer 2024. See Div 00 schedule for details on the expedited scope.

HH. MC shall work with the district's commissioning agent to commission all new equipment. Cx shall employ the use of online software for the purpose of managing and tracking Cx progress. MC shall be required to fill out online pre functional checklists, test reports, and startup reports, and submit to Cx for approval.

A. Project Site Superintendent: MC shall provide one (1) full time Project Site Superintendent while any work related to this Contract is being performed on site. Superintendent may be a working Foreman as lon g as the daily requirements of this Contract are maintained, as they relate to the Construction Documents and the Project Schedule. Construction Manager reserves the right, in their opinion, to revoke this privilege if these requirements are not maintained. Superintendent shall work closely with the Construction Manager, and the other Prime Contract Superintendents and Foremen, in a manner that best promotes the Project Master Schedules and the objectives of the Project.

1. Superintendent shall be on site while Prime Contractor's own forces, and/or their sub-contractors forces, are on site; also while other Prime Contracts are installing work, or require coordination of work, related to this Contract, and/or as requested by the Construction Manager.
2. Superintendent shall be the same individual throughout the Project.
3. Project Site Superintendent shall be an individual with minimum of five (5) years' experience in this field of work.
4. Refer to Section 013100 "Project Management and Coordination" for further requirements.

B. Project Foreman: MC shall provide at least one (1) full time Project Foreman during each shift of work at each school; Foreman shall be able to make binding decisions, as they relate to the daily activities of their crew, as related to achieving the goals of the Project.

C. Site Communications: MC shall provide Project Superintendent with a mobile phone, all costs and service charges paid for by MC; provide Construction Manager with contact number(s).

D. Project Site Field Office: Provide site office facilities for this Contract's Project Superintendent. Site Office shall be equipped with telephone w/answering machine, fax, and e-mail. Contact information shall be provided to the Construction Manager.

1. The Owner reserves the right to seek reimbursement for temporary facilities not provided by this Prime Contract.

E. Scope of Work: Work of the MC includes but is not limited to, the following:

1. Coordination with other Prime Contracts, Owner and Construction Manager as required to adhere to and maintain approved Project Master Schedules. Prior to first payment, this includes submitting the Contractor's Construction Schedule to the Construction Manager for preparation of the Project Master Schedule.
2. All Mechanical demolition and new construction as indicated in the Contract Documents.
3. Mechanical scope is identified in the Contract Documents which include but is not limited to ALL drawings, specifications, this multiple contract summary, etc. This contract includes furnishing and installing access doors for walls and ceiling as required, which may include fire rated conditions., Prior to the submission of shop drawings for mechanical curbs, survey all existing curbs for accurate measurements. Determination of new curb height shall be made in coordination with Contract Documentation..
4. Prior to removal, survey condition of all existing roof top mechanical equipment scheduled to be removed and reinstalled and submit a report of the condition of each piece of existing equipment. Report shall include photographs and a location plan, and be submitted to the Architect and Construction Manager.
5. Removal, safe storage off roof (or outside of work area, as coordinated with BE Contractor), and reinstallation of all existing mechanical roof top equipment as indicated in the Contract Documents. Demolish existing curbs (following asbestos abatement by others) and provide and install new equipment curbs.
6. Reinstallation mechanical scope includes all miscellaneous piping, ductwork extension, low voltage wiring, equipment, hardware and insulation required for a complete and functional reinstallation of existing rooftop equipment. Coordinate any new roof penetrations, if required, with BE Contractor.

7. Reinstallation mechanical scope includes start-up, testing & balancing and recommissioning services for reinstalled mechanical equipment. Submit testing & balancing and commissioning reports to Architect and Construction Manager.
8. Prime Contract shall understand that renovation work may require work to proceed while existing systems are required to be maintained; all cost associated with this sequence shall be anticipated, and incorporated into the Bid.
    a. MC shall be cognizant of phasing and sequencing conditions, that may require MC to make temporary connections or installations of heating system components, in order to maintain operation of existing/new system configuration(s). It shall be the Prime Contract's responsibility to employ its own means and methods of accomplishing any such temporary conditions, at no additional cost to the owner.
    b. All new heating system components must be protected, from potential contamination, by any existing components that are still employed during system operation, should a partial existing/new configuration exist during the required heating period, September 15th – May 31st.
9. Prime Contractor shall read and familiarized themselves with the Lead Sections of the Construction Documents. Lead-based paint has been identified to exist on specific areas/surfaces of the work located within the building(s), and when encountered the Prime Contractor shall follow all applicable regulations while working with this material.
10. Prime Contractor shall read and familiarized themselves with the Asbestos Sections of the Construction Documents. Asbestos Containing Material is scheduled to be abated throughout specific areas of the building(s). Should ACM be encountered (after Abatement is completed), that may interfere with an installation; Prime Contractor shall cease work, and notify Construction Manager immediately.
    a. Penetrations not coordinated with the Prime Contractor responsible for asbestos abatement, prior to abatement of these spaces, shall become the responsibility of the respective Prime Contract requiring the penetration.
    b. Contractor is required to review their work in the field prior to starting and advise if ACM is suspect on the work they intend to alter in anyway. There is no delay claim for lack of inspection of work.
11. Environmental Protection: Provide protection, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
    a. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms on or near the Project site.
12. The HVAC drawings are schematic in nature, and the MC will make adequate provisions to accommodate the actual field conditions without additional cost to the Owner.
13. Document on the Record Drawings all ductwork openings and penetrations larger than 2 inches in diameter.

14. Provide all demolition of Mechanical Systems indicated in the Construction Documents, and/or required for Work of this Prime Contract.
    a. Coordinate all demolition with Hazardous Materials documents.
    b. Coordinate with all other Prime Contracts regarding all removals required for the Project.
    c. Demolition of a system shall mean any and all components, removed in their entirety, to the point of origin or source.
15. Provide valves, whether permanent or temporary, to permit shutoff and/or capping of systems to achieve the Work of this Prime Contract.
16. Each Prime Contract shall be responsible for all respective SOG/SOD removals, and related infill thereof (doweled with #4 bar 16"o.c. unless otherwise detailed), that are not indicated on the Architectural Demolition plans.
    a. All concrete/masonry demolition shall be completed using wet saw methods.
17. MC Contractor shall provide all Work associated with creating structural openings or penetrations requiring lintels, for their own work (i.e. ductwork and pipe or conduit penetrations). This applies to all openings/penetrations greater than 5-inches through masonry or concrete walls.
    a. MC shall provide lintels and shop drawings for such openings for review by Design Team. MC shall indicate all required openings/penetrations requiring lintels on their Shop Drawings. Mechanical contractor is required to provide openings/penetrations on the coordination drawings that will require structural openings in accordance with the contract documents at no additional cost. Non-structural openings/penetrations, including those for convenience, shall be self-provided by the respective Prime Contractor.
    b. This assignment applies to new and existing construction areas.
    c. Refer to Structural documents for lintel type/size requirements and Architectural drawings for wall types. Walls not specifically identified in the documents are to be assumed as masonry construction.
    d. All openings/penetrations are to be identified on Record Drawings by the Prime Contract requiring the opening.
    e. All scheduled exterior wall louver openings indicated on Architectural and/or Structural documents are to be created by this MC Contractor. MC shall supply and install louver.
    f. Exact physical locations shall be laid-out by MC for coordinated sequencing with other respective Prime Contractors.
18. Provide cut and patch work related to that of this Prime Contract,, related to that of their Prime Contract, and at those areas specifically identified on the Construction Documents, regardless of trade creating the area to be patched.
    a. Each Prime Contract is responsible for all other respective Cutting & Patching required of their installations. Refer to Section 017329 "Cutting and Patching" for further information.

b. Provide cut and patch for all affected materials at building interiors as required to provide access for relocation of existing or installation of new roof drains and rood drain leaders, to point of connection to existing piping or to building exterior, as indicated in Contract Documents.

19. Provide new HVAC system(s), or modifications of existing system(s) as indicated in the Construction Documents, complete and fully operational.
    a. Furnish all disconnects and motor starters (including related "heaters, fuses, and phase protection relays") for all equipment provided under this contract, for coordinated installation by EC.
    b. Provide Instrumentation and Controls (Energy Management System) complete as indicated on the drawings or specifications:
        1) Electrical Contractor shall provide line voltage power wiring to the control panels as indicated in the Contract Documents.
        2) EMS installer shall provide all low voltage wiring of controls, transformers, actuated dampers, motors, etc., as required for a complete operational system.
    c. Provide thermal insulation of all HVAC components provided by this Prime Contract.
20. Final connections of utilities are by MC, EC or PC, unless noted or assigned otherwise.
21. Provide sleeves required for piping penetrating walls, slabs and/or decks.
22. Provide through-penetration fire stop systems at all penetrations made by MC. MC Contractor shall maintain listed ratings of indicated assemblies. Provide repair of existing through-penetration fire stopping damaged by work of this Prime Contract.
    a. Sleeves with fire stopping are to be installed in sequence with fire-rated construction. This Prime Contract shall be responsible for installing fire stopping material at intersection of sleeve and constructed materials.
23. Provide coordination with, and notification to, the Construction Manager for all specified testing, training, commissioning, etc., of the Work of this Prime Contract. Refer to Division 00 Section "Project Forms" for applicable documentation documents.
24. Substantial Completion: Clean all mechanical and plumbing installations and provided equipment at the time of Substantial Completion or as directed by Construction Manager.
25. Coordinate all the preceding requirements, accordingly, with all applicable Alternates indicated in Section 012300 "Alternates".

F. Applicable Specification Sections: All specification Sections itemized below are to be provided complete by this Prime Contract, unless noted otherwise. In addition to these specifications, the contractor is required to review all specifications included in the overall contract that may contain related scope or detail for this specific contract.

i) All Division 00 and 01 – Procurement and Contracting Requirements & General Requirements
ii) Division 03 – Concrete
iii) Division 04 – Masonry
iv) Division 05 – Structural Steel
v) Division 06 – Woods & Plastics
vi) Division 07 – Thermal & Moisture Protection
vii) Division 08 – Openings
viii) Division 09 – Finishes
ix) Division 23 – Heating, Ventilating, and Air Conditioning

G. Applicable Drawings : All drawings itemized below are to be provided complete by this Prime Contract, unless noted otherwise. In addition to these drawings, the contractor is required to review all drawings included in the overall contract that may contain related scope or detail for this specific contract.

a. All "G" drawings – All Schools
b. All "M" Drawings – All schools

2. Nanuet High School
   a. HS-S001, S101, HS-S102, HS-S103, HS-S104, HS-S501,
   b. HS-AD100 (Ceiling), HS-AD101 (Ceiling), HS-AD102 (Ceiling), HS-AD110 (Ceiling), HS-AD111 (Ceiling), HS-AD111.1 (Ceiling), HS-AD112 (Ceiling), HS-AD411(Ceiling). **NOTE scope on these sheets shall be ceiling removals related to the new HVAC scope only.**
   c. HS-A100 (Ceiling), HS-A111 (Ceiling), HS-A111.1 (Ceiling), HS-A112 (Ceiling), HS-A201, HS-A401, HS-A402, HS-A403, **NOTE: Existing ceilings temporarily removed are to be reinstalled by MC. Any new ceiling is by GC**
   d. HS-ASB-1
3. Barr Middle School:
   a. BM-AD101, (Ceiling), BM-AD102 (ceiling), **NOTE scope on these sheets shall be ceiling removals & Reinstalls related to the new HVAC scope only. Any new ceiling is by GC**

Miller Elementary School:

b. ME-ASB-1

END OF SECTION 01 12 03

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SECTION 01 12 04 – CONTRACT SUMMARY – EC-01

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes a summary of each Prime Contract, including responsibilities for coordination and temporary facilities and controls. One set of Construction Documents is issued covering the Work of multiple Prime Contracts. Each Prime Contract is responsible to review all drawings and specifications for specific requirements indicated, and for a general understanding and knowledge of the work of other Prime Contracts. All Prime Contracts are responsible for all Work of their Contract no matter what drawing on which the Work appears. All Prime Contracts are responsible to coordinate their work related to the complete set of drawings and specifications, not limited to each prime contractor scope. **All Bidders should acknowledge that for each contract listed below, each contractor is their own General Contractor and subject to all General Contractor requirements.**

B.

1. **Electrical Contract EC-01:** The Electrical Contractor shall be selected based on the bid procedure as described in the Bid Documents. Contract Bidders are responsible for (a) trade work coordination, (b) the scope contained in drawings listed below and (c) any and all additional scope specifically identified to be performed by the Electrical Contractor in other Bid Packages in the Contract.
    1) Work related to drawings: (*In addition to these drawings, the contractor is required to review all specifications included in the overall contract that may contain related scope or detail for this specific contract.)*
        a) Nanuet Senior High School
            - HVAC & Hydronic Upgrades
            - Electrical Panel Replacements
            - Admin Wing Renovations
            - Kitchen Fume Hood Replacement

b) Barr Middle School
- Toilet Room Renovations
- Fire Alarm Upgrades

c) Miller Elementary School
- Security Vestibule Projects
- HVAC Upgrades
- Fire Alarm & Electrical Upgrades

a. Bid Package Contract No. 03 - Electrical Work: All work related to Electrical Contractor which includes but is not limited to the following items: (Refer to the Contract Documents for full scope of work.)

1) Provide access panels, fire rating/firestopping, electrical work, line voltage to controllers, Transformers, Switchgear equipment, feeders for Air condition, provide all temporary power for all trades, power to all MEP equipment, lighting fixture (new, remove and replace) all patching and painting related to the installation of this scope, , all city filings and permits for any reason and as required.

2) **This EC-01 contract requires the awarded entity to self-perform the largest scope of work shown in the contract documents. There are no provisions within this contract to solely subcontractor ALL trade scope required to complete the project and its design intent. All other work in this contract is allowed to be subcontracted other than as stated herein. It is further required to clearly present what scope your own forces will be doing with your bid submission. Failure to present this at time of bid will be subject to disqualification.**

1.3 Related Sections include, but are not limited to, the following:

A. Division 01 Section "Work Restrictions" for use of the Project site and for requirements for continued Owner occupancy of premises.

B. Division 01 Section "Project Management and Coordination" for general coordination requirements.

C. Division 01 Section "Project Forms" for documents required for Testing and Coordination.

D. Division 01 Section "Temporary Facilities and Controls" for specific requirements for temporary facilities and controls

1.4 DEFINITIONS

A. Building Site: The Building Site shall be defined in the Construction Documents, as the building footprint, and all related construction within a five-foot (5'0") distance of the building's exterior face, unless noted or assigned otherwise. Coordinate with specific exceptions to the 5'0" limit indicated within each Scope of Work outline.

B. Permanent Enclosure: As determined by the Architect: permanent or temporary roofing is complete, insulated, and weathertight; and all openings are closed with permanent construction or substantial temporary closures. All cost associated with failure to maintain described installations that result in any damage or contamination to the Owner's property, shall be borne by the Prime Contract responsible for the installation.

1.5 MANAGEMENT AND COORDINATION

A. The Owner shall provide a Construction Manager.

1. The Construction Manager shall provide a full time construction site representative recognized as the Construction Manager.

1.6 CONSTRUCTION MANAGER

A. The construction manager shall provide on-site administration of the Contracts for Construction in cooperation with the Architect as set in AIA Document A232 ™ – 2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, as modified.

B. The Construction Manager shall provide administrative, management and related services to coordinate scheduled activities and responsibilities of the Multiple Prime Contractors with each other and with those of the Construction Manager, the Owner and the Architect. The Construction Manager shall coordinate the activities of the Multiple Prime Contractors in accordance with the latest approved Project Schedule and the Contract Documents.

C. Utilizing the construction schedules provided by the Prime Contractors, the Construction Manager shall update the Project schedule, incorporating the activities of the Owner, Architect, and Multiple Prime Contractors on the Projects, including activity sequences and durations, allocation of labor and materials, processing of Shop Drawings, Product Data

and Samples, and delivery and procurement of products, including those that must be ordered will in advance of construction. The Project schedule shall include the Owner's occupancy requirements showing portions of the Project having occupancy priority.

D. Utilizing information from the Prime Contractors, the Construction Manager shall schedule and coordinate the sequence of construction and assignment of space in areas where the Prime Contractors are performing Work, in accordance with the Contract Documents and the latest approved Project Schedule.

1.7 GENERAL REQUIREMENTS OF PRIME CONTRACTS

A. Prime Contracts: The context used in this Section are separate Prime Contracts that represent significant elements of work that is to be performed concurrently and in close coordination with the work of other Prime Contracts for the benefits of the Owner. Each Prime Contract is recognized to be a major part of the Work.

B. Assignment of Work: Should a conflict be indicated, Section 011200 shall take precedence over all scope of work assignments that may be indicated elsewhere within the Construction Documents.

C. Seismic Requirements: Prime Contracts are to be aware that the building(s) is located within a Seismic Zone indicated in the documents and shall provide installations in compliance with all related code requirements.

D. Layout and Installation: Each Prime Contractor shall schedule, layout and install their Work in such manner as not to delay or interfere with, but to compliment the execution of the work of other Prime Contracts, utility companies and Owner's operations.

E. Extent of Contract: The Contract Documents, drawings and specifications each contain more specific descriptions of the Work facilitating which Prime Contract includes specific elements of the Project.

1. Work provided by each Prime Contract shall mean complete and operable systems and assemblies, including products, components, accessories and installations required by the Construction Documents or indicated otherwise.
2. Prime Contractors shall exercise good judgment and perform all work according to related industry standards.
3. The Owner is exempt from payment of Federal, State and local taxes, including sales and compensating use taxes on all materials and supplies incorporated in completing the Work; these taxes are not to be included in the Bid. This exemption does not apply to tools, machinery, equipment or other property leased by, or to, the Contractor or

sub-contractor, or to supplies and materials, which even though consumed are not incorporated into the completed work. Prime Contractors, and
their sub-contractors, shall be responsible for paying any and all applicable taxes on said tools, machinery, equipment or property, and upon all said unincorporated supplies and materials, whether purchased or leased.

4. Prime Contracts shall understand that time is of the essence, and will adequately staff the Project by employing the appropriate trade's people to perform the Work; these people shall be experienced in their respective trades. A shortage of labor in the industry shall not be accepted as an excuse for not properly staffing the Project; all efforts shall be made to meet or exceed the schedule, including additional staff and/or labor hours necessary. All cost associated with this item shall be included within the Bid.
5. Local custom and trade union jurisdictional settlements will not control the scope of the Work of each Prime Contract.
    a. When a potential jurisdictional dispute or similar interruption of Work is first identified, or threatened, the affected Prime Contracts shall promptly negotiate a reasonable settlement to avoid or minimize the pending interruption and delays.
    b. Contractor's trade-related issues shall not be grounds for modification or extension of scheduled completion date(s).
6. The Work of all Prime Contracts requires close coordination with other Prime Contracts and construction personnel. Maintain flexibility and cooperation through the Project. "Out of Sequence" and "Delay" claims will only be considered when requirements of Division 01 "Administrative Requirements" have been adhered to. Delay claims must be in writing and forwarded to the Architect, per the requirements of the General Conditions of the Contract. Claims not submitted per these requirements will be rejected and/or denied.
7. The intention of the Work is to follow a logical sequence, however, a Prime Contractor may be required by the Architect or Construction Manager, to temporarily install, omit or leave out a section(s) of Work, out of sequence. All such out of sequence work, and come back time, at these areas shall be performed at no additional cost to the Owner.

F. Substitutions: Per Division 01 Section "Substitution Procedures", each Prime Contractor shall cooperate with the other Prime Contractors involved, to coordinate approved substitutions with remainder of the Work. Contractors shall submit all "Substitutions" at least ten (10) days prior to the date for receipt of Bids as specified in the Instructions to Bidders 002113 Section 3.3 Equivalents or bid will be considered per "basis of design".

G. Construction Schedules: Refer to Divisions 01 Section "Construction Progress Documentation", "Preliminary Schedule" and "Project Management and Coordination" for requirements related to meetings and schedules.

H. Construction Sequencing and Phasing: Prime Contractor shall understand that Sequencing and/or Phasing Plans are contingent upon the work areas being complete/occupied, prior to the next area of Work beginning. Should an area of construction not be complete per the Project Preliminary Schedule, the Project Master Construction Schedule/Sequencing Plans will be adjusted accordingly. The Owner will not be responsible for delay claims due to adjustments being no fault of their own.

1. Prime Contracts may be required to re-sequence the phasing of the project as a result of changes to the schedule. Prime Contracts shall provide these adjustments at no additional cost to the Owner.

I. Testing and Inspections by Owner: The Owner shall employ an independent qualified testing and inspection agency for monitoring on-site soils analysis (excluding top soil analysis), soils compaction, cast-in-place concrete, asbestos and lead abatement monitoring and Special Inspections indicated in the Construction Documents (refer to Division 01 "Quality Requirements" and/or Statement of Special Inspections" for additional specific information)

1. Prime Contractor shall give one week notice as to commencement for these requirements. Once underway, Prime Contractor shall coordinate with the Construction Manager and give 48 hours' notice as to test(s) required, by Owner's Agency, and further verify the need 24 hours in advance. Full cooperation and coordination is expected of all Contractors and their personnel with the Owner's Testing Agency in fulfilling test requirements; provide all data and materials requested for required reports.
2. Other than with regard to compliance with state and federal laws, the testing agency holds no execution authority other than to provide test results. Should testing indicate a discrepancy or non-compliance during execution of the Work, the Testing and Inspection Agent shall promptly notify the Construction Manager and Project Superintendent of such; however, the Prime Contract shall bear full responsibility for making any decision with regard to proceeding with, or stopping, the Work.
3. This assignment of Testing and Inspection responsibilities shall take precedence over any respective responsibilities that are indicated otherwise in the Construction Documents.

J. Testing by Others: All testing requirements not listed in preceding "Testing & Inspections by Owner" or otherwise identified in Division 01 "Quality Requirements" and/or "Statement

of Special Inspections" shall be the responsibility of the Prime Contract providing the respective Work as indicated in the Construction Documents.

1. The respective Prime Contract shall have performed testing requirements indicated in individual Specification Sections which may inadvertently indicate "Owner to provide," which are not identified in preceding paragraph "Testing & Inspections by Owner".
2. Prime Contractor shall submit their Testing Agency qualifications to the Architect for approval prior to any test being performed. Construction Manager shall be given 48 hours' notice of any test/inspections to be performed by Prime Contractor's Testing Agency. 24- hour notification shall be given to the Construction Manager for test/inspections requiring his/her presence; 72-hour notification shall be given to the Architect for test/inspections requiring his/her presence.
3. Determinations required of the Architect shall be anticipated by the Prime Contractor to allow ample time for inspection, investigation and reporting.
4. Prime Contractor shall secure a UFPO clearance prior to start of any UG installation work; coordinate with and advise Construction Manager.

K. Existing Conditions: Each Prime Contract shall verify existing conditions in the field prior to work commencing in that area and immediately report conditions to the Architect that are not represented correctly by the Construction Documents.

1. Each Prime Contract is responsible for familiarizing himself with Project Site Logistics and provide a "site logistics plan locating storage area, scaffolds, rubbish areas, stock piles and egress related to all work, included phased construction within 30 days of award.
2. Each Prime Contract has been given ample opportunity to review Existing Conditions related to the Project. Existing Conditions not noted in the Construction Documents that could be easily recognized during pre-bid review that interfere with the respective Prime Contract's work, shall be the responsibility of the respective Prime Contract. This includes all costs associated with removal, patching, relocation or re-fabrication of installations.

L. Hazardous Materials: Each Prime Contract shall familiarize themselves with the Hazardous Materials Sections/Drawings of the Construction Documents and follow DOL/OSHA/EPA/SED regulations while performing their respective Work in these areas. Discovery of non-identified or concealed hazardous materials shall be reported to the Construction Manager immediately and followed up with written documentation of the event.

M. Protection of Installations: Each Prime Contract is responsible for protecting their installations at all times. All costs incurred to repair, replace or clean insufficiently protected materials/installations shall be the responsibility of the installing Prime Contract.

1. Architect shall be notified, in writing, immediately upon material/installation being damaged; notification shall indicate responsible party.
2. Owner will not be liable for damaged materials and/or installations by "others", when "others" cannot be identified.
3. Repair damaged work, clean exposed surfaces or replace construction installations that cannot be repaired.
4. Each Prime Contract shall be responsible for removing all labels not required to remain from their installations.
5. Installations shall be wiped clean and proper protection then installed.
6. Each Prime Contract is responsible to protect another primes work in the event that prime has to work over or on top of that other primes work being complete. The prime working over the completed work takes full responsibility of that other primes completed work both in condition and operation.

N. Daily Cleaning: All Prime Contracts are responsible for any and all debris caused by their Work, including the Work of their subcontractors. A daily clean up and disposal is required by each Prime Contract for the periods which that Prime Contract, or its subcontractors, are performing Work on site.

1. Assign at least one person for a daily clean and sweep of the work area(s). Prime Contractor shall allot sufficient manpower and time for this to be completed by the end of each shift. Submit name of this person(s) to Construction Manager.
    a. Construction Manager shall have the authority to give direction to person(s) on the Project Site identified by the Prime Contract as designated for cleanup tasks. This shall include the safety review/securing of the site-work zone after each shift.
    b. This person has check that no construction debris was dumped in any district dumpers during this end of shift site review, if found the contractor must remove immediately the next morning to avoid back charges costs of $1500 per day not removed.
2. Any Prime Contract not providing personnel for Daily Cleaning will be Back Charged for labor provided by the Owner to complete this task.
3. Contractor working solely in an area shall be responsible for clean/sweep of that area.
4. Daily cleaning will not mean any one Prime Contract is responsible for assisting another Prime Contract with removing major quantities of debris created by a particular Prime Contract's Work.

5. Daily cleaning will be mandated to remove from the building any debris created by day-to-day activities. All Prime shall assist in sweeping shared work areas and shared corridors while working on site. Each Prime shall assist in mopping of shared corridors while working on site or as required by the Owner.
6. All prime contractors and subcontractors are required to provide sweeping compound for daily cleaning in their respective exterior and interior work areas. Each Prime Contract shall provide a sufficient number of brooms or other necessary tools, for use by their personnel to adequately fulfill their obligations.
7. All prime contractors shall provide and maintain garbage cans/refuse containers with liners for each construction area of their respective contracts as directed by the Construction Manager and shall be responsible for disposing of these materials to a dumpster.
8. All prime contractors provide the necessary equipment/containers (lull/skip-box) to move daily clean/sweep debris from the building to a dumpster on a daily basis, for each construction area of their respective contracts. Skip-box shall be emptied to a dumpster by 9:00 a.m. the following day.
9. Cleaning shall be deemed a Safety & Health issue, with Prime Contracts being held accountable for fulfilling their contractual obligations.

O. Final Cleaning: At Substantial Completion of each area of construction, each Prime Contract shall wipe/vacuum clean all of their respective installations; All interior contracts performing work inside the buildings shall mop clean all building surrounding areas and finish flooring and remove all marks/blemishes to the finish, for each construction area of their respective contracts. Each area of construction shall be wiped clean of all construction dust and debris prior to turnover to the Owner.

P. Cutting and Patching: All Primes are responsible for cutting and patching required to complete their Work. All repair of existing finish Work (including finish floors) shall be performed by contract requiring work, meeting or exceeding minimum contract requirements for that particular section, specification, or type of work. All concealed openings (piping, ductwork, conduit, etc.) must be repaired to comply with specified wall or deck conditions as well as required fire and sound ratings. All corridor penetrations require fire safing. If contractor elects to install their new work in an existing unrated wall or floor opening, whereas the wall/floor is a fire rated condition, that contractor is responsible to fire rate that opening to match the wall/floor fire rating with new and all other existing wire, piping, ducts etc. Other areas are noted in drawings and specifications.

1.8 Project Schedule. The nature of this project is to complete all the work listed as Elevator Addition in the schedule by **the Project Closeout Dates specific to each Prime Contract**

as listed below. Each Prime Contractor shall include in their bid proper allowances for foul weather.

B. Bids Received: 4/3/2024

C. Notice to Proceed: 4/16/2024

D. Submittals: The following items are to be submitted within 60 business days after Notice to Proceed:

1. Submittal List and Submission Schedule– **15 days after NTP**
2. Field Investigations
3. Shop Drawings
4. Long Lead Items– **30 days after NTP**
5. Schedule of Values and Key Submittal List – **15 days after NTP**

D. Mobilization: 6/26/2024

G. Substantial Completion and Project Closeout:

1. **Electrical Contract 01**
    a. Substantial Completion: See Milestone Schedule
    b. Project Closeout: See Milestone Schedule

1.9 TEMPORARY FACILITIES AND CONTROLS OF PRIME CONTRACTS

A. Conditions of Use: Keep temporary services or conditions clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary facilities as required as work progresses; do not overload facilities or permit them to interfere with progress. Take necessary fire prevention measures; do not allow hazardous, dangerous, or unsanitary conditions to develop or persist on the Project site.

1. Installation, operation, maintenance, and removal of each temporary service or condition are considered part of the respective Prime Contract's own construction activity, as are costs and use charges associated with each facility.
2. Locate service or condition where they will serve the Project adequately and with minimum interference of the Work, coordinate with the Construction Manager and the other Prime Contracts prior to installation.

B. Temporary Use of Permanent Facilities: Prime Contract, as installer of each permanent service or condition, shall assume responsibility for its operation, maintenance and protection during use as a construction facility prior to the Owner's acceptance, regardless of previously assigned temporary facilities and controls responsibility.

C. Owner's Facilities: Contractors are not allowed to use the Owner's facilities (toilets, telephones, food service, etc.) for their own benefit or convenience. Prime Contract Superintendents shall enforce this policy with their respective work forces.

1. Construction personnel parking will be restricted to area as directed and agreed to by the Owner, and to facilitate the completion of the work. Owner reserves the right to remove from their property, unauthorized vehicles occupying unauthorized areas, at respective vehicle owner's expense.

D. Storage on the Project Site: Each Prime Contract shall provide sufficient secure weathertight storage facilities for their materials and equipment. These storage containers are required to be located on the "site logistics plan." The Owner's facilities and the Project's building areas shall <u>not</u> be used for storage unless agreed upon, in writing, with the Owner via the Construction Manager.

1. Until permanently incorporated into the Work, all materials on the Project site are considered to be the Prime Contract's responsibility for security and protection.
2. Prime contractor is required to check on their onsite stored material periodically to ensure that all material continues to be located in the stored location and that it remains protected from all damage, theft, and endangerment to others and ready to be used on notice for coordination with other contractors. Failure to arrange for materials to be on site to complete coordinated work with other Prime Contractors will result in back charges for delays resulting therefrom.
3. Temporary long-term storage facilities are not available to Prime Contracts by the Owner.
4. Prime Contractors and their subcontractors, shall coordinate deliveries with the Construction Manager to ensure that disruptions and Owner inconvenience are avoided.

E. Tools and Equipment: Each Prime Contractor shall provide all tools and equipment necessary for its own activities; this includes secure lock-up and storage for all items on the Project Site.

1. Provide all construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities; this shall include any additional supplementary power, ventilation, lighting requirements and weather protection.

F. Project Site Communication: Each Prime Contractor shall provide their Project a full time on site at all times Superintendent with a mobile phone for the duration of the Project, as indicated in their Scope of Work. Construction Manager shall be furnished with contact numbers associated with each phone.

G. Safety: Prime Contracts, not the Architect or Construction Manager, are responsible for Project Site Safety, as related to their operations (refer to Section 013150 "Special Procedures" for further requirements).

1. Each Prime Contract shall correct safety hazards and violations immediately. If safety issues are not immediately rectified, the Owner shall secure outside sources to correct the deficiency and back charge the responsible Prime Contract.
2. Maintain unobstructed access/egress to fire extinguishers, fire hydrants, stairways, corridors, ladders and other safety routes/devices.

H. Fire Extinguishers: All Prime Contracts provide and maintain "general use" fire extinguishers for each construction area of their respective contracts; comply with applicable codes for quantities required. Use of the Owner's fire extinguishers to meet this requirement is not permitted. Comply with NFPA for recommended classes for exposure; extinguishers shall be inspected and appropriately tagged prior to being brought on site. Provide stands, painted bright orange, sturdy enough to carry the extinguisher, and built as not to create a tipping hazard.

1. Each Prime Contract shall supplement this requirement by providing additional fire extinguishers specifically related to their work activity (e.g., welding, soldering, abrasive cutting, etc.).
2. Each Prime Contract shall provide and maintain proper fire extinguishers at/in their respective on site office and storage facilities.
3. Store combustible materials in approved containers in fire-safe locations.

I. Welding: Any Prime Contract performing welding, cutting or other activities with open flames or producing sparks shall at a minimum:

1. Coordinate interruption/shutdown of detection system(s) to avoid creating false alarms.
2. Protect the area and surrounding areas from fire and damage.
3. Maintain fire extinguishers, compatible with activity, at the location of the activity.
4. Provide a continuous Fire Watch during the activity and one-half hour beyond the completion of the activity.
5. Provide all necessary fans and ventilation required for the activity.
6. Any welding, burning and or use of flame the contractor is required to provide all required "hot work permit" to use such equipment prior to start of work. Its

mandatory that no "hot work" shall start without these permits issued to the CM and Owner. Failure to this requirement will result to the removal of the project super of that company from all district projects.

J. Temporary Power: Each Prime Contractor shall provide for their own temporary power needs for any scheduled electrical utility shut downs.

K. Each Prime Contractor shall provide for their own temporary generators, power cords and temporary lighting as needed during these periods to continue to perform their work and maintain adherence to the Preliminary Schedule and approved Project Master Schedules. All temporary power equipment shall comply with all applicable codes and regulations.

N. Waste Disposal Facilities:

1. General debris/refuse/construction waste containers (dumpsters) shall be provided by each prime contractor and secured as specified herein this contract.
2. It shall be the responsibility/requirement of each Prime Contract to bring their waste to the dumpsters, including but not limited to all equipment, demolition debris, discarded materials with further identification including the following; construction and demolition debris refers to discarded materials generally considered non-hazardous in nature, including but not limited to steel, glass, brick, concrete, asphalt material, pipe, gypsum wallboard, and lumber, from the construction or destruction of a structure as part of a construction or demolition project or from the renovation of a structure, including such debris from construction of structures at a site remote from the construction or demolition project site.
3. It shall be the responsibility and requirement of each Prime Contract to recycle metals generated by its Work, and the Work of its subcontracts.
4. Joint-effort recycling by all Prime Contracts is encouraged.

O. Temporary Sanitary Facilities: Provide temporary self-contained toilets units for duration of the project.

1. Temporary Sanitary Facilities:
   a. Each prime contractor is required to provide their own Temporary Sanitary Facilities and secured behind fencing and/or locked after work hours and weekends.
2. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.
3. Provide separate facilities (minimum of one ea.) for male and female personnel in proportion required by OSHA.
4. Shield toilets to ensure privacy.
5. Coordinate mobilization and demobilization of units with Construction Manager.

6. Toilets shall be cleaned at least once per week, with additional facilities or cleanings provided if requested by Construction Manager.
7. Provide and maintain adequate supply of toilet tissue and hand sanitizer for each facility.

1.10 WORK HOURS & SEQUENCE

A. EC-01 Contract is permitted to work during the school day on non-disruptive work. Sawcutting, jackhammering, power shutdowns, or work that may affect emergency egress must be performed second shift or weekends. The contractor is responsible to factor this into their bids.

B. Unless otherwise approved by the Construction Manager, During the school days, Work is to be performed in this contract during the hours of 3:30pm to 10:00pm on weekdays, and Saturdays and Sundays from 7:00am to 3:30pm. During School breaks, work is to be performed from 7:00am to 10:00pm. There is no additional cost to the owner for working the hours of 3:30pm through 10:00pm, or weekend work during the school year. Any work done during these times MUST BE COMPLETED, CLEANED, AND TESTED AS NECESSARY FOR STUDENT OCCUPANCY BEFORE THE START OF THE NEXT SCHOOL DAY. Contractors are required to schedule work during school breaks, school days off, and school holidays.

C. Summer work starts June 28th through August 23rd for 2024. The Summer working hours are from 7:00am to 9:30pm. There is no additional cost to the owner for working the hours of 3:30pm through 9:30pm or on weekends and holidays during the Summer.

D. Contractors are required to start working on site within 30 days of execution of contract, to the extent permitted by contract. Contractors are required to coordinate and perform work simultaneously with other Contractors. Contractors are required to complete their contract work by the designated Substantial Completion and Final Completion end dates as indicated on the Invitation to Bid.

E. Mandatory clean up periods - From August 24th, 2024 to August 31st , 2024 and August 30th , 2024 to September 6th, 2024, contractors shall clean up all interior and exterior areas.

F. Contractors are required per contract to fully staff the project during the work shifts stated above with the required manpower to complete their work within the allowed scheduled time frame. Contractors are required to provide a 72-hour advanced request to the Owner via the Construction Manager for any Saturday and Sunday work. If a project schedule delay has been caused by the fault of the contractor, the contractor is

required to provide 3rd shift work from 9pm to 6am to make up the project schedule. All costs for CM, Architect and district personal related to this 3rd shift request will be charged to the contractor at a combined rate for all at $3,000 per 8hr shift.

G. The shifts noted above are not considered overtime or premium time hours.

H. Contract summaries will provide start and end dates for each contractor.

I. Additional requirements:

1. Multiple Crews: Each Prime Contract shall provide multiple crews, supervision, cranes, scaffold and other means necessary to perform the Work, and maintain the Project Master Schedules.
2. Interruption of any utility and/or power must be coordinated with the Owner, via the Construction Manager.
3. Any and all -3rd shift, overtime, weekend and/or holiday work required to meet the Project Master Schedules shall be incorporated in the respective Prime Contract's bid.
4. Should a Contractor's progress fall behind, as to schedule, Prime Contractor shall employ additional – 3rd shift and/or overtime and/or weekend workforce until situation is rectified, to the satisfaction of the Architect and Construction Manager, at no additional cost to the Owner, however subject to charges as stated in section 1.8 C for lack of maintaining schedule
5. Should a Prime Contract feel another Prime Contract is delaying them sufficient time to complete their installations, per the schedule, the Architect and Construction Manager shall be notified in writing immediately of the situation (refer to Conditions of the Contract for protocol). A Prime Contract creating such a delay, that causes a proven burden upon another Prime Contract to maintain schedule, shall bear all costs incurred by the delayed Prime Contract to maintain the schedule.
6. The Architect and Construction Manager shall not be overburdened as to overtime cost, to monitor the work, due to no cause of his or her own. Owner will compensate the Architect and Construction Manager for all additional cost related to the issue of a Prime Contractor's failing to execute the Contract by fully staffing per the work hours and days noted herein. The Owner reserves the right to back charge the responsible Prime Contract for these fees if incurred.
7. All Asbestos and/or Lead Abatement shall take place to meet the requirements of the Preliminary Schedule and Project Master Schedules and shall be coordinated with the other Prime Contractors prior to commencement.

J. The Work shall be conducted to provide the least possible interference to the activities of the Owner's personnel and the surrounding property owners (neighbors).

1. Prime Contracts are hereby notified that: All Prime Contractors and their subcontractors shall limit excessive noise during 2nd shift known as work extending to 10PM weekdays upon approval by owner and city work hour restrictions. These operations shall not create a disturbance to neighboring properties.

K. Construction access to the site shall be limited to personnel, equipment and deliveries by suppliers relative to the Work of Prime Contractors and their subcontractors. Prime Contracts shall keep the Construction Manager advised of persons accessing the site and shall seek assistance with coordinating parking and storage facility locations for all Prime Contracts.

1. Where applicable, Contractors shall provide Building Site perimeter barricades as described herein the project and all temporary exit doors/lockable gates on the Project, securing these doors, fencing and/or gates at the end of each work shift.

2. When a Prime Contract engages in overtime, weekend or 2nd shift work, during the summer months and or during the normal school year, the respective Prime Contract shall notify Construction Manager of such and be responsible for securing the Project Site at the end of that work shift and perform site walk around the outside of construction area/work zone ensuring all debris is pickup up and there are no construction related hazards of any kind present once the responsible person leaves the site for the evening or weekend. This includes that all materials and equipment are fenced in and keys are removed. All interior projects have the same requirement to ensure that outside the work zone is clean from dust-dirt and that no materials are left outside the work area at any time.

3. All electrical disconnected and reconnects for roof top equipment is by EC-01. EC-01 shall review "M" drawings to coordinate this work.

4. All "lay in" electrical fixtures installed in ACT grid shall be independently hung by EC-01.

5. Required Access doors are to be furnished by EC-01 and installed by GC-01. EC-01 to coordinate location and quantity with GC as to not hinder GC work.

6. Any existing ceiling removal/replacement necessary to install new electrical work to be done by Electrical Contract #1 (e.g. – new conduits for feeders through existing ceilings, etc.).

7. Any wood blocking or panel backboards for electrical items by EC Contract #1.

8. EC specifically notified construction is phased which necessitates that utilities/services will need to be temporarily connected and maintained as necessary to ensure that all occupied areas have the required services. (power, fire alarm, PA, etc.

9. In areas where the GC is removing existing ceilings, the EC or MC will remove any ceiling-mounted electrical items, light fixtures, FA devices, Speakers, WAP, exit signs, cameras, etc. EC to reinstall after new ceilings are completed. Please review A,S,M, & P drawings.

10. After GC ceiling removals for areas scheduled to receive new acoustic grid/tile, the EC will properly tie up any sagging wires at 6' o.c. to be supported above the ceiling grid in accordance with code. EC is to verify with GC before proceeding with any ceiling-mounted fixture installations.

11. All Fire Alarm connections, smoke detectors, Carbon monoxide detectors, duct detectors, etc. are provided by EC.

12. **Duct detectors are provided by the EC, installed in the duct by MC, and wired by EC. EC is to review E & M drawings for locations and quantities. Consult division 28 in the project specifications. EC is to provide all FA connections & commissioning of FA components to main panel through districts preferred FA vendor.**

13. All Mag Holds are provided and mounted by the GC. EC is to run power and FA wiring for all mag holds. Review the A drawings for new doors requiring mag holds. Review Architectural scope for Mag Holds.

14. EC is responsible for any trenching and patching associated with their work. Trenches within concrete slabs require type 2 backfill, vapor barrier, and #4 rebar dowels at 16" O.C. epoxy into existing slab. See Div 03 for concrete infill PSI strength.

15. No work may be performed to live panels or connections of live fixtures. The EC is to locate existing main panels and associated circuits and perform lockout tagout procedures to de-energize the sub panel or fixture to which work is being performed.

1.11 RELATED DOCUMENTS

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

1.12 DRAWINGS AND SPECIFICATIONS

A. Construction Documents indicate the sum total of the Contract that make up the complete work for the Project. Through this Section "Summary of Work", the intent of the Contractor's scope of Work and responsibility is generally described. Related requirements and conditions that are indicated in the Contract Documents include but are not limited to the following:

1. General Conditions and Requirements.
2. Referenced and applicable Codes, Regulations and Standards.
3. Scheduling and phasing requirements.
4. Existing conditions and restrictions on use of the site and facilities.

B. Drawings and Specifications are cooperative and supplementary. Portions of the Work, which can best be illustrated by Drawings, are not included in the Specifications and portions best described by Specifications are not depicted on Drawings.
1. All items necessary to complete the work shall be furnished whether written or illustrated.
2. All primes shall exercise good judgment and perform all work according to related industry standards.

PART 2 - SCOPE OF WORK

2.1 PRIME CONTRACTS

A. Scope of Work: Work includes but is not limited to, the following:
1. Provide all work identified in the Contract Documents.

2. Applicable Specification Sections: All specification Sections itemized below are to be provided complete by this Prime Contract, unless noted otherwise. In addition to these specifications, the contractor is required to review all specifications included in the overall contract that may contain related scope or detail for this specific contract.

2. Divisions 00 and 01 – Procurement and Contracting Requirements & General Requirements.
3. Division 02- Existing Conditions
4. Division 03 – Concrete
5. Division 26 – Electrical
6. Division 27 – Communications
7. Division 28 – Fire Detection and Alarm

3. Applicable Drawings : All drawings itemized below are to be provided complete by this Prime Contract, unless noted otherwise. In addition to these drawings, the contractor is required to review all drawings included in the overall contract that may contain related scope or detail for this specific contract.
4. All "HS-E Drawings"
5. All "BM-E Drawings"
6. All "ME-E Drawings"
7. EC-01 Shall review all HS, BM, & ME "M" & "A" drawings for locations and quantities of duct detectors or electrical connections to HVAC equipment.

NOTE: Only low voltage connections are by MC. All feeders/circuits for HVAC equipment or architectural fixtures are by EC. EC shall review A drawings and coordinate with E drawings for lighting fixture layout. Any electrical fixtures shown on A drawings & E drawings is by EC-01 contract.

PART 3 - EXECUTION

3.1 WORK SEQUENCE

A. The Work shall be conducted to provide the least possible interference to the activities of the Owner's personnel, per the Project Preliminary Schedule.

B. Work required during overtime, extended shifts or holidays due to failure of contractor to maintain schedule, will be monitored by Architect/Construction Site representative, and may be monitored by Owners' personnel. Additional costs for Architect/Construction Site Representative and/or Owner personnel will be borne by the Contractor.

C. Coordination of any utility and power interruption must be done with approval of the Architect/Construction Site Representative. Shutdowns must occur during non-occupied timeframes only.

D. Construction access to the site shall be limited to those designated for personnel, equipment and deliveries by the Owner. All contractor staging, parking and storage shall be coordinated with the Construction Site Representative and subject to change.

E. Payments: Each bid that covers more than one school (i.e. one SED project) shall provide completed AIA G732 & G703 by building (for each SED project).

F. No work shall be installed without approved shop drawings. Any work in place without approved shop drawings will be rejected and removed by that contractor at their expense and backed charge all other costs related to.

G. Any work deemed by CM, Architect and District not properly installed by a contractor per the contract drawings and specifications shall be removed immediately and corrected, with all associated costs to be borne solely by that contractor.

H. All prime contractors shall coordinate their contract work with other primes to meet the project schedule and for a complete operational system or area or work.

I. All contractors are to provide within 3 weeks of award a "base line" construction schedule for their work from commencement to completion including all phasing. This schedule is to be updated monthly to show percentage progress of each item listed. This schedule shall be revised to provide a recovery schedule in the event of a delay for any reason. The recovery schedule shall include the "base line" item and the recovery to show how the delay is affecting the overall project schedule. This schedule is to be provided in MS Project or Primavera. Excel schedules are not accepted.

J. Prime contractor "base line" schedules are to be reviewed by each prime contractor and coordinated where work is related and that each prime's work shall be included in each "base line" contractor's schedule as necessary for coordination.

K. All contractors are to provide 2-week look ahead schedules showing work related to the base line and shall be coordinated with other prime 2-week look ahead schedules. These schedules will be Excel format. Format will be provided by the CM.

L. Contractors to provide a full-time supervisor on site 100% of the time. This is not a working foreman. Supervisors are not working with tools they are supervising their workers and coordinating with other contractors and district/ CM. Failure to provide will be default of your contract and subject costs related to and termination.

M. All prime contractors are the provide a project manpower structure showing names and telephone numbers of each responsible person on the project. This shall be updated as needed if personal changes are made.

N. All site equipment and dumpsters are to be behind temporary chain link fence when stored on site and or within the construction work zone where temporary chain link fence has been providing and installed by the prime. Each prime contractor is responsible to provide and install temporary chain link fence around their own stored equipment and dumpsters on site.

O. No equipment, panels or any services shall be turned off for any reason without written request and approval by the district. Project form shall be used for all shutdowns and required a 3-day notice. Other shutdowns may require more time.

3.2 **CONTRACT ELECTRICAL WORK (EC-01)** – ELECTRICAL PRIME CONTRACT AT NANUET HIGH SCHOOL, MILLER ELEMENTARY SCHOOL & BARR MIDDLE SCHOOL – SECURITY AND TOILET ROOM RENOVATIONS, HVAC EQUIPMENT CONNECTIONS, FIRE ALARM INCLUDING LIGHTING, POWER, AND DATA WORK.

C. Project Site Superintendent: EC shall provide one (1) full time Project Site Superintendent while any work related to this Contract is being performed on site. Superintendent may be a working Foreman as long as the daily requirements of this Contract are maintained, as they relate to the Construction Documents and the Project Schedule. Construction Manager reserves the right, in their opinion, to revoke this privilege if these requirements are not maintained. Superintendent shall work closely with the Construction Manager, and the other Prime Contract Superintendent(s), in a manner that best promotes the Master Construction Schedule and the objectives of the Project.

1. Superintendent shall be on site while Prime Contractor's own forces, and/or their sub-contractors' forces, are on site; also, while other Prime Contracts are installing work, or require coordination of work, related to this Prime Contract, and/or as requested by the Construction Manager.
2. Superintendent shall be the same individual throughout the Project.
3. Refer to Section 01 31 00 "Project Management and Coordination" for further requirements.

D. Project Foreman: EC shall provide at least one (1) full time Project Foreman during each shift of work for each school; Foreman shall be able to make binding decisions, as they relate to the daily activities of their crew as related to achieving the goals of the Project.

E. Site Communications: EC shall provide Project Superintendent with a mobile phone, all costs and service charges paid for by EC; provide Construction Manager with contact number(s).

F. Project Site Field Office: Provide site office facilities for this Contract's Project Superintendent. Site Office shall be equipped with telephone w/answering machine, fax, and e-mail. Contact information shall be provided to the Construction Manager.

1. The Owner reserves the right to seek reimbursement for temporary facilities not provided by this Prime Contract.

G. Scope of Work: In addition to Divisions 26, 27 and 28, Work of the EC includes but is not limited to, the following:
   1. Coordination with other Prime Contracts, Owner and Construction Manager as required to adhere to and maintain approved Project Master Schedules. Prior to first payment, this includes submitting the Contractor's Construction Schedule to Construction Manager of the Project Master Schedule.
   2. Electrical scope is identified on the Contract Documents for removal, installation and replacement of all electrical interior and exterior components shown on the Contract Documents for all schools. Including but not limited to coordination and installation of conduits and panels. Provide all removals of existing Electrical Devices, Fixtures & Systems indicated, or required, for Work of this Prime Contract.
      a. Coordinate all removals with Hazardous Materials documents.
   3. **This contract includes furnishing access doors for walls and ceiling as required, which may include fire rated conditions, and coordinate with General Contractor (GC) for installation. EC shall provide Access Door for GC to install.**
   4. **All duct Detectors are provided by EC contract and Installed by MC contract. All FA Control and power wiring for duct detectors are provided by EC contract. EC is to refer to the HVAC schematic diagrams for quantity of duct detectors to be furnished.**
   5. **EC is to review HVAC drawings and provide power to all Fire Smoke dampers as indicated on the drawings.**
   6. **All FA shutdown relays are by EC.**
   7. Provide all reinstallation of existing Electrical Devices, Fixtures & Systems, replacement or new Electrical Devices, Fixtures & Systems associated the classrooms.
   8. EC shall conform to phasing and sequencing of renovations. See Preliminary Schedule for all work as shown on the phasing plans.
   9. The Electrical Contractor shall review the Contract Documents in its entirety for complete electrical scope of work in this contract.
      a. EC shall install work in accordance with the National Electrical Code requirements. No additional compensation will be made for extra offsets in conduit or retro-fit work due to improper component location, or lack of Prime Contractor's coordination.
   10. Prime Contract shall understand that renovation work may require work to proceed while existing systems are required to be maintained; all cost associated with this sequence shall be anticipated, and incorporated into the Bid.
   11. Prime Contractor shall read and familiarized themselves with the Lead Sections of the Construction Documents. Lead-based paint has been identified to exist on specific

areas/surfaces of the work located within the building(s), and when encountered the Prime Contractor shall follow all applicable regulations while working with this material.

12. Prime Contractor shall read and familiarized themselves with the Asbestos Sections of the Construction Documents. Asbestos Containing Material is scheduled to be abated throughout specific areas of the building(s). Should ACM be encountered (after Abatement is completed), that may interfere with an installation; Prime Contractor shall cease work, and notify Construction Manager immediately.
    a. Penetrations not coordinated with GC, prior to abatement of these spaces, shall become the responsibility of the respective Prime Contract requiring the penetration.
13. EC shall provide all Work associated with creating structural openings or penetrations requiring lintels whether for their own work (i.e. conduit penetrations). This applies to all openings/penetrations greater than 5-inches through masonry or concrete walls.
    a. Non-structural openings/penetrations, including those for convenience, shall be self-provided by the EC.
    b. This assignment applies to new and existing construction areas.
    c. Refer to Structural documents for lintel type/size requirements and Architectural drawings for wall types. Walls not specifically identified in the documents are to be assumed as masonry construction.
    d. All openings/penetrations are to be identified on Record Drawings by the Prime Contract requiring the opening.
14. Provide cut and patch work related to that of this Prime Contract, related to that of their Prime Contract, and at those areas specifically identified on the Construction Documents, regardless of trade creating the area to be patched.
    a. Each Prime Contract is responsible for all <u>other</u> respective Cutting & Patching required of their installations (refer to Section 017329 for further information).
15. Provide complete electrical requirements, materials and methods including, but not limited to:
    a. Service and distribution including bus-way, switchgear, panel boards, and disconnect switches.
    b. Provide grounding protection for all circuits and outlets and as required by applicable codes and authorities having jurisdiction. Properly ground building equipment provided by this project.
    c. Coordinate any electrical switchover as to least impact the Project Schedule. This scope is considered "critical path" and is required to be addressed submitted and shop drawing submitted within 2 weeks upon BoE approval.
    d. Provide all power, controls, and standby generator requirements for temporary power that might be required during the renovation upgrade for all other prime contractors working during the shutdown.

e. Immediately after installation, provide and maintain temporary ID of all circuit breakers and at all shut offs/disconnects until permanent ID is in place.
f. Exterior lighting and lighting control equipment; provide occupancy sensors and/or timing devices as indicated.
g. Provide raceways, boxes, cabinets and sleeves through existing and new construction as part of the complete electrical installation.
h. Provide wire, cable, conduit, boxes, and wiring devices as part of the complete electrical installation.
i. Provide permanent electrical identification.
Provide type written panel board schedules.
Clearly label all panel boards, disconnects, relays, junction boxes, and other electrical devices and equipment.

16. Final connections of utilities are by EC unless noted or assigned otherwise.
17. Final connection of installations or equipment that are provided by others.
    a. Provide final connections to all scheduled equipment furnished by the Owner.
18. Provide Fire Alarm system as indicated in the Construction Documents.
    a. EC shall provide Fire Alarm and/ or coordinate as indicated on drawings.
19. Coordinate with Owner and provide confirmation to Construction Manager of low voltage systems, including but not limited to telephone, building access, security, PA/intercom, data and CCTV systems, as indicated in the Construction Documents.
    a. EC shall confirm full operational status of existing low voltage systems following reinstallation of existing devices. Replace and commission all devices and components damaged by construction work.
    b. Provide all components, and their installations required for a complete system.
    c. Provide, terminate, test, and label all point-to-point field wiring.
    d. Provide all associated power circuits and requirements that support these systems, including but not limited to, final connections.
20. Provide sleeves required for piping penetrating walls, slabs and/or decks.
21. Provide through-penetration fire stop systems at all penetrations made by EC. Maintain listed ratings of indicated assemblies. Provide repair of existing through-penetration fire stopping damaged by work of this Prime Contract.
    a. Sleeves with fire stopping are to be installed in sequence with fire-rated construction. This Prime Contract shall be responsible for installing fire stopping material at intersection of sleeve and constructed materials.
22. Provide all testing and adjusting, instruction and guarantees for materials and equipment of this Prime Contract. Refer to Division 00 Section “Project Forms” for applicable documents.

a. Substantial Completion: Clean all light fixtures and electrical equipment at the time of installation or at Substantial Completion, whichever is later, or as directed by Construction Manager.

23. Coordinate all the preceding requirements, accordingly, with all applicable Alternates indicated in Section 012300 "Alternates."
24. Submission of all required closeout documentation and final application for payment no later than -September 30 2022.
25. **EC-01 is required to work with the districts fire alarm vendor to connect new systems to the existing FA. Contractors pricing shall include all integration into the buildings fire alarm controls. Upon contractor's request, a contact will be provided for coordination.**

H. Supplemental Temporary Facilities and Controls by the EC include, but are not limited to:

1. Waste Disposal Facilities: Provided by each contractor.
2. Temporary Interior Barricades: Provide, maintain and eventually remove all temporary barricades per OSHA Regulations, Industry Standards, or as indicated in the Construction Documents. These include, but are not limited to, the following areas:
   a. Roof openings/penetrations.
   b. To isolate Abatement areas.
   c. To isolate renovation areas.
   d. Floor openings/penetrations, including stairwells.
      1) Horizontal Openings: close openings in floors, roof decks, and horizontal surfaces with load bearing, wood and/or steel framed construction per applicable regulations.
3. Temporary Doors, Frames & Wall Assemblies: Provide, maintain and eventually remove all temporary installations where required per OSHA Regulations, Industry Standards, or as indicated in the Construction Documents. Provide fire rated assemblies as required. Provide exit (panic bar/crash bar) devices at locations of egress. Coordinate locations with Construction Exiting Plan, Sequencing/Phasing Plans, and the Construction Manager. Temporary doors shall be constructed using 1/2' plywood and 2x construction, equipped with hasps, locks, handle and latch mechanism, and spring or counter weight installed to allow door to close after opening. Permanent doors will not be used in temporary conditions.
4. Temporary Heat: The existing heating system and ventilation system in the building area are not to be used for temporary heat or ventilation in construction areas. The contractor for General Construction must provide temporary heat in construction in construction areas. Provide submittal for temporary heat strategy that states what equipment will be used and where fuel will be stored. Fuel source cannot be located in the building. Heaters with self-contained fuel sources are not allowed to be placed in the building.

5. Temporary Window Openings: Window openings shall be enclosed using 2x construction, 1/2' plywood, and reinforced polyethylene. Where window opening start at or near the floor, plywood shall be installed from finish floor to minimum of 42" AFF; reinforced poly may be installed from this point up. Should contractor choose to install plywood across the entire opening, sufficient area will be installed with reinforced poly to allow emergency escape, if required, and to allow natural light into the work area.
    a. Installation shall be insulated if temporary heat or cooling is being employed.
6. Temporary Exterior Wall Enclosure: Provide and maintain temporary enclosures for weather protection and security of the construction in progress, where needed, up until completion of permanent installation specified. Enclosures shall protect the building from exposure, foul weather, other construction operations, and similar activities. Provide temporary weather tight enclosure for building exterior.
    a. Where heating and cooling is needed and permanent enclosure is not complete, provide insulated temporary enclosures. Coordinate enclosure with venting and material drying or curing requirements to avoid dangerous conditions and effects.
    b. Install tarpaulins securely; install fire retardant materials only.
    c. Where temporary wood enclosures exceed 100 sq. ft. in area, use fire retardant treated materials for framing and sheathing.
    d. All cost incurred to repair and/or replace materials damaged, due to the failure of EC to provide and maintain weather tight enclosure shall be borne by this Prime Contract. This includes any contamination of materials that may lead to the introduction of mold and mildew.
    e. Immediately notify the Construction Manager, in writing, as to damage to temporary enclosures by "others"; identify responsible party in the submission. Owner shall not be liable for damages caused by "others" if Prime Contract cannot identify responsible party.
7. Temporary Sanitary Facilities: Provided by each contractor.
8. Existing Stair Usage: Use of Owner's existing stairs in unoccupied areas will be permitted, provided that at Substantial Completion, stairs are restored to conditions existing before initial use.
    a. Provide photo documentation of existing stair conditions prior to use by all Prime Contracts. Document during use, and at completion of the Renovation Project in order to document any and all damage to the Owner's property.
    b. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If, despite such protection, stairs become damaged, restore damaged areas so no evidence remains of correction work.
9. Provide all shoring required for Work of this Prime Contract, including but not limited to;

a. Cutting or altering of existing construction.
b. Provide protection of all new and existing surfaces during the Work. Do not stand, walk, or work off of any unprotected finished surface above the floor.

10. Maintain temporary fencing and barricading to keep unauthorized persons away from hazardous areas for which this Prime Contract is responsible.
11. Traffic Controls: Provide flagman while any operations of this Prime Contract interfere with traffic flow on adjacent roadways.

END OF SECTION 01 12 04

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SECTION 01 12 05 –CONTRACT SUMMARY – PC-01

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes a summary of each Prime Contract, including responsibilities for coordination and temporary facilities and controls. One set of Construction Documents is issued covering the Work of multiple Prime Contracts. Each Prime Contract is responsible to review all drawings and specifications for specific requirements indicated, and for a general understanding and knowledge of the work of other Prime Contracts. All Prime Contracts are responsible for all Work of their Contract no matter what drawing on which the Work appears. All Prime Contracts are responsible to coordinate their work related to the complete set of drawings and specifications, not limited to each prime contractor scope. **All Bidders should acknowledge that for each contract listed below, each contractor is their own General Contractor and subject to all General Contractor requirements.**

B.

1. **Plumbing Work Contract :** The Plumbing Contractor shall be selected based on the bid procedure as described in the Bid Documents. Contract Bidders are responsible for (a) trade work coordination, (b) the scope contained in drawings listed below and (c) any and all additional scope specifically identified to be performed by the Plumbing Contractor in other Bid Packages in the Contract.

C.

1) Work related to drawings: (In addition to these drawings, the contractor is required to review all specifications included in the overall contract that may contain related scope or detail for this specific contract.)

a) Barr Middle School:
   - Barr Middle School Toilet Room Renovations

b) Nanuet High School:
   - Admin wing kitchenette (Alternate)

a. Bid Package Contract No. 05 - Plumbing Work: All work related to mechanical construction which includes but is not limited to the following items: (Refer to the Contract Documents for full scope of work.)
   i. Provide access panels, fire rating/firestopping, All plumbing work, except underground services on site plans. Contract includes but not limited to, all concrete demo and interior pads related to PC Equipment, all demo and discard of, piping, insulation and fittings, domestic water, cold water grounding reconnections, feed water, all patching and painting related to the installation of their scope, all city filings and permits for any reason and as required
   ii. All work related to drawings; (*In addition to these drawings, the contractor is required to review all specifications included in the overall contract that may contain related scope or detail for this specific contract.)*

2) Related Sections include, but are not limited to, the following:

2. Division 01 Section "Work Restrictions" for use of the Project site and for requirements for continued Owner occupancy of premises.
3. Division 01 Section "Project Management and Coordination" for general coordination requirements.
4. Division 01 Section "Project Forms" for documents required for Testing and Coordination.
5. Division 01 Section "Temporary Facilities and Controls" for specific requirements for temporary facilities and controls.

1.3 DEFINITIONS

A. Building Site: The Building Site shall be defined in the Construction Documents, as the building footprint, and all related construction within a five-foot (5'0") distance of the

building's exterior face, unless noted or assigned otherwise. Coordinate with specific exceptions to the 5'0" limit indicated within each Scope of Work outline.

B. Permanent Enclosure: As determined by the Architect: permanent or temporary roofing is complete, insulated, and weathertight; and all openings are closed with permanent construction or substantial temporary closures. All cost associated with failure to maintain described installations that result in any damage or contamination to the Owner's property, shall be borne by the Prime Contract responsible for the installation.

1.4 MANAGEMENT AND COORDINATION

A. The Owner shall provide a Construction Manager.

1. The Construction Manager shall provide a full time construction site representative recognized as the Construction Manager.

1.5 CONSTRUCTION MANAGER

A. The construction manager shall provide on-site administration of the Contracts for Construction in cooperation with the Architect as set in AIA Document A232 ™ – 2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, as modified.

B. The Construction Manager shall provide administrative, management and related services to coordinate scheduled activities and responsibilities of the Multiple Prime Contractors with each other and with those of the Construction Manager, the Owner and the Architect. The Construction Manager shall coordinate the activities of the Multiple Prime Contractors in accordance with the latest approved Project Schedule and the Contract Documents.

C. Utilizing the construction schedules provided by the Multiple Prime Contractors, the Construction Manager shall update the Project schedule, incorporating the activities of the Owner, Architect, and Multiple Prime Contractors on the Projects, including activity sequences and durations, allocation of labor and materials, processing of Shop Drawings, Product Data and Samples, and delivery and procurement of products, including those that must be ordered will in advance of construction. The Project schedule shall include the Owner's occupancy requirements showing portions of the Project having occupancy priority.

D. Utilizing information from the Multiple Prime Contractors, the Construction Manager shall schedule and coordinate the sequence of construction and assignment of space in

areas where the Multiple Prime Contractors are performing Work, in accordance with the Contract Documents and the latest approved Project Schedule.

1.6 GENERAL REQUIREMENTS OF PRIME CONTRACTS

A. Prime Contracts: The context used in this Section are separate Prime Contracts that represent significant elements of work that is to be performed concurrently and in close coordination with the work of other Prime Contracts for the benefits of the Owner. Each Prime Contract is recognized to be a major part of the Work.

B. Assignment of Work: Should a conflict be indicated, Section 011200 shall take precedence over all scope of work assignments that may be indicated elsewhere within the Construction Documents.

C. Seismic Requirements: Prime Contracts are to be aware that the building(s) is located within a Seismic Zone indicated in the documents and shall provide installations in compliance with all related code requirements.

D. Layout and Installation: Each Prime Contractor shall schedule, layout and install their Work in such manner as not to delay or interfere with, but to compliment the execution of the work of other Prime Contracts, utility companies and Owner's operations.

E. Extent of Contract: The Contract Documents, drawings and specifications each contain more specific descriptions of the Work facilitating which Prime Contract includes specific elements of the Project.

1. Work provided by each Prime Contract shall mean complete and operable systems and assemblies, including products, components, accessories and installations required by the Construction Documents or indicated otherwise.
2. Prime Contractors shall exercise good judgment and perform all work according to related industry standards.
3. The Owner is exempt from payment of Federal, State and local taxes, including sales and compensating use taxes on all materials and supplies incorporated in completing the Work; these taxes are not to be included in the Bid. This exemption does not apply to tools, machinery, equipment or other property leased by, or to, the Contractor or sub-contractor, or to supplies and materials, which even though consumed are not incorporated into the completed work. Prime Contractors, and their sub-contractors, shall be responsible for paying any and all applicable taxes on said tools, machinery, equipment or property, and upon all said unincorporated supplies and materials, whether purchased or leased.
4. Prime Contracts shall understand that time is of the essence, and will adequately staff the Project by employing the appropriate trade's people to perform the Work;

these people shall be experienced in their respective trades. A shortage of labor in the industry shall not be accepted as an excuse for not properly staffing the Project; all efforts shall be made to meet or exceed the schedule, including additional staff and/or labor hours necessary. All cost associated with this item shall be included within the Bid.

5. Local custom and trade union jurisdictional settlements will not control the scope of the Work of each Prime Contract.
   a. When a potential jurisdictional dispute or similar interruption of Work is first identified, or threatened, the affected Prime Contracts shall promptly negotiate a reasonable settlement to avoid or minimize the pending interruption and delays.
   b. Contractor's trade-related issues shall not be grounds for modification or extension of scheduled completion date(s).
6. The Work of all Prime Contracts requires close coordination with other Prime Contracts and construction personnel. Maintain flexibility and cooperation through the Project. "Out of Sequence" and "Delay" claims will only be considered when requirements of Division 01 "Administrative Requirements" have been adhered to. Delay claims must be in writing and forwarded to the Architect, per the requirements of the General Conditions of the Contract. Claims not submitted per these requirements will be rejected and/or denied.
7. The intention of the Work is to follow a logical sequence, however, a Prime Contractor may be required by the Architect or Construction Manager, to temporarily install, omit or leave out a section(s) of Work, out of sequence. All such out of sequence work, and come back time, at these areas shall be performed at no additional cost to the Owner.

F. Substitutions: Per Division 01 Section "Substitution Procedures", each Prime Contractor shall cooperate with the other Prime Contractors involved, to coordinate approved substitutions with remainder of the Work. Contractors shall submit all "Substitutions" at least ten (10) days prior to the date for receipt of Bids as specified in the Instructions to Bidders 002113 Section 3.3 Equivalents or bid will be considered per "basis of design".

G. Construction Schedules: Refer to Divisions 01 Section "Construction Progress Documentation", "Milestone and Phasing Schedule" and "Project Management and Coordination" for requirements related to meetings and schedules.

H. Construction Sequencing and Phasing: Prime Contractor shall understand that Sequencing and/or Phasing Plans are contingent upon the work areas being complete/occupied, prior to the next area of Work beginning. Should an area of

construction not be complete per the Milestone and Phasing Schedule, the Project Master Construction Schedule/Sequencing Plans will be adjusted accordingly. The Owner will not be responsible for delay claims due to adjustments being no fault of their own.

1. Prime Contracts may be required to re-sequence the phasing of the project as a result of changes to the schedule. Prime Contracts shall provide these adjustments at no additional cost to the Owner.

I. Prime Contract shall verify existing conditions in the field prior to work commencing in that area and immediately report conditions to the Architect that are not represented correctly by the Construction Documents.

1. Each Prime Contract is responsible for familiarizing himself with Project Site Logistics and provide a "site logistics plan locating storage area, scaffolds, rubbish areas, stock piles and egress related to all work, included phased construction within 30 days of award.
2. Each Prime Contract has been given ample opportunity to review Existing Conditions related to the Project. Existing Conditions not noted in the Construction Documents that could be easily recognized during pre-bid review that interfere with the respective Prime Contract's work, shall be the responsibility of the respective Prime Contract. This includes all costs associated with removal, patching, relocation or re-fabrication of installations.

J. Hazardous Materials: Each Prime Contract shall familiarize themselves with the Hazardous Materials Sections/Drawings of the Construction Documents, and follow DOL/OSHA/EPA/SED regulations while performing their respective Work in these areas. Discovery of non-identified or concealed hazardous materials shall be reported to the Construction Manager immediately and followed up with written documentation of the event.

K. Protection of Installations: Each Prime Contract is responsible for protecting their installations at all times. All costs incurred to repair, replace or clean insufficiently protected materials/installations shall be the responsibility of the installing Prime Contract.

1. Architect shall be notified, in writing, immediately upon material/installation being damaged; notification shall indicate responsible party.
2. Owner will not be liable for damaged materials and/or installations by "others", when "others" cannot be identified.
3. Repair damaged work, clean exposed surfaces or replace construction installations that cannot be repaired.

4. Each Prime Contract shall be responsible for removing all labels not required to remain from their installations.
5. Installations shall be wiped clean and proper protection then installed.
6. Each Prime Contract is responsible to protect another primes work in the event that prime has to work over or on top of that other primes work being complete. The prime working over the completed work takes full responsibility of that other primes completed work both in condition and operation.

L. Daily Cleaning: All Prime Contracts are responsible for any and all debris caused by their Work, including the Work of their subcontractors. A daily clean up and disposal is required by each Prime Contract for the periods which that Prime Contract, or its sub-contractors, are performing Work on site.

1. Assign at least one person for a daily clean and sweep of the work area(s). Prime Contractor shall allot sufficient manpower and time for this to be completed by the end of each shift. Submit name of this person(s) to Construction Manager.
    a. Construction Manager shall have the authority to give direction to person(s) on the Project Site identified by the Prime Contract as designated for cleanup tasks. This shall included the safety review/securing of the site-work zone after each shift.
    b. This person has check that no construction debris was dumped in any district dumpers during this end of shift site review, if found the contractor must remove immediately the next morning to avoid back charges costs of $1500 per day not removed.
2. Any Prime Contract not providing personnel for Daily Cleaning will be Back Charged for labor provided by the Owner to complete this task.
3. Contractor working solely in an area shall be responsible for clean/sweep of that area.
4. Daily cleaning will not mean any one Prime Contract is responsible for assisting another Prime Contract with removing major quantities of debris created by a particular Prime Contract's Work.
5. Daily cleaning will be mandated to remove from the building any debris created by day-to-day activities. All Prime shall assist in sweeping shared work areas and shared corridors while working on site. Each Prime shall assist in mopping of shared corridors while working on site or as required by the Owner.
6. All prime contractors and subcontractors are required to provide sweeping compound for daily cleaning in their respective exterior and interior work areas. Each Prime Contract shall provide a sufficient number of brooms or other necessary tools, for use by their personnel to adequately fulfill their obligations.

7. All prime contractors shall provide and maintain garbage cans/refuse containers with liners for each construction area of their respective contracts as directed by the Construction Manager and shall be responsible for disposing of these materials to a dumpster.
8. All prime contractors provide the necessary equipment/containers (lull/skip-box) to move daily clean/sweep debris from the building to a dumpster on a daily basis, for each construction area of their respective contracts. Skip-box shall be emptied to a dumpster by 9:00 a.m. the following day.
9. Cleaning shall be deemed a Safety & Health issue, with Prime Contracts being held accountable for fulfilling their contractual obligations.
10. Final Cleaning: At Substantial Completion of each area of construction, each Prime Contract shall wipe/vacuum clean all of their respective installations; All interior contracts performing work inside the buildings shall mop clean all building surrounding areas and finish flooring and remove all marks/blemishes to the finish, for each construction area of their respective contracts. Each area of construction shall be wiped clean of all construction dust and debris prior to turnover to the Owner.

M. Cutting and Patching: All Primes are responsible for cutting and patching required to complete their Work. All repair of existing finish Work (including finish floors) shall be performed by contract requiring work, meeting or exceeding minimum contract requirements for that particular section, specification, or type of work. All concealed openings (piping, ductwork, conduit, etc.) must be repaired to comply with specified wall or deck conditions as well as required fire and sound ratings. All corridor penetrations require fire safing. If contractor elects to install their new work in an existing unrated wall or floor opening, whereas the wall/floor is a fire rated condition, that contractor is responsible to fire rate that opening to match the wall/floor fire rating with new and all other existing wire, piping, ducts etc. Other areas are noted in drawings and specifications.

1.7 Project Schedule. The nature of this project is to complete all the work listed as Phase 4 in the schedule by **the Project Closeout Dates specific to each Prime Contract as listed below**. Each Prime Contractor shall include in their bid proper allowances for foul weather.

A. Bids Received: 4/3/2024

B. Anticipated Notice to Proceed: 4/16/2024

C. Submittals: The following items are to be submitted within 60 business days after Notice to Proceed:
   1. Submittal List and Submission Schedule– **15 days after NTP**
   2. Field Investigations
   3. Shop Drawings
   4. Long Lead Items– **30 days after NTP**
   5. Schedule of Values and Key Submittal List – **15 days after NTP**

D. Mobilization: 6/26/2025

E. Substantial Completion and Project Closeout: Per 01 11 00 Milestone Schedule

1.7 TEMPORARY FACILITIES AND CONTROLS OF PRIME CONTRACTS

A. Conditions of Use: Keep temporary services or conditions clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary facilities as required as work progresses; do not overload facilities or permit them to interfere with progress. Take necessary fire prevention measures; do not allow hazardous, dangerous, or unsanitary conditions to develop or persist on the Project site.

   1. Installation, operation, maintenance, and removal of each temporary service or condition are considered part of the respective Prime Contract's own construction activity, as are costs and use charges associated with each facility.
   2. Locate service or condition where they will serve the Project adequately and with minimum interference of the Work, coordinate with the Construction Manager and the other Prime Contracts prior to installation.

B. Temporary Use of Permanent Facilities: Prime Contract, as installer of each permanent service or condition, shall assume responsibility for its operation, maintenance and protection during use as a construction facility prior to the Owner's acceptance, regardless of previously assigned temporary facilities and controls responsibility.

C. Owner's Facilities: Contractors are not allowed to use the Owner's facilities (toilets, telephones, food service, etc.) for their own benefit or convenience. Prime Contract Superintendents shall enforce this policy with their respective work forces.

   1. Construction personnel parking will be restricted to area as directed and agreed to by the Owner, and to facilitate the completion of the work. Owner reserves the right to remove from their property, unauthorized vehicles occupying unauthorized areas, at respective vehicle owner's expense.

D. Storage on the Project Site: Each Prime Contract shall provide sufficient secure weather-tight storage facilities for their materials and equipment. These storage containers are required to be located on the "site logistics plan" The Owner's facilities and the Project's building areas shall not be used for storage unless agreed upon, in writing, with the Owner via the Construction Manager.

1. Until permanently incorporated into the Work, all materials on the Project site are considered to be the Prime Contract's responsibility for security and protection.
2. Prime contractor is required to check on their onsite stored material periodically to ensure that all material continues to be located in the stored location and that it remains protected from all damage, theft, and endangerment to others and ready to be used on notice for coordination with other contractors. Failure to arrange for materials to be on site to complete coordinated work with other Prime Contractors will result in back charges for delays resulting therefrom.
3. Temporary long-term storage facilities are not available to Prime Contracts by the Owner.
4. Prime Contractors and their subcontractors, shall coordinate deliveries with the Construction Manager to ensure that disruptions and Owner inconvenience are avoided.

E. Tools and Equipment: Each Prime Contractor shall provide all tools and equipment necessary for its own activities; this includes secure lock-up and storage for all items on the Project Site.

1. Provide all construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities; this shall include any additional supplementary power, ventilation, lighting requirements and weather protection.

F. Project Site Communication: Each Prime Contractor shall provide their Project a full time on site at all times Superintendent with a mobile phone for the duration of the Project, as indicated in their Scope of Work. Construction Manager shall be furnished with contact numbers associated with each phone.

G. Safety: Prime Contracts, not the Architect or Construction Manager, are responsible for Project Site Safety, as related to their operations (refer to Section 013150 "Special Procedures" for further requirements).

1. Each Prime Contract shall correct safety hazards and violations immediately. If safety issues are not immediately rectified, the Owner shall secure outside sources to correct the deficiency and back charge the responsible Prime Contract.
2. Maintain unobstructed access/egress to fire extinguishers, fire hydrants, stairways, corridors, ladders and other safety routes/devices.

H. Fire Extinguishers: All Prime Contracts provide and maintain "general use" fire extinguishers for each construction area of their respective contracts; comply with applicable codes for quantities required. Use of the Owner's fire extinguishers to meet this requirement is not permitted. Comply with NFPA for recommended classes for exposure; extinguishers shall be inspected and appropriately tagged prior to being brought on site. Provide stands, painted bright orange, sturdy enough to carry the extinguisher, and built as not to create a tipping hazard.

1. Each Prime Contract shall supplement this requirement by providing additional fire extinguishers specifically related to their work activity (e.g., welding, soldering, abrasive cutting, etc.).
2. Each Prime Contract shall provide and maintain proper fire extinguishers at/in their respective on site office and storage facilities.
3. Store combustible materials in approved containers in fire-safe locations.

I. Welding: Any Prime Contract performing welding, cutting or other activities with open flames or producing sparks shall at a minimum:

1. Coordinate interruption/shutdown of detection system(s) to avoid creating false alarms.
2. Protect the area and surrounding areas from fire and damage.
3. Maintain fire extinguishers, compatible with activity, at the location of the activity.
4. Provide a continuous Fire Watch during the activity and one-half hour beyond the completion of the activity.
5. Provide all necessary fans and ventilation required for the activity.
6. Any welding, burning and or use of flame the contractor is required to provide all required "hot work permit" to use such equipment prior to start of work. Its mandatory that no "hot work" shall start without these permits issued to the CM and Owner. Failure to this requirement will result to the removal of the project super of that company from all district projects.

J. Remove each temporary facility when it can be replaced by the authorized permanent facility no later than Substantial Completion, or as directed by the Architect and/or Construction Manager. Complete or restore permanent facilities that may have been delayed due to interim use of a temporary barrier or condition.

K. Temporary Power: Each Prime Contractor shall provide for their own temporary power needs for any scheduled electrical utility shut downs. Each Prime Contractor shall provide for their own temporary generators, power cords and temporary lighting as needed during these periods to continue to perform their work and maintain adherence to the

Milestone Phasing Schedule and approved Project Master Schedules. All temporary power equipment shall comply with all applicable codes and regulations.

1. In all other schools in this phase 4, known as HBE; GMD; WBW & DWE have local electrical panel replacements, therefore each prime contractor and their sub-contractors are required to provide their own generator power for equipment and lighting to perform their work during these times with no additional cost to the owner.

L. Waste Disposal Facilities:

1. General debris/refuse/construction waste containers (dumpsters) shall be provided by each prime contractor and secured as specified herein this contract.
2. It shall be the responsibility/requirement of each Prime Contract to bring their waste to the dumpsters, including but not limited to all equipment, demolition debris, discarded materials with further identification including the following; construction and demolition debris refers to discarded materials generally considered non-hazardous in nature, including but not limited to steel, glass, brick, concrete, asphalt material, pipe, gypsum wallboard, and lumber, from the construction or destruction of a structure as part of a construction or demolition project or from the renovation of a structure, including such debris from construction of structures at a site remote from the construction or demolition project site.
3. It shall be the responsibility and requirement of each Prime Contract to recycle metals generated by its Work, and the Work of its subcontracts.
4. Joint-effort recycling by all Prime Contracts is encouraged.

M. Temporary Sanitary Facilities: Provide temporary self-contained toilets units for duration of the project.

a. Temporary Sanitary Facilities:
    1) Each prime contractor is required to provide their own Temporary Sanitary Facilities and secured behind fencing and/or locked after work hours and weekends.
b. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.
c. Provide separate facilities (minimum of one ea.) for male and female personnel in proportion required by OSHA.
d. Shield toilets to ensure privacy.
e. Coordinate mobilization and demobilization of units with Construction Manager.
f. Toilets shall be cleaned at least once per week, with additional facilities or cleanings provided if requested by Construction Manager.

g. Provide and maintain adequate supply of toilet tissue and hand sanitizer for each facility.

1.8 WORK HOURS & SEQUENCE

A. During the school days, Work is to be performed in this contract during the hours of 3:30pm to 10:00pm on weekdays, and Saturdays and Sundays from 7:00am to 3:30pm. During School breaks, work is to be performed from 7:00am to 10:00pm. There is no additional cost to the owner for working the hours of 3:30pm through 10:00pm, or weekend work during the school year. **Any work done during these times MUST BE COMPLETED, CLEANED, AND TESTED AS NECESSARY FOR STUDENT OCCUPANCY BEFORE THE START OF THE NEXT SCHOOL DAY. Contractors are required to schedule work during school breaks, school days off, and school holidays**.

B. Summer work starts June 28th through August 23rd for 2025/26 The Summer working hours are from 7:00am to 9:30pm. There is no additional cost to the owner for working the hours of 3:30pm through 9:30pm or on weekends and holidays during the Summer.

C. Contractors are required to start working on site within 30 days of execution of contract, to the extent permitted by contract. Contractors are required to coordinate and perform work simultaneously with other Contractors. Contractors are required to complete their contract work by the designated Substantial Completion and Final Completion end dates as indicated on the Invitation to Bid.

D. Mandatory clean up periods - From August 24th, 2025 to August 31st , 2025/26 and August 30th , 2025to September 6th, 2025, contractors shall clean up all interior and exterior areas Contractors are required per contract to fully staff the project during the work shifts stated above with the required manpower to complete their work within the allowed scheduled time frame. Contractors are required to provide a 72-hour advanced request to the Owner via the Construction Manager for any Saturday and Sunday work. If a project schedule delay has been caused by the fault of the contractor, the contractor is required to provide 3rd shift work from 9pm to 6am to make up the project schedule. All costs for CM, Architect and district personal related to this 3rd shift request will be charged to the contractor at a combined rate for all at $3,000 per 8hr shift.

E. The shifts noted above are not considered overtime or premium time hours.

F. Contract summaries will provide start and end dates for each contractor.

G. Additional requirements:

1. Multiple Crews: Each Prime Contract shall provide multiple crews, supervision, cranes, scaffold and other means necessary to perform the Work, and maintain the Project Master Schedules.
2. Interruption of any utility and/or power must be coordinated with the Owner, via the Construction Manager.
3. Any and all overtime, weekend and/or holiday work required to meet the Project Master Schedules shall be incorporated in the respective Prime Contract's bid.
4. Should a Contractor's progress fall behind, as to schedule, Prime Contractor shall employ additional – 3rd shift and/or overtime and/or weekend workforce until situation is rectified, to the satisfaction of the Architect and Construction Manager, at no additional cost to the Owner, however subject to charges as stated in section 1.10 E for lack of maintaining schedule
5. Should a Prime Contract feel another Prime Contract is delaying them sufficient time to complete their installations, per the schedule, the Architect and Construction Manager shall be notified in writing immediately of the situation (refer to Conditions of the Contract for protocol). A Prime Contract creating such a delay, that causes a proven burden upon another Prime Contract to maintain schedule, shall bear all costs incurred by the delayed Prime Contract to maintain the schedule.
6. The Architect and Construction Manager shall not be overburdened as to overtime cost, to monitor the work, due to no cause of his or her own. Owner will compensate the Architect and Construction Manager for all additional cost related to the issue of a Prime Contractor's failing to execute the Contract by fully staffing per the work hours and days noted herein. The Owner reserves the right to back charge the responsible Prime Contract for these fees if incurred.
7. All Asbestos and/or Lead Abatement shall take place to meet the requirements of the Milestone Phasing Schedule and Project Master Schedules and shall be coordinated with the other Prime Contractors prior to commencement.

H. The Work shall be conducted to provide the least possible interference to the activities of the Owner's personnel and the surrounding property owners (neighbors).

1. Prime Contracts are hereby notified that: All Prime Contractors and their subcontractors shall limit excessive noise during 2nd shift known as work extending to 10PM weekdays upon approval by owner and city work hour restrictions. These operations shall not create a disturbance to neighboring properties.

I. Construction access to the site shall be limited to personnel, equipment and deliveries by suppliers relative to the Work of Prime Contractors and their subcontractors. Prime Contracts shall keep the Construction Manager advised of persons accessing the site

and shall seek assistance with coordinating parking and storage facility locations for all Prime Contracts.

1. Where applicable, Contractors shall provide Building Site perimeter barricades as described herein the project and all temporary exit doors/lockable gates on the Project, securing these doors, fencing and/or gates at the end of each work shift.
2. When a Prime Contract engages in overtime, weekend or 2nd shift work, during the summer months and or during the normal school year, the respective Prime Contract shall notify Construction Manager of such and be responsible for securing the Project Site at the end of that work shift and perform site walk around the outside of construction area/work zone ensuring all debris is pickup up and there are no construction related hazards of any kind present once the responsible person leaves the site for the evening or weekend. This includes that all materials and equipment are fenced in and keys are removed. All interior projects have the same requirement to ensure that outside the work zone is clean from dust-dirt and that no materials are left outside the work area at any time.

1.11 RELATED DOCUMENTS

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

1.9 DRAWINGS AND SPECIFICATIONS

A. Construction Documents indicate the sum total of the Contract that make up the complete work for the Project. Through this Section "Summary of Work", the intent of the Contractor's scope of Work and responsibility is generally described. Related requirements and conditions that are indicated in the Contract Documents include but are not limited to the following:

1. General Conditions and Requirements.
2. Referenced and applicable Codes, Regulations and Standards.
3. Scheduling and phasing requirements.
4. Existing conditions and restrictions on use of the site and facilities.

B. Drawings and Specifications are cooperative and supplementary. Portions of the Work, which can best be illustrated by Drawings, are not included in the Specifications and portions best described by Specifications are not depicted on Drawings.

1. All items necessary to complete the work shall be furnished whether written or illustrated.
2. All primes shall exercise good judgment and perform all work according to related industry standards.

PART 2 - SCOPE OF WORK

2.1 PRIME CONTRACTS

A. Scope of Work: Work includes but is not limited to, the following:
   1. Provide all work identified in the Contract Documents.
   2. All Specification Sections provided.
   3. All abatement drawings provided for reference.

PART 3 - EXECUTION

3.1 WORK SEQUENCE

A. The Work shall be conducted to provide the least possible interference to the activities of the Owner's personnel, per the Project Milestone Phasing Schedule.

B. Work required during overtime, extended shifts or holidays due to failure of contractor to maintain schedule, will be monitored by Architect/Construction Site representative, and may be monitored by Owners' personnel. Additional costs for Architect/Construction Site Representative and/or Owner personnel will be borne by the Contractor.

C. Coordination of any utility and power interruption must be done with approval of the Architect/Construction Site Representative. Shutdowns must occur during non-occupied timeframes only.

D. Construction access to the site shall be limited to those designated for personnel, equipment and deliveries by the Owner. All contractor staging, parking and storage shall be coordinated with the Construction Site Representative and subject to change.

E. Payments: Each bid that covers more than one school (i.e. one SED project) shall provide completed AIA G732 & G703 by building (for each SED project).

F. No work shall be installed without approved shop drawings. Any work in place without approved shop drawings will be rejected and removed by that contractor at their expense and backed charge all other costs related to.
G. Any work deemed by CM, Architect and District not properly installed by a contractor per the contract drawings and specifications shall be removed immediately and corrected, with all associated costs to be borne solely by that contractor.
H. All prime contractors shall coordinate their contract work with other primes to meet the project schedule and for a complete operational system or area or work.
I. All contractors are to provide within 3 weeks of award a "base line" construction schedule for their work from commencement to completion including all phasing. This schedule is to be updated monthly to show percentage progress of each item listed. This schedule shall be revised to provide a recovery schedule in the event of a delay for any reason. The recovery schedule shall include the "base line" item and the recovery to show how the delay is affecting the overall project schedule. This schedule is to be provided in MS Project or Primavera. Excel schedules are not accepted.
J. Prime contractor "base line" schedules are to be reviewed by each prime contractor and coordinated where work is related and that each prime's work shall be included in each "base line" contractor's schedule as necessary for coordination.
K. All contractors are to provide 2-week look ahead schedules showing work related to the base line and shall be coordinated with other prime 2-week look ahead schedules. These schedules will be Excel format. Format will be provided by the CM.
L. Contractors to provide a full time supervisor on site 100% of the time. This is not a working foreman. Supervisors are not working with tools they are supervising their workers and coordinating with other contractors and district/ CM. Failure to provide will be default of your contract and subject costs related to and termination.
M. All prime contractors are the provide a project manpower structure showing names and telephone numbers of each responsible person on the project. This shall be updated as needed if personal changes are made.
N. All site equipment and dumpsters are to be behind temporary chain link fence when stored on site and or within the construction work zone where temporary chain link fence has been providing and installed by the prime. Each prime contractor is responsible to provide and install temporary chain link fence around their own stored equipment and dumpsters on site.
O. No equipment, panels or any services shall be turned off for any reason without written request and approval by the district. Project form shall be used for all shutdowns and required a 3-day notice. Other shutdowns may require more time.

3.1 **CONTRACT NO. 5 PLUMBING WORK** (PC-01) —PLUMBING PRIME CONTRACT AT BARR MIDDLE SCHOOL & NANUET HIGH SCHOOL

A. Project Site Superintendent: PC shall provide one (1) full time Project Site Superintendent while any work related to this Contract is being performed on site. Superintendent may be a working Foreman as long as the daily requirements of this Contract are maintained, as they relate to the Construction Documents and the Project Schedule. Construction Manager reserves the right, in their opinion, to revoke this privilege if these requirements are not maintained. Superintendent shall work closely with the Construction Manager, and the other Prime Contract Superintendents and Foremen, in a manner that best promotes the Project Master Schedules and the objectives of the Project.

1. Superintendent shall be on site while Prime Contractor's own forces, and/or their sub-contractors forces, are on site; also while other Prime Contracts are installing work, or require coordination of work, related to this Contract, and/or as requested by the Construction Manager.
2. Superintendent shall be the same individual throughout the Project.
3. Project Site Superintendent shall be an individual with minimum of five (5) years' experience in this field of work.
4. Refer to Section 013100 "Project Management and Coordination" for further requirements.

B. Project Foreman: PC shall provide at least one (1) full time Project Foreman during each shift of Work at each school; Foreman shall be able to make binding decisions, as they relate to the daily activities of their crew, as related to achieving the goals of the Project.

C. Site Communications: PC shall provide Project Superintendent with a mobile phone, all costs and service charges paid for by PC; provide Construction Manager with contact number(s).

D. Project Site Field Office: Provide site office facilities for this Contract's Project Superintendent. Site Office shall be equipped with telephone w/answering machine, fax, and e-mail. Contact information shall be provided to the Construction Manager.

1. The Owner reserves the right to seek reimbursement for temporary facilities not provided by this Prime Contract.

E. Scope of Work: In addition to Divisions 22 & 23, Work of the PC includes but is not limited to, the following:

1. Coordination with other Prime Contracts, Owner and Construction Manager as required to adhere to and maintain approved Project Master Schedules. Prior to first

payment, this includes submitting the Contractor's Construction Schedule to the Lead Contractors for preparation of the Project Master Schedules for all work related noted in the Contract Documents. All Plumbing demolition and new construction as indicated in the Contract Documents.

2. All Plumbing scope is identified on the drawings as noted on the Contract Documents. Prior to the submission of shop drawings for work related to this contract and as shown on the Contract Documents.
3. All housekeeping pads for mechanical equipment shall be furnish and installed by this prime contract.
4. This contract includes furnishing access doors for walls and ceiling as required, which may include fire rated conditions, and coordinate with Interior Contractor (IC) for installation.
5. Removal, safe storage off roof (or outside of work area, as coordinated with BE), and reinstallation of all existing roof mounted piping as indicated in the Contract Documents. Seal all penetrations upon removal of piping to protect building from weather. New supports for piping will be supplied by PC, coordinate with BE for installation of supports. Provide new roof mounted piping as indicated in the Contract Documents, inclusive of all supports, painting and labeling.
6. Temporary connection and disconnection of domestic water as required to facilitate asbestos abatement by others.
7. Work delineation between building and site is at five feet (5') outside of the face of building, existing and new, unless noted or assigned otherwise. The new underground water service final connection outside the structure shall be completed by this PC contractor and coordinated with the SW contractor for location and final connection.
8. Prime Contract shall understand that renovation work may require work to proceed while existing systems are required to be maintained; all cost associated with this sequence shall be anticipated, and incorporated into the Bid.
    a. PC shall be cognizant of phasing and sequencing conditions, that may require PC to make temporary connections or installations of plumbing components, in order to maintain operation of existing/new system configuration(s). It shall be the Prime Contract's responsibility to employ its own means and methods of accomplishing any such temporary conditions, at no additional cost to the owner.
9. Prime Contractor shall read and familiarized themselves with the Lead Sections of the Construction Documents. Lead-based paint has been identified to exist on specific areas/surfaces of the work located within the building(s), and when encountered the Prime Contractor shall follow all applicable regulations while working with this material.

10. Prime Contractor shall read and familiarized themselves with the Asbestos Sections of the Construction Documents. Asbestos Containing Material is scheduled to be abated throughout specific areas of the building(s). Should ACM be encountered (after Abatement is completed), that may interfere with an installation; Prime Contractor shall cease work, and notify Construction Manager immediately.
    a. Penetrations not coordinated with the Prime Contractor responsible for asbestos abatement, prior to abatement of these spaces, shall become the responsibility of the respective Prime Contract requiring the penetration.
11. Environmental Protection: Provide protection, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
    a. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms on or near the Project site.
12. The Plumbing Drawings are schematic in nature, and the PC will make adequate provisions to accommodate the actual field conditions without additional cost to the Owner.
13. **Plumbing contractor provides and installs flushometers and drills holes. PC supplies the associated transformer to the EC. All wiring of Flushometers is by EC.**
14. **All access doors for plumbing items provided by PC and installed by GC. PC is to review GC drawings and coordinate areas that will require access panels per building code.**
15. **PC is responsible for all cutting, trenching, and patching for new plumbing as required.**
16. **PC is required to/cut or raise any floor drains to meet new FFL.**
17. **All wall carriers are to be furnished and installed by PC. Coordinated with GC for FFL to adjust carrier height.**
18. **All plumbing lines are to be pressure tested per specification. The CM shall be present and witness pressure tests. PC to provide 1 week written notice for all testing. CM/Engineer may request PC to expose work for any plumbing not tested and concealed. All costs shall be those of the PC.**
19. **PC shall demonstrate flushing of all plumbing lines to CM prior to pressurization with water.**
20. Document on the Record Drawings all openings and penetrations larger than 2 inches in diameter.
21. Provide all demolition of Plumbing Systems indicated in the Construction Documents, and/or required for Work of this Prime Contract.
    a. Coordinate all demolition with Hazardous Materials documents.

b. Coordinate with all other Prime Contracts regarding all removals required for the Project.
c. Demolition of a system shall mean any and all components, removed in their entirety, to the point of origin or source.

22. Provide valves, whether permanent, chlorination, or temporary, to permit shutoff and/or capping of systems to achieve the Work of this Prime Contract.
23. Each Prime Contract shall be responsible for all respective SOG/SOD removals, and related infill thereof (doweled with #4 bar 16" o.c. unless otherwise detailed), that are not indicated on the Architectural Demolition plans.
    a. All concrete/masonry demolition shall be completed using wet saw methods.
24. PC shall coordinate housekeeping pads for new equipment with Interior Contractor. PC shall provide all shop drawings and information of new equipment.
25. PC shall provide all Work associated with creating structural openings or penetrations requiring lintels for their own work (i.e. ductwork and pipe penetrations). This applies to all openings/penetrations greater than 5-inches through masonry or concrete walls.
    a. MC, EC and PC shall indicate all required openings/penetrations requiring lintels on Coordination Drawings. Failure to note required openings/penetrations on the coordination drawings will require that the respective MC, EC and PC provide their own structural openings in accordance with the contract documents at no additional cost.
    b. Non-structural openings/penetrations, including those for convenience, shall be self-provided by the respective MC, EC and PC.
    c. This assignment applies to new and existing construction areas.
    d. Refer to Structural documents for lintel type/size requirements and Architectural drawings for wall types. Walls not specifically identified in the documents are to be assumed as masonry construction.
    e. All openings/penetrations are to be identified on Record Drawings by the Prime Contract requiring the opening.
    f. Exact physical locations shall be laid-out by PC for coordinated sequencing with all other prime contracts.
26. Provide cut and patch work related to that of this Prime Contract,, related to that of their Prime Contract, and at those areas specifically identified on the Construction Documents, regardless of trade creating the area to be patched.
    a. Each Prime Contract is responsible for all other respective Cutting & Patching required of their installations. Refer to Section 017329 "Cutting and Patching" for further information.
    b. Provide cut and patch for all affected materials at building interiors as required to provide access for relocation of existing or installation of new roof drains

and roof drain leaders, to point of connection to existing piping or to building exterior, as indicated in Contract Documents.

27. Provide new Plumbing system(s), or modifications of existing system(s) as indicated in the Construction Documents, complete and fully operational.
28. Final connections of utilities are by MC, EC or PC unless noted or assigned otherwise.
29. Provide sleeves required for piping penetrating walls, slabs and/or decks.
30. Provide through-penetration fire stop systems at all penetrations made by PC.. This Prime Contract shall maintain listed ratings of indicated assemblies. Provide repair of existing through-penetration fire stopping damaged by work of this Prime Contract.
    a. Sleeves with fire stopping are to be installed in sequence with fire-rated construction. This Prime Contract shall be responsible for installing fire stopping material at intersection of sleeve and constructed materials.
31. Provide coordination with, and notification to, the Construction Manager for all specified testing, training, commissioning, etc., of the Work of this Prime Contract. Refer to Division 00 Section "Project Forms" for applicable documentation documents.
32. Substantial Completion: Clean all mechanical and plumbing installations and provided equipment at the time of Substantial Completion or as directed by Construction Manager.
33. Coordinate all the preceding requirements, accordingly, with all applicable Alternates indicated in Section 012300 "Alternates".

F. Applicable Specification Sections: All specification Sections itemized below are to be provided complete by this Prime Contract, unless noted otherwise. In addition to these specifications, the contractor is required to review all specifications included in the overall contract that may contain related scope or detail for this specific contract.

29. All plumbing work, except underground services on site plans. Contract includes but not limited to, sprinkler piping and head replacements, all concrete demo and interior pads related to PC Equipment, all demo and discard of, piping, insulation and fittings, domestic water, cold water grounding reconnections, controls for any meters and equipment related to the water main work, feed water, all patching and painting related to the installation of their scope, all city filings and permits for any reason and as required, West Chester County Department of Health, throughout the District Wide Project (DW).

1. All Division 00 and 01 – Procurement and Contracting Requirements & General Requirements
2. Division 03 – Concrete
3. Division 07 – Thermal and Moisture Protection
4. Division 22 – Plumbing
5. Division 26 – Electrical, as related to installations of this Prime Contract specifically identified herein

G. Applicable Drawings : All drawings itemized below are to be provided complete by this Prime Contract, unless noted otherwise. In addition to these drawings, the contractor is required to review all drawings included in the overall contract that may contain related scope or detail for this specific contract.

H. **All "HS-P, & "BM-P" drawings**

I. Supplemental Temporary Facilities and Controls by PC include, but are not limited to:

1. Waste Disposal Facilities: Provided by each contractor.
2. Temporary Interior Barricades: Provide, maintain and eventually remove all temporary barricades per OSHA Regulations, Industry Standards, or as indicated in the Construction Documents. These include, but are not limited to, the following areas:
   a. To isolate new construction areas.
   b. To isolate renovation areas.
   c. Floor openings/penetrations, including stairwells.
      1) Horizontal Openings: close openings in floors and horizontal surfaces with load bearing, wood and/or steel framed construction per applicable regulations.
3. Temporary Doors, Frames & Wall Assemblies: Provide, maintain and eventually remove all temporary installations per OSHA Regulations, Industry Standards, or as indicated in the Construction Documents. Provide fire rated assemblies as required. Provide exit (panic bar/crash bar) devices at locations of egress. Coordinate locations with Construction Exiting Plan, Sequencing/Phasing Plans, and the Construction Manager. Temporary doors shall be constructed using ½" plywood and 2x construction, equipped with hasps, locks, handle and latch mechanism, and spring or counter weight installed to allow door to close after opening. Permanent doors will not be used in temporary conditions.
4. Temporary Sanitary Facilities: Provided by each contractor.

5. Existing Stair Usage: Use of Owner's existing stairs in unoccupied areas will be permitted, provided that at Substantial Completion, stairs are restored to conditions existing before initial use.
   a. Provide photo documentation of existing stair conditions prior to use by all Prime Contracts. Document during use, and at completion of the Renovation Project in order to document any and all damage to the Owner's property.
   b. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If, despite such protection, stairs become damaged, restore damaged areas so no evidence remains of correction work.
6. Indoor air quality management at all areas of Construction, once building is enclosed.
   a. Provide all necessary dust partitions, fans, temporary ducts, and barricades to properly contain and ventilate all work area fumes and odors, created by demolition and new construction or alterations, directly to the outside. Ventilate to an area outside the building, sufficiently away from the building, as not to contaminate other areas. There will be no additional claims honored if the Construction Manager requests additional ventilation or requirements.
   b. Provide and exhaust air system for the project indoor areas that could produce fumes, VOC's, off gasses, dusts, mists, or other emissions.
   c. System Operation:
      1) A sufficient quantity of exhaust fans in existing window openings or other approved locations shall be operated.
      2) Exhaust air system shall operate for a minimum of 72 hours after work is completed or until all materials have cured sufficiently so as to stop out – gassing of fumes or odors and area has been ventilated to remove all detectable traces of odors and fumes.
      3) Maintain 25 feet clearance from all temporary exhaust outlets to all active building outdoor air intakes.
      4) Refer to Division 01 Section "Work Restrictions" for further information.
7. Provide all shoring required for Work of this Prime Contract, including but not limited to;
   a. Cutting or altering of existing construction.
   b. Provide protection of all new and existing surfaces during the Work. Do not stand, walk, or work off of any unprotected finished surface above the floor.

8. Maintain temporary fencing and barricading to keep unauthorized persons away from dangerous and hazardous areas for which this Prime Contract is responsible.
9. Traffic Controls: Provide flagman while any operation of this Prime Contract interferes with traffic flow on adjacent roadways.

END OF SECTION 01 12 05

SECTION 01 21 00 – ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements governing allowances.
   1. Selected materials and equipment are specified in the Contract Documents by allowances. In some cases, these allowances include installation. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when additional information is available for evaluation. If necessary, additional requirements will be issued by Change Order.

B. Types of allowances include the following:
   1. Lump-sum allowances.
   2. Contingency allowances.

C. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Division 1 Section "Modification Procedures" specifies procedures for submitting and handling Change Orders.
   2. Division 1 Section "Quality Control Services" specifies procedures governing the use of allowances for inspection and testing.

1.3 SELECTION AND PURCHASE

A. At the earliest practical date after award of the Contract, advise the Architect of the date when the final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.

B. At the Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

C. Purchase products and systems selected by the Architect from the designated supplier

1.4 SUBMITTALS

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

B. Submit invoices or delivery slips to show the actual quantities of materials delivered to the site for use in fulfillment of each allowance.

1.5 CONTINGENCY ALLOWANCES

A. Use the contingency allowance only as directed for the Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.

B. The Contractor's overhead and profit, including costs for bonds and insurance, delivery, equipment rental and similar costs, for these allowances shall be included in the values of the general requirements of contract sum and are not chargeable under allowance disbursement.

C. At Project closeout, credit unused amounts remaining in the contingency allowance to the Owner by Change Order.

1.6 UNUSED MATERIALS

A. Return unused materials to the manufacturer or supplier for credit to the Owner, after installation has been completed and accepted.
   1. When requested by the Architect, prepare unused material for storage by Owner where it is not economically practical to return the material for credit. When directed by the Architect, deliver unused material to the Owner's storage space. Otherwise, disposal of unused material is the Contractor's responsibility.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine products covered by an allowance promptly upon delivery for damage or defects.

3.2 PREPARATION

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

3.3 SCHEDULE OF ALLOWANCES

A. Include a contingency allowance for each Base Bid according to the following schedule:

   1. Contract BE-01 – General Contract Work: Provide a Contingency Allowance of:
      a. $137,000 for use at **Miller Elementary School** according to Owner’s instructions.

   2. Contract GC-01 – General Contract Work: Provide a Contingency Allowance of:
      a. $8,000 for use at **Nanuet High School** according to Owner’s instructions.
      b. $45,000 for use at **Barr Middle School** according to Owner’s instructions.
      c. $22,000 for use at **Miller Elementary School** according to Owner’s instructions.

   3. Contract EC-01 – General Contract Work: Provide a Contingency Allowance of:
      a. $32,000 for use at **Nanuet High School** according to Owner’s instructions.
      b. $55,000 for use at **Barr Middle School** according to Owner’s instructions.
      c. $53,000 for use at **Miller Elementary School** according to Owner’s instructions.

   4. Contract MC-01 – General Contract Work: Provide a Contingency Allowance of:
      a. $285,000 for use at **Nanuet High School** according to Owner’s instructions.
      b. $33,000 for use at **Barr Middle School** according to Owner’s instructions.
      c. $27,000 for use at **Miller Elementary School** according to Owner’s instructions.

5. Contract PC-01 – General Contract Work: Provide a Contingency Allowance of:
   a. $13,000 for use at **Barr Middle School** according to Owner's instructions

END OF SECTION 012100

SECTION 01 22 00 - UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for unit prices.

B. Related Requirements:

1. Section 01 26 00 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
2. Section 01 45 00 "Quality Requirements" for general testing and inspecting requirements.

1.3 DEFINITIONS

A. Unit price is an amount incorporated in the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, overhead, and profit.

B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

General Contractor – GC-01

A. Unit Price GC #1: Abatement of VAT
   1. Description: Abatement of ACM floor Tile & Mastic (VAT) to be used as an add or deduct from base bid quantities.
   2. Unit of Measurement: Per Square Foot (SF) of flooring

B. Unit Price GC #2: Abatement of ACM pipe insulation
   1. Description: All labor and material Abatement of ACM pipe insulation (including elbows) to be used as an add or deduct from base bid quantities.
   2. Unit of Measurement: Per Linear Foot (LF) of insulation

C. Unit Price GC#3: Abatement of Transite Paneling
   1. Description: All labor and material Abatement of Transite Panel to be used as an add or deduct from the base bid quantities.
   2. Unit of Measurement: Per Square Foot (SF) of panel

D. Unit Price GC #4: Masonry Repointing
   1. Description: All labor and material to repoint existing masonry as indicated in the contract documents.
   2. Unit of Measurement: Per Square foot (SF)

E. Unit Price GC #5: Masonry Cleaning
   1. Description: All labor and material to clean existing masonry. Removal of grime and efflorescence.
   2. Unit of Measurement: Per Square foot (SF)

F. Unit Price GC #6: New Brick Furnish and Install
   1. Description: All labor and material to remove old brick and provide and install new brick as indicated in the contract documents.
   2. Unit of Measurement: Per Square foot (SF)

G. Unit Price GC #7: Scrape and Paint Steel Lintels
   1. Description: All labor and material to repoint existing masonry as indicated in the contract documents.
   2. Unit of Measurement: Per Square foot (SF)

H. Unit Price GC #8: Window Caulking with backer rod
   1. Description: All labor and material to repoint existing masonry as indicated in the contract documents.
   2. Unit of Measurement: Per Linear foot (LF)

I. Unit Price GC#9: Concrete Sidewalks
   1. Description: All labor and material to excavate, form, and pour concrete sidewalk per the contract documents, add to base bid quantities.
   2. Unit of Measurement: Per Square Foot (SF) of sidewalk.

Mechanical Contractor – MC

J. Unit Price MC #1: Abatement of VAT
   1. Description: All labor and material abatement of ACM floor Tile & Mastic (VAT) to be used as an add or deduct from base bid quantities.
   2. Unit of Measurement: Per Linear Foot (SF) of flooring

K. Unit Price MC #2: Abatement of ACM pipe insulation
   1. Description: All labor and material abatement of ACM pipe insulation (including elbows) to be used as an add or deduct from base bid quantities.
   2. Unit of Measurement: Per Linear Foot (LF) of insulation

END OF SECTION 01 22 00

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SECTION 01 23 00 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1.3 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. Schedule: A Schedule of Alternates is included at the end of this Section identifying each Alternate by number and describes basic changes to be incorporated into the Work only when that Alternate is made part of the Work by specific provision in the Owner/Contractor Agreement. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES:

A. CONTRACT GC-01-GENERAL CONSTRUCTION WORK:

1. GC-01 ALT #1: The contractor shall state the total amount to be **added** to the base bid to Renovate Business Administration suite as called out on Architectural drawings HS-AD401.1 & HS-A401.1, and Abatement drawings HS-ASB-2 noted with ALT #1.
2. GC-01 ALT #2: The contractor shall state the total amount to be **added** to the base bid to Replace the second floor corridor ceiling as called out on Architectural drawings HS-AD112.1 & HS-112.1.

B. CONTRACT EC-01-ELECTRICAL CONSTRUCTION WORK:

1. EC-01 ALT #1: The contractor shall state the total amount to be **added** to the base bid to remove existing, furnish and install all labor, equipment and material required to supply and install light fixtures in association with the renovation of the Business Administration suite as called out Electrical drawings HS-E401 noted with ALT #1.

2. EC-01 ALT #2: The contractor shall state the total amount to be **added** to the base bid to remove existing, furnish and install all labor, equipment and material required to supply and install light fixtures in association with the renovation of the second floor corridor as called out Electrical drawings HS-E402 noted with ALT #2.

3. EC-01 ALT #3: The contractor shall state the total amount to be **added** to the base bid to remove existing, furnish and install all labor, equipment and material required to replace the kitchen hood as called out Electrical drawings HS-E103 noted with ALT #3

4. EC-01 ALT #4: The contractor shall state the total amount to be **added** to the base bid to remove existing, furnish and install all labor, equipment and material required to replace rooftop exhaust fans as called out on Electrical drawings ME-E102 noted with ALT #4
5.

C. CONTRACT MC-01-MECHANICAL CONSTRUCTION WORK:

1. MC-01 ALT #1: The contractor shall state the total amount to be **deducted** to the base bid to remove existing Unit Ventilators, furnish and install all labor, equipment and material required to supply and install VRF's in association with the renovation of the Business Administration suite as called out Mechanical drawings HS-M401, HS-M402 noted with ALT #1.
2. MC-01 ALT #2: The contractor shall state the total amount to be **added** to the base bid to remove existing, furnish and install all labor, equipment and material required to replace

the kitchen hood as called out Mechanical drawings HS-M106 noted with ALT #2 and the related kitchen ceiling removals and modifications as called out on Architectural drawings HS-AD111.1 & HS-A111.1.

3. MC-01 ALT #3: The contractor shall state the total amount to be **added** to the base bid to remove existing, furnish and install all labor, equipment and material required to replace rooftop exhaust fans as called out on Mechanical drawings ME-M102 & ME-M103 noted with ALT #3 .

D. CONTRACT PC-01-PLUMBING CONSTRUCTION WORK:

1. PC-01 ALT #1: The contractor shall state the total amount to be **added** to the base bid to remove, furnish and install all labor, equipment and material required to extending and connect existing piping for a new wall sink in association with the renovation of the Lounge as called out Plumbing drawings HS-P101 noted with ALT #1.

   HS Admin kitchenette

END OF SECTION 012300

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SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for handling requests for substitutions made after award of the Contract.
   1. Single General Contracts: Provisions of this Section apply to the construction activities of General Contractor.

B. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Division 1 Section "Submittals" specifies requirements for submitting the Contractor's Construction Schedule and the Submittal Schedule.
   2. Division 1 Section "Materials and Equipment" specifies requirements governing the Contractor's selection of products and product options.

1.3 DEFINITIONS

A. Definitions in this Article do not change or modify the meaning of other terms used in the Contract Documents.

B. Substitutions: Changes in products, materials, equipment, and methods of construction required by the Contract Documents proposed by the Contractor after award of the Contract are considered to be requests for substitutions. The following are not considered to be requests for substitutions:
   1. Substitutions requested during the bidding period, and accepted by Addendum prior to award of the Contract, are included in the Contract Documents and are not subject to requirements specified in this Section for substitutions.
   2. Revisions to the Contract Documents requested by the Owner or Architect.
   3. Specified options of products and construction methods included in the Contract Documents.
   4. The Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.

1.4 SUBMITTALS

A. Substitution Request Submittal: The Architect will consider requests for substitution if received within 15 days after the award of the Work. Requests received more than 15 days after the award of the Work may be considered or rejected at the discretion of the Architect.
   1. Submit 3 copies of each request for substitution for consideration. Submit requests in the form and according to procedures required for change-order proposals. See 00 43 25 for the Substitution Request From.
   2. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers.
   3. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:

a. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate contractors, that will be necessary to accommodate the proposed substitution.
b. A detailed comparison of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements, such as performance, weight, size, durability, and visual effect.
c. Product Data, including Drawings and descriptions of products and fabrication and installation procedures.
d. Samples, where applicable or requested.
e. A statement indicating the substitution's effect on the Contractor's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.
f. Cost information, including a proposal of the net change, if any in the Contract Sum.
g. The Contractor's certification that the proposed substitution conforms to requirements in the Contract Documents in every respect and is appropriate for the applications indicated.
h. The Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of the failure of the substitution to perform adequately.

4. Architect's Action: If necessary, the Architect will request additional information or documentation for evaluation within one week of receipt of a request for substitution. The Architect will notify the Contractor of acceptance or rejection of the substitution within 2 weeks of receipt of the request, or one week of receipt of additional information or documentation, whichever is later. Acceptance will be in the form of a change order.
   a. Use the product specified if the Architect cannot make a decision on the use of a proposed substitute within the time allocated.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Conditions: The Architect will receive and consider the Contractor's request for substitution when one or more of the following conditions are satisfied, as determined by the Architect. If the following conditions are not satisfied, the Architect will return the requests without action except to record noncompliance with these requirements.

1. Extensive revisions to the Contract Documents are not required.
2. Proposed changes are in keeping with the general intent of the Contract Documents.
3. The request is timely, fully documented, and properly submitted.
4. The specified product or method of construction cannot be provided within the Contract Time. The Architect will not consider the request if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.
5. The request is directly related to an "or-equal" clause or similar language in the Contract Documents.
6. The requested substitution offers the Owner a substantial advantage, in cost, time, energy conservation, or other considerations, after deducting additional responsibilities the Owner must assume. The Owner's additional responsibilities may include compensation to the Architect for redesign and evaluation services, increased cost of other construction by the Owner, and similar considerations.

7. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
8. The specified product or method of construction cannot be provided in a manner that is compatible with other materials and where the Contractor certifies that the substitution will overcome the incompatibility.
9. The specified product or method of construction cannot be coordinated with other materials and where the Contractor certifies that the proposed substitution can be coordinated.
10. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provides the required warranty.
11. Where a proposed substitution involves more than one general contractor, each contractor shall cooperate with the other contractors involved to coordinate the Work, provide uniformity and consistency, and assure compatibility of products.

B. The Contractor's submittal and the Architect's acceptance of Shop Drawings, Product Data, or Samples for construction activities not complying with the Contract Documents do not constitute an acceptable or valid request for substitution, nor do they constitute approval.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 012500

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SECTION 012600 – CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for handling and processing contract modifications.

1. Multiple Prime Contracts: Provisions of this Section apply to the work of each prime contractor.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 1 Section "Submittals" for requirements for the Contractor's Construction Schedule.
2. Division 1 Section "Applications for Payment" for administrative procedures governing Applications for Payment.
3. Division 1 Section "Substitutions" for administrative procedures for handling requests for substitutions made after award of the Contract.

1.3 MINOR CHANGES IN THE WORK

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

1.4 SUBMITTALS

A. Every change or allowance proposal (regardless of whom initiated) will be accompanied by the following information:

1. Labor Rate worksheet (attached at the end of this section) must be filled out for each trade and notarized with the required supporting documentation.

2. Full itemized breakdown: All proposals to be broken down by material, labor, man hours, quantities, unit prices, overhead, profit, subcontractor, and supplier quotes attached.

3. If the contractor fails to submit this required information timely, it will be cause for delay and will be addressed as such under the applicable sections of the contract.

1.5 CHANGE ORDER PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: The Architect will issue a detailed description of proposed changes in the Work that will require adjustment to the Contract Sum or Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Proposal requests issued by the Architect are for information only. Do not consider them as an instruction either to stop work in progress or to execute the proposed change.

2. Within 10 days of receipt of a proposal request, submit an estimate of cost necessary to execute the change to the Architect for the Owner's review.

a. Include an itemized list of quantities of products required and unit costs, with the total amount of purchases to be made. Furnish survey data and backup paperwork to substantiate quantities. Separate labor hours by trade and indicate labor rate.
b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.

c. Include a statement indicating the effect the proposed change in the Work will have on the Contract Time.

B. Contractor-Initiated Proposals: When latent or unforeseen conditions require modifications to the Contract, the Contractor may propose changes by submitting a request for a change to the Architect.

1. Include a statement outlining the reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and Contract Time.
2. Include an itemized list of quantities of products required and unit costs, with the total amount of purchases to be made. Furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Comply with requirements in Section "Product Substitutions" if the proposed change requires substitution of one product or system for a product or system specified.

C. Proposal Request Form: Use AIA Document G731 for Change Order Proposal Requests.

1.6 ALLOWANCES

A. Allowance Adjustment: For allowance-cost adjustment, base each Change Order Proposal on the difference between the actual purchase amount and the allowance, multiplied by the final measurement of work-in-place. Where applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.

1. Include installation costs in the purchase amount only where indicated as part of the allowance.

2. When requested, prepare explanations and documentation to substantiate the margins claimed.
3. Submit substantiation of a change in scope of work claimed in the Change Orders related to unit-cost allowances.
4. The Owner reserves the right to establish the actual quantity of work-in-place by independent quantity survey, measure, or count.
5. Contractor's overhead and profit, including costs for bonds & insurances, for these allowances shall be included in the values of the general requirements of contract sum and are not chargeable under allowance disbursement.

B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or the Contractor's handling, labor, installation, overhead, and profit. Submit claims within 15 days of receipt of the Change Order or Construction Change Directive authorizing work to proceed. The Owner will reject claims submitted later than 15 days.

1. Do not include the Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in Contract Documents.
2. No change to the Contractor's indirect expense is permitted for selection of higher or lower-priced materials or systems of the same scope and nature as originally indicated.

1.7 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: When the Owner and the Contractor disagree on the terms of a Proposal Request, the Architect may issue a Construction Change Directive on AIA Form G733. The Construction Change Directive instructs the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. The Construction Change Directive contains a complete description of the change in the Work. It also designates the method to be followed to determine change in the Contract Sum or Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of the change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

1.8 CHANGE ORDER PROCEDURES

A. Upon the Owner's approval of a Proposal Request, the Architect will issue a Change Order for signatures of the Owner and the Contractor on AIA Form G731.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 012600

SECTION 012900 – PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements governing each prime contractor's Applications for Payment.

1. Coordinate the Schedule of Values and Applications for Payment with the Contractor's Construction Schedule, Submittal Schedule, and List of Subcontracts.

B. Related Sections: The following Sections contain requirements that relate to this Section.

1. Schedules: The Contractor's Construction Schedule and Submittal Schedule are specified in Division 1 Section "Submittals."

1.3 SCHEDULE OF VALUES

A. Coordination: Each prime Contractor shall coordinate preparation of its Schedule of Values for its part of the Work with preparation of the Contractors' Construction Schedule.

1. Correlate line items in the Schedule of Values with other required administrative schedules and forms, including:

a. Contractor's Construction Schedule.
b. Application for Payment forms, including Continuation Sheets.
c. List of subcontractors.
d. Schedule of allowances.
e. Schedule of alternates.
f. Schedule of submittals.

2. Submit the Schedule of Values to the Construction Manager within 10 days of receipt of Letter of Intent but no later than 7 days before the date scheduled for submittal of the initial Applications for Payment.

B. Format and Content: Use the Project Manual table of contents as a guide to establish the format for the Schedule of Values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the Schedule of Values:

a. Project name and location.

b. Name of the Architect.
c. Name of the Construction manager
d. Project number.
e. Contractor's name and address and contract number.
f. Date of submittal.

2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:

a. Related Specification Section or Division.
b. Description of Work.
c. Name of subcontractor.
d. Name of manufacturer or fabricator.
e. Name of supplier.
f. Change Orders (numbers) that affect value.
g. Dollar value.
    1) Percentage of Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

3. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Break principal subcontract amounts down into several line items. All items to have separate material and labor lines. Front end items will be broken out separately and have categories for bonds, insurance, submittals, field supervision, project management, cleanup, final cleanup (allowance – last page / entry). Balance of items separated by spec section and / or work activity (as directed by ARCHITECT).
4. Round amounts to nearest whole dollar; the total shall equal the Contract Sum.
5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment, purchased or fabricated and stored, but not yet installed.
6. **Payment Applications must be broken down and submitted by schools separately. The contractor shall list the SED number of each school as the project number on the header of each payment application and SOV.**

7. General Conditions shall be broken out in the contractor's SOV in the following format:
    a. Project Administration – 2%
    b. Supervision – 2%
    c. Meetings – 1%
    d. Submittals – 2%
    e. Cleanup – 1%
    f. Punchlist – 2%
    g. Closeout – 2%

8. Bonds and Insurance shall be a separate line items.

9. Differentiate between items stored on-site and items stored off-site. Include requirements for insurance and bonded warehousing, if required.

10. Provide separate line items on the Schedule of Values for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.

11. Unit-Cost Allowances: Show the line-item value of unit-cost allowances, as a product of the unit cost, multiplied by the measured quantity. Estimate quantities from the best indication in the Contract Documents.
12. Margins of Cost: Show line items for indirect costs and margins on actual costs only when such items are listed individually in Applications for Payment. Each item in the Schedule of Values and Applications for Payment shall be complete. Include the total cost and proportionate share of general overhead and profit margin for each item.

    a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at the Contractor's option.

13. Schedule Updating: Update and resubmit the Schedule of Values prior to the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.4 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications and payments as certified by 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 for Payment involve additional requirements.

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.

C. Payment-Application Times: The date for each progress payment is as designated by the Owner – typically the last Friday of the month). The period covered by each Application for Payment is the previous month. Contractors will submit their pencil copy of the 25th of the month. Late applications will not be processed until the next months billing period.

D. Payment-Application Forms: Use AIA Document G732/CMa and Continuation Sheets G703 as the form for Applications for Payment.

   1. Separate Continuation Sheets shall be provided for work which takes place on each building, which will detail that portion of the contract which is attributable to the specific building. The appropriate S.E.D. project number shall be shown on the top of each continuation form.

E. 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 were made.
   2. Include amounts of Change Orders and Construction Change Directives issued prior to the last day of the construction period covered by the application.
   3. Provide copies of payrolls which are signed and notarized documenting compliance with prevailing wage laws. Payroll for Prime Contractors is required from the 25th of the

previous month to the 24th of the current month. Payroll for Subcontractors is required from the 16th of the previous month to the 15th of the current month.

4. Provide copies of lien waivers for the previous payment. Include certificate of monthly payment for subcontractors for the previous month.
5. CONTRACTOR MUST SUBMIT AIA G706 & G706A with each payment application or the application will not be processed.
6. Provide tool box talks for pay period.
7. Provide OSHA Cards
8. Provide receipts and photos for any stored material being billed.

F. Transmittal: Submit 1 digital signed and notarized original copy of each Application for Payment to the Construction Manager by a method ensuring receipt within 24 hours. Each copy shall be complete, including waivers of lien, affidavit of debts and claims, certified payroll, OSHA 10 cards, tool box talks, and similar attachments, when required. Application for payments without the required backup will not be signed by the Architect, CM, or owner and thus will not be processed.

G. Waivers of Mechanics Lien: With each Application for Payment, submit waivers of mechanics liens (G706A) from subcontractors, sub-subcontractors and suppliers for the construction period covered by the previous application.

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 final Applications for Payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.

4. Waiver Forms: Submit waivers of lien on forms, and executed in a manner, acceptable to the Owner.

H. Initial Application for Payment: Administrative actions and submittals, that must precede or coincide with submittal of 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. When preliminary submissions are received with the initial application (items 4 and 7), the final submission for these items must be received and approved by the Architect prior to submission of the second application for payment.

1. List of subcontractors.
2. List of principal suppliers and fabricators.
3. Schedule of Values.
4. Contractor's Construction Schedule (preliminary if not final).
5. Schedule of principal products.
6. Schedule of unit prices.
7. Submittal Schedule (preliminary if not final).
8. List of Contractor's staff assignments.
9. List of Contractor's principal consultants.
10. Copies of building permits.
11. Copies of authorizations and licenses from governing authorities for performance of the Work.
12. Initial progress report.

13. Report of preconstruction meeting.
14. Certificates of insurance and insurance policies.
15. Performance and payment bonds.
16. Data needed to acquire the Owner's insurance.
17. Initial settlement survey and damage report, if required.

I. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an Application 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 records.
    d. Maintenance instructions.
    e. Meter readings.
    f. Startup performance reports.
    g. Changeover information related to Owner's occupancy, use, operation, and maintenance.
    h. Final cleaning.
    i. Application for reduction of retainage and consent of surety.
    j. Advice on shifting insurance coverages.
    k. Final progress photographs.
    l. 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 for Payment include the following:

1. Completion of Project closeout requirements.
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 to the Owner.
6. Certified property survey.
7. Proof that taxes, fees, and similar obligations were paid.
8. Removal of temporary facilities and services.
9. Removal of surplus materials, rubbish, and similar elements.
10. Change of door locks to Owner's access.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 012900

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SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and supervisory requirements necessary for coordinating construction operations including, but not necessarily limited to, the following:

1. General project coordination procedures.
2. Conservation.
3. Coordination Drawings.
4. Administrative and supervisory personnel.
5. Cleaning and protection.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 1 Section "Project Meetings" for progress meetings, coordination meetings, and pre-installation conferences.
2. Division 1 Section "Submittals" for preparing and submitting the Contractor's Construction Schedule.
3. Division 1 Section "Materials and Equipment" for coordinating general installation.
4. Division 1 Section "Contract Closeout" for coordinating contract closeout.

1.3 COORDINATION

A. Coordinate construction operations included in various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in the sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to assure maximum accessibility for required maintenance, service, and repair.
3. Make provisions to accommodate items scheduled for later installation.
4. Each Prime Contractor is required to coordinate with the General Contract #1, and be on site as walls are being built to lay out all penetrations to walls under construction and install their roughing as the walls are progressing.

B. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.

1. Prepare similar memoranda for the Owner and separate contractors where coordination of their work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and assure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of schedules.
2. Installation and removal of temporary facilities.
3. Processing of submittals and photocopying/delivery to affected contractors.
4. Progress meetings.
5. Project closeout activities.

D. Conservation: Coordinate construction operations to assure that operations are carried out with consideration given to conservation of energy, water, and materials.

1. Salvage materials and equipment involved in performance of, but not actually incorporated in, the Work.

1.4 SUBMITTALS

A. Coordination Drawings: Prepare coordination drawings where careful coordination is needed for installation of products and materials fabricated by separate entities. Prepare coordination drawings where limited space availability necessitates maximum utilization of space for efficient installation of different components.

1. Show the relationship of components shown on separate Shop Drawings.
2. Indicate required installation sequences.
3. Comply with requirements contained in Section "Submittals."
4. A coordination meeting with all Prime Contractors to review completed coordination drawings will be held within 30 days of Contract award.

B. Staff Names: Within 15 days of commencement of construction operations, submit a list of the Contractor's principal staff assignments, including the superintendent and other personnel in attendance at the Project Site. Identify individuals and their duties and responsibilities. List their addresses and telephone numbers.

1. Post copies of the list in the Project meeting room, the temporary field office, and each temporary telephone.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 GENERAL COORDINATION PROVISIONS

A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

B. Coordinate temporary enclosures with required inspections and tests to minimize the necessity of uncovering completed construction for that purpose.

3.2 CLEANING AND PROTECTION

A. Each Prime Contractor is to clean and protect construction in progress and adjoining materials in place, during handling and installation. Apply protective covering where required to assure protection from damage or deterioration at Substantial Completion.

B. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to assure operability without damaging effects.

C. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:

1. Excessive static or dynamic loading.
2. Excessive internal or external pressures.
3. Excessively high or low temperatures.
4. Thermal shock.
5. Excessively high or low humidity.
6. Air contamination or pollution.
7. Water or ice.
8. Solvents.
9. Chemicals.
10. Light.
11. Radiation.
12. Puncture.
13. Abrasion.
14. Heavy traffic.
15. Soiling, staining, and corrosion.
16. Bacteria.
17. Rodent and insect infestation.
18. Combustion.
19. Electrical current.
20. High-speed operation.
21. Improper lubrication.
22. Unusual wear or other misuse.
23. Contact between incompatible materials.
24. Destructive testing.
25. Misalignment.
26. Excessive weathering.
27. Unprotected storage.
28. Improper shipping or handling.
29. Theft.
30. Vandalism.

END OF SECTION 013100

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SECTION 013119 - PROJECT MEETINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for project meetings, including, but not limited to, the following:

1. Preconstruction conferences.
2. Preinstallation conferences.
3. Progress meetings.
4. Coordination meetings.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 1 Section "Coordination" for procedures for coordinating project meetings with other construction activities.
2. Division 1 Section "Submittals" for submitting the Contractor's Construction Schedule.

1.3 PRECONSTRUCTION CONFERENCE

A. A preconstruction conference will be scheduled before starting construction, at a time convenient to the Owner and the Architect and construction manager, but no later than 14 days after execution of the Agreement. The conference will be held at the Project Site or another convenient location.

B. Attendees: Authorized representatives of the Owner, Architect, construction manager and their consultants; the Contractor and its superintendent; major subcontractors; manufacturers; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.

C. Agenda: Discuss items of significance that could affect progress, including the following:

1. Tentative construction schedule.
2. Critical work sequencing.
3. Designation of responsible personnel.
4. Procedures for processing field decisions and Change Orders.
5. Procedures for processing Applications for Payment.
6. Distribution of Contract Documents.
7. Submittal of Shop Drawings, Product Data, and Samples.
8. Preparation of record documents.

9. Use of the premises.
10. Parking availability.
11. Office, work, and storage areas.
12. Equipment deliveries and priorities.
13. Safety procedures.
14. First aid.
15. Security.
16. Housekeeping.
17. Working hours.

D. Reporting: Construction Manager shall prepare and issue minutes to attendees and interested parties.

1.4 PREINSTALLATION CONFERENCES

A. Conduct a pre-installation conference at the Project Site before each construction activity that requires coordination with other construction.

B. Attendees: The Installer and representatives of the Prime Contractor, manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise the Construction Manager of scheduled meeting dates.

1. Review the progress of other construction activities and preparations for the particular activity under consideration at each pre-installation conference, including requirements for the following:

a. Contract Documents.
b. Options.
c. Related Change Orders.
d. Purchases.
e. Deliveries.
f. Shop Drawings, Product Data, and quality-control samples.
g. Review of mockups.
h. Possible conflicts.
i. Compatibility problems.
j. Time schedules.
k. Weather limitations.
l. Manufacturer's recommendations.
m. Warranty requirements.
n. Compatibility of materials.
o. Acceptability of substrates.
p. Temporary facilities.
q. Space and access limitations.
r. Governing regulations.
s. Safety.
t. Inspecting and testing requirements.
u. Required performance results.
v. Recording requirements
w. Protection.

2. Record significant discussions and agreements and disagreements of each conference and the approved schedule. Promptly distribute the record of the meeting to everyone concerned, including the Owner and the Architect.
3. Do not proceed with the installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of Work and reconvene the conference at the earliest feasible date.
4. Reporting: Prime Contractor or Installer shall issue minutes to attendees, Owner and Architect, and construction manager.

1.5 PROGRESS MEETINGS

A. Progress meetings will be held at the Project Site on a weekly basis.

B. Attendees: In addition to representatives of the Owner and the Architect and Construction Manager, each Prime Contractor shall be represented at these meetings. **Attendance is mandatory at each meeting and a penalty sum of $500.00 per missed meeting will be assessed to the Prime Contractor not attending without prior written authorization from the Architect. This sum can be deducted from the contractors Schedule of Values.** Subcontractors, suppliers, or other entities will be invited at the discretion of the Owner and the Architect. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.

C. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the status of the Project.

1. Contractor's Construction Schedule: Review progress since the last meeting. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to insure that current and subsequent activities will be completed within the Contract Time.
2. Review the present and future needs of each entity present, including the following:

    a. Interface requirements.
    b. Time.
    c. Sequences.
    d. Status of submittals.
    e. Deliveries.
    f. Off-site fabrication problems.
    g. Access.
    h. Site utilization.
    i. Temporary facilities and services.
    j. Hours of work.
    k. Hazards and risks.
    l. Housekeeping.
    m. Quality and work standards.
    n. Change Orders.
    o. Documentation of information for payment requests.

D. Reporting: Approximately 5 days after each meeting, Construction Manager will prepare and distribute minutes of the meeting to each party present and to parties who should have been

present. Include a brief summary, in narrative form, of progress since the previous meeting and report.

1.6 COORDINATION MEETINGS

A. Conduct project coordination meetings at regular intervals convenient for all parties involved. Project coordination meetings are in addition to specific meetings held for other purposes, such as regular progress meetings and special pre-installation meetings.

B. Request representation at each meeting by every party currently involved in coordination or planning for the construction activities involved.

C. Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

D. The Owner's Field Manager will conduct daily meetings with all prime contractors performing work. The purpose of the meeting is to provide the opportunity for each prime contractor to communicate to the Field Manager any items relating to their respective construction activity for that day (request for shutdown, deliveries, etc.) The meetings will commence from 7:00 o'clock am until 7:30 o'clock am. The foreman of each Prime Contractor must attend. These meetings are generally informal. The Field Manager will keep minutes of these meetings when appropriate and will be available upon request.

1.7 SAFETY MEETINGS

A. Each Prime Contractor will be responsible to conduct safety meetings on a regular basis (but not less than three times during any thirty day period.)

B. Minutes of the Safety Meeting must be submitted to the construction manager within 4 business days. Failure to conduct and submit meeting minutes will be grounds to reject the Prime Contractor's progress payment.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 013119

SECTION 01 31 50 - SAFETY AND HEALTH

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 PROJECT SITE SAFETY

A. The Prime Contractor, not the Architect, is responsible for Project site safety.

1.3 SAFETY AND HEALTH REGULATIONS

A. The Prime Contractor, and any entity working for the Prime Contractor, shall comply with the U.S. Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91-54), latest revisions and with the latest requirements of the "Right to Know" laws and the New York State Labor Law.

B. In order to protect the general public and the lives and health of his/her employees under the Contract, the Prime Contractor shall comply with all pertinent provisions of the latest issues of the Federal Register, Bureau of Labor Standards, Safety and Health Regulations; New York State Industrial Code Rule 30 pertaining to Tunneling Operations; New York State Industrial Code Rule 23 pertaining to Trenching Operations; and the "Manual of Accident Prevention in Construction" issued by the Associated General Contractors of America, Inc., and shall maintain an accurate record of all cases of death, occupational disease, and injury requiring medical attention or causing loss of time from work under this Contract. In case of a conflict between the above noted authorities the most stringent shall prevail.

C. The Prime Contractor shall have on the project site at all times, while work is in progress, at least one person skilled in safety and health procedures and familiar with State and Federal safety and health regulations whose responsibility shall be to observe methods and procedures. He shall have the duty and authority to stop and correct all unsafe and unhealthy conditions.

D. Toxic, noxious or otherwise hazardous fumes, gases or dusts, etc. from welding, cadwelding, painting, grinding, sawing, sweeping or any other operations shall be kept to the absolute minimum and shall be vented directly to the outside by the Contractor, and only used when authorized by the Architect.

E. The Prime Contractor to submit to the Architect, prior to first payment application approval, 2 copies of Material Safety and Data Sheets (MSDS) for all material used on site. The Prime Contractor shall also keep one (1) complete set of Material Safety and Data Sheets (MSDS) onsite at all times.

1. These reference materials shall be updated continuously throughout the Project, as additional materials are added to/brought to the Project site.

1.4 SAFETY AND FIRST AID

A. The Prime Contractor shall at all times exercise caution of his/her operations and shall be responsible for the safety and protection of all persons on or about the site arising out of or relating to his/her Work. All hazards shall be avoided or guarded in accordance with the provisions of the Manual of Accident Prevention in Construction of the AGCA, unless such provisions contravene local law. The safety provisions of all applicable laws, codes and ordinances shall be observed.

B. The Prime Contractor shall provide and maintain at the Site, at each location where work is in progress, as part of his/her plant, an approved first aid kit. Ready access thereto shall be provided at all times when persons are employed on the work site.

C. The Prime Contractor shall take due precautions against infectious diseases and shall arrange for the immediate isolation and removal from the Site of any employee who becomes ill or is injured while engaged on the work site.

D. The Prime Contractor shall, upon request of the Architect, immediately correct all conditions that constitute a clear and present danger to persons as interpreted by the Architect. If such danger is not so corrected, the Owner or the Architect will employ other persons to do such work and the expense thereof shall be deducted from any monies due or to become due to the Prime Contractor.

E. Clean up of the Prime Contractor's, and/or their subcontractor's, materials and/or debris shall be deemed a safety and health issue.

1.5 ACCIDENTS AND ACCIDENT REPORTS

A. Notify Architect immediately of any accidents involving Prime Contractor, subcontractor or supplier personnel on site.

B. Within 24 hours of the occurrence, the Prime Contractor shall submit a written accident report, to the Architect, fully detailing the occurrence.

1.6 TOOL BOX SAFETY MEETINGS

A. The Prime Contractor shall hold weekly toolbox safety meetings with his/her own workers. Records of these meetings shall be forwarded to the Owner, through the Construction Site Coordinator's office, each week.

1. Failure to comply with this requirement shall result in Applications for Payment not being reviewed and processed.

2. **Tool box talks must be submitted with application for payment**.

1.7 OTHER SAFETY REQUIREMENTS

A. All prime contractors are required to perform the following safety measures on all project sites and construction zones/areas.
1. Hard hats, safety googles/glasses, and safety vests are mandatory and shall be worn at all times by all persons on the project.
2. All construction workers shall wear photo ID at all times and be visible on the person, failure to do so will result to that employee being asked to leave until such ID has been worn visible.
3. All visitors are required to check in with the CM for any reason and not allowed on site without proper PPE.
4. Any workers not wearing PPE will asked to stop working until PPE is appropriate donned. All second offense of said worker, he /she will be removed from site and all district work. All contractors are required to keep the work areas clean and safe from all hazards at all times.
5. Site contractor is to review provided phasing/logistics plan and assume at a minimum quantities of site fencing/protections indicated in those plans be provided in their contract.
6. Some contracts will not be provided a logistics plan to reference due the nature of their work. The contractor is still required to assume the use of construction fencing around all dumpsters and any exterior work area. Any interior work to proceed while school building are occupied require the use of 1 hour rated fire barriers to separate students and staff from active construction. This is to be assumed in the contractor's bid, and is at the CM's discretion to request additional protections as deemed necessary during construction.
7. All fencing shall have construction sign at every 50 feet stating ''CONSTRUCTION AREA; NO UNAUTHORIZED PERSONAL; NO TRESSPASSING. and continuous scrim.
8. All site contractors are required to clean up outside of their chain link and gated fenced in work zone(s) where construction debris may have fallen on a non-work zone area. Sand bags are not considered anchoring.

9. Where driven anchoring of fencing is not feasible due to protection of installed finishes and existing conditions, contractor shall provide YODOCK barriers around construction sites with integral fence panels above.
10. Contractor shall ensure that all chain link construction fence/barriers around the work zone is closed off to any adjacent structure, building, etc. ending the fence perimeter work zone at all times. These areas are the be checked 3 times a day, once before the start of work, mid shift and before the contractor leaves at the end of shift.
11. All site contractors are to have a 24-hour available emergency contact person available to fix and correct areas that have been compromised after hours, weekends and holidays. Upon notification of such incident the contractor is required to deploy workers as necessary within 1-2 hours maximum to be on site to correct such matters reported.
12. All gas-powered equipment shall have the spark plugs removed at the end of each day so that these cannot be started in any way.
13. All LULLS, man lifts, and all equipment shall not have keys left inside and all booms shall be lowered when not in use.
14. All site contractors shall have a dedicated site safety experienced (Manager) person responsible for the site safety with a minimum of 30 hours OSHA training certificate. This person shall be responsible to ensure that the perimeter work zones are free from any fallen construction and trip hazards at the minimum of the 3 field surveys as stated in item 9 above and as noted elsewhere in contract. . Site walk logs are to be submitted daily to the CM including safety status and any items found and corrected.
15. All dumpsters are to be fully surrounded with chain link fence if stored outside other fenced/barricaded work areas.
16. All safety observation reports issued to contractors shall be corrected immediately. If the contractor fails to respond and/or correct the condition(s) included in the safety observation report, that contractor will be subject to termination and charged by the District with all costs related to correcting the reported condition(s) and any other items related thereto.
17. **All contractors are to conform to 155.5 SED Code.**
18. All contractors are to submit their "tool box talks" weekly to the CM.
19. All contractors are to submit daily reports of their activities related to work performed, manpower, equipment onsite and all safety measures put in place that day and any maintenance/monitoring thereof.
20. All contractors are required to provide "egress plans" for both interior and exterior work for locations where work will close off any exits, corridors, pathways, roads, and any access way. These plans are to be provided in advance at least 2 months before work commences in that area, no work shall be started in any manner without approval of such plan. The failure to provide such plan for coordinating and scheduling will result into back charges to the prime(s) involved. These plans

must include all locations and details where scaffolding, fencing and all temporary construction barriers are required.

21. All contractors are to provide their corporate safety manuals to the CM prior to commencement of any work. Under no circumstances can any field work can start without receipt of such manual. This shall be provided in a 3-ring binder in PDF format. Contractors shall maintain a copy on site.
22. All personnel who fail to wear the required PPE while onsite will be warned and directed to stop work until PPE is properly worn. In the event that an employee is warned a second time for failure to comply with PPE requirements, said employee will be removed from all New Rochelle School projects. If the company continues to fail with their employees not abiding by the safety contract requirements, that contractor will be subject to termination for such endangerment of other workers and others.
23. All contractors are required to have a full time flagman(men) as needed at all times escorting construction vehicles into entrances and out of exits to the property/work zone. when . Flagman are required to escort construction vehicles to and from work areas to property lines and public streets. At every gate, the Prime Contractor shall post signage indicating contractor name and contact information including 24-hour emergency telephone number.
24. All contractors storing any materials and equipment on site shall be surrounded with chain link fencing.

END OF SECTION 013150

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SECTION 01 32 33 - PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Preconstruction photographs.
2. Periodic construction photographs.
3. Final completion construction photographs.
    a. Name of Contractor.
    b. Date photograph was taken.
    c. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
    d. Unique sequential identifier keyed to accompanying key plan.

1.3 USAGE RIGHTS

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

PART 2 - PRODUCTS

2.1 PHOTOGRAPHIC MEDIA

A. Digital Images: Provide images in JPG format, produced by a digital camera with minimum sensor size of 8 megapixels, and at an image resolution of not less than 3200 by 2400 pixels.

PART 3 - EXECUTION

3.1 CONSTRUCTION PHOTOGRAPHS

A. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.

1. Maintain key plan with each set of construction photographs that identifies each photographic location.

B. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.

1. Date and Time: Include date and time in file name for each image.
2. Field Office Images: Maintain one set of images accessible in the field office at Project site, available at all times for reference. Identify images in the same manner as those submitted to Architect and Construction Manager.

C. Preconstruction Photographs: Before commencement of excavation take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect and Construction Manager.

1. Flag construction limits before taking construction photographs.
2. Take 20 photographs to show existing conditions adjacent to property before starting the Work.
3. Take 20 photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
4. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.

D. Periodic Construction Photographs: Take 20 photographs weekly, with timing each month adjusted to coincide with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.

E. Architect and Construction Manager-Directed Construction Photographs: From time to time, Architect and Construction Manager will instruct photographer about number and frequency of photographs and general directions on vantage points. Select actual vantage points and take photographs to show the status of construction and progress since last photographs were taken.

F. Time-Lapse Sequence Construction Photographs: Take 20 photographs as indicated, to show status of construction and progress since last photographs were taken.

1. Frequency: Take photographs weekly, with timing each month adjusted to coincide with the cutoff date associated with each Application for Payment.
2. Vantage Points: Following suggestions by Architect and Construction Manager and Contractor, photographer to select vantage points. During each of the following construction phases, take not less than two of the required shots from same vantage point each time to create a time-lapse sequence as follows:

a. Commencement of the Work, through completion of subgrade construction.
b. Above-grade structural framing.
c. Exterior building enclosure.
d. Interior Work, through date of Substantial Completion.

G. Final Completion Construction Photographs: Take 20 color photographs after date of Substantial Completion for submission as project record documents. Architect and Construction Manager will inform photographer of desired vantage points.

1. Do not include date stamp.

END OF SECTION 01 32 33

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SECTION 013300 - ELECTRONIC SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

B. Related Sections:

1. Division 01 Section “Payment Procedures” for submitting Applications for Payment and the schedule of values.

2. Division 01 Section “Construction Progress Documentation” for submitting schedules and reports, including Contractor’s construction schedule.

3. Division 01 Section “Operation and Maintenance Data” for submitting operation and maintenance manuals.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect’s responsive action. Action submittals are those submittals indicated in individual Specification Sections as action submittals.

B. Informational Submittals: Written and graphic information and physical samples that do not require Architect’s responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as informational submittals.

C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.

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

1.4 ACTION SUBMITTALS

A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or modifications to submittals noted by the Architect and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.

2. Initial Submittal: Submit concurrently with start-up construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.

3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.

    a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.

4. Format: Arrange the following information in a tabular format:

    a. Scheduled date for first submittal.
    b. Specification Section number and title.
    c. Submittal category: Action, informational.
    d. Name of subcontractor.
    e. Description of the Work covered.
    f. Scheduled date for Architect's final release or approval.
    g. Scheduled dates for purchasing.
    h. Scheduled dates for installation.
    i. Activity or event number.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Architect's Digital Data Files: Electronic copies of REVIT Drawings of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals.

1. Architect will furnish Contractor one set of digital data drawing files of the Contract Drawings for use in preparing Shop Drawings and Project record drawings.

    a. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.

    b. Digital Drawing Software Program: The Contract Drawings are available in REVIT Version 2020.

    c. Contractor shall execute a data licensing agreement that will be supplied by Architect.

    d. The following plot files will by furnished for each appropriate discipline:

        1) Floor plans
        2) Site plans .

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.

2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.

3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.

4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

   a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 10 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.

2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.

3. Resubmittal Review: Allow 10 days for review of each resubmittal.

4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 15 days for initial review of each submittal.

5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 15 days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.

D. Identification and Information: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file with links enabling navigation to each item.

2. Name file with submittal number or other unique identifier, including revision identifier.

   a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., BR-061000.01 or MH-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., BR-061000.01.A or MH-061000.01.A).

3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.

4. Include the following information on an inserted cover sheet:

a. Project name.
b. Date.
c. Name and address of Architect.
d. Name of Contractor.
e. Name of firm or entity that prepared submittal.
f. Name of subcontractor.
g. Name of supplier.
h. Name of manufacturer.
i. Number and title of appropriate Specification Section.
j. Drawing number and detail references, as appropriate.
k. Location(s) where product is to be installed, as appropriate.
l. Related physical samples submitted directly.
m. Other necessary identification.

5. Include the following information as keywords in the electronic file metadata:

a. Project name.
b. Number and title of appropriate Specification Section.
c. Manufacturer name.
d. Product name.

E. Options: Identify options requiring selection by the Architect.

F. Deviations: Identify deviations from the Contract Documents on submittals.

G. Transmittal: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Contracting Officer will return submittals, without review, received from sources other than Contractor.

1. Transmittal Form: Provide locations on form for the following information:

a. Project name.
b. Date.
c. Destination (To:).
d. Source (From:).
e. Names of subcontractor, manufacturer, and supplier.
f. Category and type of submittal.
g. Submittal purpose and description.
h. Specification Section number and title.
i. Indication of full or partial submittal.
j. Drawing number and detail references, as appropriate.
k. Transmittal number, numbered consecutively.
l. Submittal and transmittal distribution record.
m. Remarks.
n. Signature of transmitter.

2. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

H. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.

I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

J. Use for Construction: Use only final submittals that are marked with approval notation from Architect's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Submit electronic submittals via email as PDF electronic files.

    a. Architect, through Contracting Officer, will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.

2. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 01 Section "Closeout Procedures."

3. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.

    a. Provide a digital signature with digital certificate on electronically-submitted certificates and certifications where indicated.
    b. Provide a notarized statement on original paper copy certificates and certifications where indicated.

4. Test and Inspection Reports Submittals: Comply with requirements specified in Division 01 Section "Quality Requirements."

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.

2. Mark each copy of each submittal to show which products and options are applicable.

3. Include the following information, as applicable:

    a. Manufacturer's catalog cuts.
    b. Manufacturer's product specifications.
    c. Standard color charts.

d. Statement of compliance with specified referenced standards.
e. Testing by recognized testing agency.
f. Application of testing agency labels and seals.
g. Notation of coordination requirements.
h. Availability and delivery time information.

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

a. Wiring diagrams showing factory-installed wiring.
b. Printed performance curves.
c. Operational range diagrams.
d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before or concurrent with Samples.

6. Submit Product Data in the following format:

a. PDF electronic file.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal based upon Architect's digital data drawing files is otherwise permitted.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

a. Identification of products.
b. Schedules.
c. Compliance with specified standards.
d. Notation of coordination requirements.
e. Notation of dimensions established by field measurement.
f. Relationship and attachment to adjoining construction clearly indicated.
g. Seal and signature of professional engineer if specified.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 30 by 42 inches (750 by 1067 mm).

3. Submit Shop Drawings in the following format:

a. PDF electronic file.

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.

2. Identification: Attach label on unexposed side of Samples that includes the following:

a. Generic description of Sample.
b. Product name and name of manufacturer.

c. Sample source.
d. Number and title of applicable Specification Section.

3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
b. Samples not incorporated into the Work, or otherwise designated as Government's property, are the property of Contractor.

4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect, through Contracting Officer, will return submittal with options selected.

5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

a. Number of Samples: Submit three sets of Samples. Architect will retain one Sample set; remainder will be returned. Mark up and retain one returned Sample set as a Project record sample.

1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product indicated in the Contract Documents.

2. Manufacturer and product name, and model number if applicable.

3. Number and name of room or space.

4. Location within room or space.

5. Submit product schedule in the following format:

a. PDF electronic file.

F. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."

G. Application for Payment: Comply with requirements specified in Division 01 Section "Payment Procedures."

H. Schedule of Values: Comply with requirements specified in Division 01 Section "Payment Procedures."

I. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, and telephone number of entity performing subcontract or supplying products.

2. Number and title of related Specification Section(s) covered by subcontract.

3. Drawing number and detail references, as appropriate, covered by subcontract.

4. Submit subcontract list in the following format:

a. PDF electronic file.

J. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

K. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on American Welding Society (AWS) forms. Include names of firms and personnel certified.

L. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

M. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

N. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

O. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

P. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

Q. Product Test Reports: Submit written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

R. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

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

S. Schedule of Tests and Inspections: Comply with requirements specified in Division 01 Section "Quality Requirements."

T. Field Test Reports: Submit reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

U. Maintenance Data: Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Contracting Officer.

B. Project Closeout and Maintenance/Material Submittals: Refer to requirements in Division 01 Section "Closeout Procedures."

C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action, as follows:

1. Approved: Where the submittal is marked "Approved," the Work covered by the submittal may proceed provided it complies with the Contract Documents. Final acceptance will depend on that compliance.

2. Approved As Corrected (do not resubmit): Where the submittal is marked "Approved As Corrected" the work covered by the submittal may proceed provided it complies both with Architect's notations and corrections on the submittal and the Contract Documents. Final acceptance will depend on that compliance.

3. Revise and Resubmit (see notes): Where the submittal is marked “Revise and Resubmit” do not proceed with the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity for the product submitted. Revise and prepare a new submittal according to Architect’s notations and corrections.

4. Rejected: Where the submittal is marked “Rejected”, do not proceed with the Work covered by the submittal. Prepare a new submittal for a product that complies with the Contract Documents.

C. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

5. Submit Specified Item: Where the submittal is marked “Submit Specified Item”, do not proceed with the Work covered by the submittal. Prepare a new submittal for a product that complies with the Contract Documents.

D. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.

E. Incomplete submittals are not acceptable, will be considered nonresponsive, and will be returned without review.

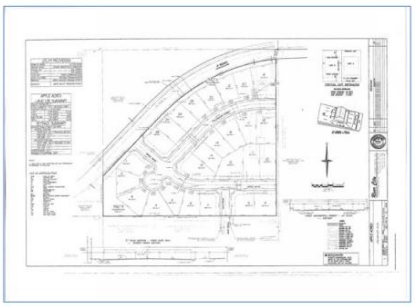
F. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 013300

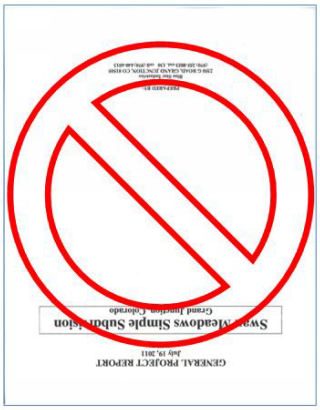
Document Orientation Guide

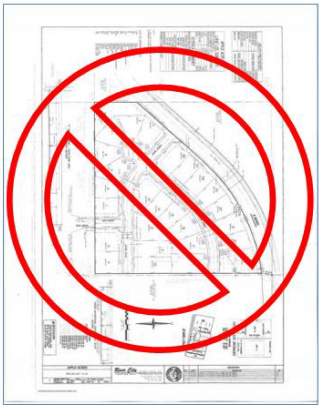
Correct Orientation:





Incorrect Orientation:





No:_____

SUBMITTAL COVERSHEET
Nanuet UFSD –Phase 4 Projects

Architect:
KSQ Architects
215 W 40th Street,15th Floor
New York, NY 10018

Owner:
Nanuet Union Free School District
101 Church Street
Nanuet, NY 10954

Construction Manager:
Jacobs
One Penn Plaza, 54th floor
New York, NY 10019

Contractor: _____ **Contract:** _____

Address: _____ **Telephone:** _____

_____ **Fax:** _____

School Name: _____

Type of Submittal: **Re-submittal: [ ] No [ ] Yes**

[ ] Shop Drawings **[ ]** Product Data **[ ]** Schedule **[ ]** Sample **[ ]** _____
[ ] Test Report **[ ]** Certificate **[ ]** Color Sample **[ ]** Warranty **[ ]** _____

Submittal Description:

Product Name: _____

Manufacturer: _____

Subcontractor/ Supplier: _____

References:

Spec. Section No.: _____ **Drawing No(s):** _____

Paragraph: _____ **Rm. or Detail No(s):** _____

Architect's/ Engineer's Review Stamp	Contractor Review Statement: These documents have been checked for accuracy and coordinated with job conditions and Contract requirements by this office and have been found to comply with the provisions of the Contract Documents. _____ Name: Date: Company Name:

_____
_____
_____
_____
_____

Remarks:

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SECTION 01 4200 – REFERENCES STANDARDS AND DEFINITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DEFINITIONS

A. General: Basic contract definitions are included in the Conditions of the Contract.

B. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on the Drawings, or other paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the reader locate the reference. Location is not limited.

C. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by the Architect, requested by the Architect, and similar phrases.

D. "Approved": The term "approved," when used in conjunction with the Architect's action on the Contractor's submittals, applications, and requests, is limited to the Architect's duties and responsibilities as stated in the Conditions of the Contract.

E. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": The term "furnish" means supply and deliver to the Project Site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": The term "install" describes operations at the Project Site including the actual unloading, unpacking, assembly, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

H. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.

I. "Installer": An installer is the Contractor or another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction activity, including installation, erection, application, or similar operations. Installers are required to be experienced in the operations they are engaged to perform.

1. The term "experienced," when used with the term "installer," means having a minimum of 5 previous projects similar in size and scope to this Project, being familiar with the special requirements indicated, and having complied with requirements of authorities having jurisdiction.

2. Trades: Using terms such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.

3. Assigning Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized exp

erts in those operations. The specialists must be engaged for those activities, and their assignments are requirements over which the Contractor has no option. However, the ultimate responsibility for fulfilling contract requirements remains with the Contractor.

a. This requirement shall not be interpreted to conflict with enforcing building codes and similar regulations governing the Work. It is also not intended to interfere with local trade-union jurisdictional settlements and similar conventions.

J. "Project Site" is the space available to the Contractor for performing construction activities, either exclusively or in conjunction, with others performing other work as part of the Project. The extent of the Project Site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.

K. "Testing Agencies": A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

1.3 SPECIFICATION FORMAT AND CONTENT EXPLANATION

A. Specification Format: These Specifications are organized into Divisions and Sections based on CSI's 33-Division format and MasterFormat's numbering system.

B. Specification Content: This Specification uses certain conventions regarding the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:

1. Abbreviated Language: Language used in Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be interpolated as the sense requires. Singular words will be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.
2. Streamlined Language: The Specifications generally use the imperative mood and streamlined language. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the Text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor or by others when so noted.

a. The words "shall be" are implied where a colon (:) is used within a sentence or phrase.

1.4 INDUSTRY STANDARDS

A. Applicability of Standards: Except where the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with the standards in effect as of the date of the Contract Documents.

C. Conflicting Requirements: Where compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer to the Architect bef

ore proceeding for a decision on requirements that are different but apparently equal, and where it is uncertain which requirement is the most stringent.

1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum acceptable. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to the Architect for a decision before proceeding.

D. Copies of Standards: Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source.

E. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where such acronyms or abbreviations are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards-generating organization, authorities having jurisdiction, or other entity applicable to the context of the text provision. Refer to Gale Research Co.'s "Encyclopedia of Associations," available in most libraries.

F. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. The following acronyms or abbreviations, as referenced in the Contract Documents, are defined to mean the associated names. Names and addresses are subject to change and are believed, but are not assured, to be accurate and up-to-date as of the date of the Contract Documents.

AA	Aluminum Association 900 19th St., NW, Suite 300 Washington, DC 20006	(202) 862-5104
AABC	Associated Air Balance Council 1518 K St., NW Washington, DC 20005	(202) 737-0202
AAMA	American Architectural Manufacturers Assoc. 1540 E. Dundee Road, Suite 310 Palatine, IL 60067	(708) 202-1350
AAN	American Association of Nurserymen 1250 Eye St., NW, Suite 500 Washington, DC 20005	(202) 789-2900
AASHTO	American Association of State Highway and Transportation Officials 444 North Capitol St., Suite 24 Washington, DC 20001	(202) 624-5800
AATCC	American Association of Textile Chemists and Colorists P.O. Box 12215 Research Triangle Park, NC 27709-2215	(919) 549-8141

ABMA	American Bearing Manufacturers Assoc. 1101 Connecticut Ave., NW, Suite 700 Washington, DC 20036	(202) 429-5155
ACI	American Concrete Institute P.O. Box 19150 Detroit, MI 48219	(313) 532-2600
ACIL	American Council of Independent Laboratories 1629 K St., NW Washington, DC 20006	(202) 887-5872
ACPA	American Concrete Pipe Assoc. 8300 Boone Blvd., Suite 400 Vienna, VA 22182	(703) 821-1990
ADC	Air Diffusion Council One Illinois Center, Suite 200 111 East Wacker Dr. Chicago, IL 60601-4298	(312) 616-0800
AFBMA	Anti-Friction Bearing Manufacturers Assoc. (Now ABMA)	
AFPA	American Forest and Paper Assoc. (American Wood Council of the) 2nd Floor, 1250 Connecticut Ave., NW Washington, DC 20036	(202) 463-2455
AGA	American Gas Assoc. 1515 Wilson Blvd. Arlington, VA 22209	(703) 841-8400
AHA	American Hardboard Assoc. 1210 W. Northwest Highway Palatine, IL 60067	(708) 934-8800
AHAM	Association of Home Appliance Manufacturers 20 N. Wacker Dr., Suite 1500 Chicago, IL 60606	(312) 984-5800
AI	Asphalt Institute Research Park Dr. P.O. Box 14052 Lexington, KY 40512-4052	(606) 288-4960
AIA	The American Institute of Architects 1735 New York Ave., NW Washington, DC 20006	(202) 626-7300
AIA	American Insurance Assoc. 1130 Connecticut Ave., NW, Suite 1000 Washington, DC 20036	(202) 828-7100

AIHA	American Industrial Hygiene Assoc. 2700 Prosperit Ave., Suite 250 Fairfax, VA 22031	(703) 849-8888
AISC	American Institute of Steel Construction One East Wacker Dr., Suite 3100 Chicago, IL 60601-2001	(312) 670-2400
AISI	American Iron and Steel Institute 1101 17th St., NW Washington, DC 20036-4700	(202) 452-7100
AITC	American Institute of Timber Construction 7012 S. Revere Parkway, #140 Englewood, CO 80112	(303) 792-9559
ALI	Associated Laboratories, Inc. c/o HOH Chemicals 500 S. Vermont St. Palatine, IL 60067	(708) 358-7400
ALSC	American Lumber Standards Committee P.O. Box 210 Germantown, MD 20875	(301) 972-1700
AMCA	Air Movement and Control Assoc. 30 W. University Dr. Arlington Heights, IL 60004-1893	(708) 394-0150
ANSI	American National Standards Institute 11 West 42nd St., 13th Floor New York, NY 10036	(212) 642-4900
AOAC	AOAC International 2200 Wilson Blvd., Suite 400 Arlington, VA 22201-3301	(703) 522-3032
AOSA	Association of Official Seed Analysts California State Seed Laboratory 1220 N St. Sacramento, CA 95814	(916) 445-4521
APA	American Plywood Assoc. P.O. Box 11700 Tacoma, WA 98411	(206) 565-6600
API	American Petroleum Institute 1220 L St., NW Washington, DC 20005	(202) 682-8000
ARI	Air-Conditioning and Refrigeration Institute 4301 Fairfax Dr., Suite 425 Arlington, VA 22203	(703) 524-8800

ARMA	Asphalt Roofing Manufacturers Assoc. 6000 Executive Dr., Suite 201 Rockville, MD 20852-3803	(301) 231-9050
ASA	Acoustical Society of America 500 Sunnyside Blvd. Woodbury, NY 11797	(516) 576-2360
ASC	Adhesive and Sealant Council 1627 K St., NW, Suite 1000 Washington, DC 20006-1707	(202) 452-1500
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers 1791 Tullie Circle, NE Atlanta, GA 30329	(404) 636-8400
ASME	American Society of Mechanical Engineers 345 East 47th St. New York, NY 10017	(212) 705-7722
ASPA	American Sod Producers Assoc. 1855-A Hicks Rd. Rolling Meadows, IL 60008	(708) 705-9898
ASPE	American Society of Plumbing Engineers 3617 Thousand Oaks Blvd., Suite 210 Westlake, CA 91362	(805) 495-7120
ASSE	American Society of Sanitary Engineering P.O. Box 40362 Bay Village, OH 44140	(216) 835-3040
ASTM	American Society for Testing and Materials 1916 Race St. Philadelphia, PA 19103-1187	(215) 299-5400
ATIS	Alliance for Telecommunications Industry Solutions 1200 G St., NW, Suite 500 Washington, DC 20005	(202) 628-6380
AWCMA	American Window Covering Manufacturers Assoc. (Now WCMA)	
AWI	Architectural Woodwork Institute P.O. Box 1550 13924 Braddock Rd., No. 100 Centerville, VA 22020	(703) 222-1100
AWPA	American Wood Preservers' Assoc. P.O. Box 286 Woodstock, MD 21163-0286	(410) 465-3169
AWPB	American Wood Preservers' Bureau (This organization is now defunct.)	

AWS	American Welding Society 550 LeJeune Rd., NW Miami, FL 33126	(305) 443-9353
AWWA	American Water Works Assoc. 6666 W. Quincy Ave. Denver, CO 80235	(303) 794-7711
BANC	Brick Association of North Carolina P.O. Box 13290 Greensboro, NC 27415-3290	(910) 273-5566
BHMA	Builders' Hardware Manufacturers Assoc. 355 Lexington Ave., 17th Floor New York, NY 10017	(212) 661-4261
BIA	Brick Institute of America 11490 Commerce Park Dr. Reston, VA 22091	(703) 620-0010
BIFMA	The Business and Institutional Furniture Manufacturer's Association 2680 Horizon Dr., SE, Suite A1 Grand Rapids, MI 49546-7500	(616) 285-3963
CAGI	Compressed Air and Gas Institute c/o Thomas Associates, Inc. 1300 Sumner Ave. Cleveland, OH 44115-2851	(216) 241-7333
CAUS	Color Association of the United States 409 W. 44th St. New York, NY 10036	(212) 582-6884
CBHF	State of California, Dept. of Consumer Affairs Bureau of Home Furnishings and Thermal Insulation 3485 Orange Grove Ave. North Highland, CA 95660-5595	(800) 952-5210
CBM	Certified Ballast Manufacturers Assoc. 1422 Euclid Ave., Suite 402 Cleveland, OH 44115-2851	(216) 241-0711
CCC	Carpet Cushion Council P.O. Box 546 Riverside, CT 06878	(203) 637-1312
CDA	Copper Development Association Inc. 260 Madison Ave., 16th Floor New York, NY 10016	(212) 251-7200
CFFA	Chemical Fabrics & Film Association, Inc. c/o Thomas Associates, Inc. 1300 Sumner Ave.	

	Cleveland, OH 44115-2851	(216) 241-7333
CGA	Compressed Gas Assoc. 1725 Jefferson Davis Highway, Suite 1004 Arlington, VA 22202-4100	(703) 412-0900
CISCA	Ceiling and Interior Systems Construction Assoc. 579 W. North Ave., Suite 301 Elmhurst, IL 60126	(708) 833-1919
CISPI	Cast Iron Soil Pipe Institute 5959 Shallowford Rd., Suite 419 Chattanooga, TN 37421	(615) 892-0137
CRI	Carpet and Rug Institute P.O. Box 2048 Dalton, GA 30722	(706) 278-3176
CRSI	Concrete Reinforcing Steel Institute 933 N. Plum Grove Rd. Schaumburg, IL 60173	(708) 517-1200
CTI	Ceramic Tile Institute of America 12061 West Jefferson Blvd. Culver City, CA 90230	(310) 574-7800
DHI	Door and Hardware Institute 14170 Newbrook Dr. Chantilly, VA 22021-2223	(703) 222-2010
DIPRA	Ductile Iron Pipe Research Assoc. 245 Riverchase Parkway East, Suite O Birmingham, AL 35244	(205) 988-9870
DLPA	Decorative Laminate Products Assoc. 13924 Braddock Rd. Centreville, VA 22020	(800) 684-3572
ECSA	Exchange Carriers Standards Assoc. (Now ATIS)	
EIA	Electronic Industries Assoc. 2001 Pennsylvania Ave., NW Washington, DC 20006-1813	(202) 457-4900
EIMA	EIFS Industry Manufacturers Assoc. 2759 State Road 580, Suite 112 Clearwater, FL 34621	(813) 726-6477
EJMA	Expansion Joint Manufacturers Assoc. 25 N. Broadway Tarrytown, NY 10591	(914) 332-0040
ETL	ETL Testing Laboratories, Inc. P.O. Box 2040 3933 Route 11, Industrial Park	

	Cortland, NY 13045	(607) 753-6711
FCI	Fluid Controls Institute P.O. Box 9036 Morristown, NJ 07960	(201) 829-0990
FCIB	Floor Covering Installation Board 310 Holiday Ave. Dalton, GA 30720	(706) 226-5488
FGMA	Flat Glass Marketing Assoc. White Lakes Professional Bldg. 3310 S.W. Harrison St. Topeka, KS 66611-2279	(913) 266-7013
FM	Factory Mutual Systems 1151 Boston-Providence Turnpike P.O. Box 9102 Norwood, MA 02062	(617) 762-4300
FTI	Facing Tile Institute P.O. Box 8880 Canton, OH 44711	(216) 488-1211
GA	Gypsum Association 810 First St., NE, Suite 510 Washington, DC 20002	(202) 289-5440
HEI	Heat Exchange Institute c/o Thomas Associates, Inc. 1300 Sumner Ave. Cleveland, OH 44115-2851	(216) 241-7333
HI	Hydronics Institute P.O. Box 218 35 Russo Place Berkeley Heights, NJ 07922	(908) 464-8200
HI	Hydraulic Institute 9 Sylvan Way Parsippany, NJ 07054-3802	(201) 267-9700
HMA	Hardwood Manufacturers Assoc. 400 Penn Center Blvd. Pittsburgh, PA 15235	(412) 829-0770
HPVA	Hardwood Plywood and Veneer Assoc. 1825 Michael Farraday Dr. P.O. Box 2789 Reston, VA 22090	(703) 435-2900
IBD	Institute of Business Designers 341 Merchandise Mart Chicago, IL 60654	(312) 467-1950

ICEA	Insulated Cable Engineers Association, Inc. P.O. Box 440 South Yarmouth, MA 02664	(508) 394-4424
IEC	International Electrotechnical Commission (Available from ANSI) 1430 Broadway New York, NY 10018	(212) 354-3300
IEEE	Institute of Electrical and Electronic Engineers 345 E. 47th St. New York, NY 10017	(212) 705-7900
IESNA	Illuminating Engineering Society of North America 345 E. 47th St. New York, NY 10017	(212) 705-7913
IGCC	Insulating Glass Certification Council c/o ETL Testing Laboratories, Inc. P.O. Box 2040 Route 11, Industrial Park Cortland, NY 13045	(607) 753-6711
ILI	Indiana Limestone Institute of America Stone City Bank Building, Suite 400 Bedford, IN 47421	(812) 275-4426
IMSA	International Municipal Signal Assoc. 165 E. Union St. Newark, NY 14513	(315) 331-2182
IRI	Industrial Risk Insurers P.O. Box 5010 85 Woodland St. Hartford, CT 06102-5010	(203) 520-7300
ISA	Instrument Society of America P.O. Box 12277 67 Alexander Dr. Research Triangle Park, NC 27709	(919) 549-8411
KCMA	Kitchen Cabinet Manufacturers Assoc. 1899 Preston White Dr. Reston, VA 22091-4326	(703) 264-1690
LIA	Lead Industries Association, Inc. 295 Madison Ave. New York, NY 10017	(212) 578-4750
LPI	Lightning Protection Institute 3365 N. Arlington Heights Rd., Suite J Arlington Heights, IL 60004	(800) 488-6864
MBMA	Metal Building Manufacturer's Assoc.	

	c/o Thomas Associates, Inc. 1300 Sumner Ave. Cleveland, OH 44115-2851	(216) 241-7333
MCAA	Mechanical Contractors Association of America 1385 Piccard Dr. Rockville, MD 20850-4329	(301) 869-5800
MFMA	Maple Flooring Manufacturers Assoc. 60 Revere Dr., Suite 500 Northbrook, IL 60062	(708) 480-9138
MIA	Marble Institute of America 33505 State St. Farmington, MI 48335	(810) 476-5558
ML/SFA	Metal Lath/Steel Framing Assoc. (A Division of the National Association of Architectural Metal Manufacturers) 600 S. Federal St., Suite 400 Chicago, IL 60605	(312) 922-6222
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry 127 Park St., NE Vienna, VA 22180	(703) 281-6613
NAA	National Arborist Assoc. The Meeting Place Mall Route 101, P.O. Box 1094 Amherst, NH 03031-1094	(603) 673-3311
NAAMM	National Association of Architectural Metal Manufacturers 600 S. Federal St., Suite 400 Chicago, IL 60605	(312) 922-6222
NAIMA	North American Insulation Manufacturers Assoc. 44 Canal Center Plaza, Suite 310 Alexandria, VA 22314	(703) 684-0084
NAPA	National Asphalt Pavement Assoc. NAPA Building 5100 Forbes Blvd. Lanham, MD 20706-4413	(301) 731-4748
NAPF	National Association of Plastic Fabricators (Now DLPA)	
NBGQA	National Building Granite Quarries Assoc. P.O. Box 482 Barre, VT 05641	(802) 476-3115

NBHA	National Builders Hardware Assoc. (Now DHI)	
NCMA	National Concrete Masonry Assoc. 2302 Horse Pen Rd. Herndon, VA 22071-3406	(703) 713-1900
NCPI	National Clay Pipe Institute P.O. Box 759 253-80 Center St. Lake Geneva, WI 53147	(414) 248-9094
NCRPM	National Council on Radiation Protection and Measurements 7910 Woodmont Ave., Suite 800 Bethesda, MD 20814	(301) 657-2652
NCSPA	National Corrugated Steel Pipe Association 1255 23rd St., NW, Suite 850 Washington, DC 20037	(202) 452-1700
NEC	National Electrical Code (from NFPA)	
NECA	National Electrical Contractors Assoc. 3 Bethesda Metro Center, Suite 1100 Bethesda, MD 20814	(301) 657-3110
NEII	National Elevator Industry, Inc. 185 Bridge Plaza, North Fort Lee, NJ 07024	(201) 944-3211
NEMA	National Electrical Manufacturers Assoc. 2101 L St., NW, Suite 300 Washington, DC 20037	(202) 457-8400
NETA	International Electrical Testing Assoc. P.O. Box 687 Morrison, CO 80465	(303) 697-8441
NFPA	National Fire Protection Assoc. One Batterymarch Park P.O. Box 9101 Quincy, MA 02269-9101	(617) 770-3000 (800) 344-3555
NFPA	National Forest Products Assoc. (Now AFPA)	
NHLA	National Hardwood Lumber Assoc. P.O. Box 34518 Memphis, TN 38184-0518	(901) 377-1818
NKCA	National Kitchen Cabinet Assoc. (Now KCMA)	
NLGA	National Lumber Grades Authority	

	4400 Dominion St., Suite 103 Burnaby, BC V5G 4G3	(604) 451-7323
NOFMA	National Oak Flooring Manufacturers Assoc. P.O. Box 3009 Memphis, TN 38173-0009	(901) 526-5016
NPA	National Particleboard Assoc. 18928 Premiere Ct. Gaithersburg, MD 20879	(301) 670-0604
NPCA	National Paint and Coatings Assoc. 1500 Rhode Island Ave., NW Washington, DC 20005	(202) 462-6272
NRCA	National Roofing Contractors Assoc. 10255 W. Higgins Rd., Suite 600 Rosemont, IL 60018-5607	(708) 299-9070
NSF	National Sanitation Foundation 3475 Plymouth Rd. P.O. Box 130140 Ann Arbor, MI 48113-0140	(313) 769-8010
NSSEA	National School Supply and Equipment Assoc. 8300 Colesville Rd., No. 250 Silver Spring, MD 20910	(301) 495-0240
NTMA	National Terrazzo and Mosaic Assoc. 3166 Des Plaines Ave., Suite 132 Des Plaines, IL 60018	(708) 635-7744
NWMA	National Woodwork Manufacturers Assoc. (Now NWWDA)	
NWWDA	National Wood Window and Door Assoc. 1400 E. Touhy Ave., #G54 Des Plaines, IL 60018	(708) 299-5200 (800) 223-2301
PATMI	Power Actuated Tool Manufacturers' Institute, Inc. 1000 Fairgrounds Rd., Suite 200 St. Charles, MO 63301	(314) 947-6610
PCA	Portland Cement Assoc. 5420 Old Orchard Rd. Skokie, IL 60077	(708) 966-6200
PCI	Precast/Prestressed Concrete Institute 175 W. Jackson Blvd. Chicago, IL 60604	(312) 786-0300
PDI	Plumbing and Drainage Institute c/o Sol Baker 1106 W. 77th St., South Dr.	

	Indianapolis, IN 46260	(317) 251-6970
PEI	Porcelain Enamel Institute 102 Woodmont Blvd., Suite 360 Nashville, TN 38205	(615) 385-0758
RFCI	Resilient Floor Covering Institute 966 Hungerford Dr., Suite 12-B Rockville, MD 20805	(301) 340-8580
RIS	Redwood Inspection Service 405 Enfrente Dr., Suite 200 Novato, CA 94949	(415) 382-0662
RMA	Rubber Manufacturers Assoc. 1400 K St., NW Washington, DC 20005	(202) 682-4800
SDI	Steel Deck Institute P.O. Box 9506 Canton, OH 44711	(216) 493-7886
SDI	Steel Door Institute 30200 Detroit Rd. Cleveland, OH 44145	(216) 889-0010
SGCC	Safety Glazing Certification Council c/o ETL Testing Laboratories Route 11, Industrial Park Cortland, NY 13045	(607) 753-6711
SHLMA	Southern Hardwood Lumber Manufacturers Assoc. (Now HMA)	
SIGMA	Sealed Insulating Glass Manufacturers Assoc. 401 N. Michigan Ave. Chicago, IL 60611	(312) 644-6610
SJI	Steel Joist Institute 1205 48th Avenue North, Suite A Myrtle Beach, SC 29577	(803) 449-0487
SMA	Screen Manufacturers Assoc. 3950 Lake Shore Dr., Suite 502-A Chicago, IL 60613-3431	(312) 525-2644
SMACNA	Sheet Metal and Air Conditioning Contractors National Assoc. 4201 Lafayette Center Dr. Chantilly, VA 22021	(703) 803-2980
SPIB	Southern Pine Inspection Bureau	

	4709 Scenic Highway Pensacola, FL 32504	(904) 434-2611
SPRI	Single Ply Roofing Institute 20 Walnut St. Wellesley Hills, MA 02181	(617) 237-7879
SSPC	Steel Structures Painting Council 4516 Henry St. Pittsburgh, PA 15213	(412) 687-1113
SSPMA	Sump and Sewage Pump Manufacturers Assoc. P.O. Box 647 Northbrook, IL 60065-0647	(708) 559-9233
STI	Steel Tank Institute 570 Oakwood Rd. Lake Zurich, IL 60047	(708) 438-8265
SWI	Steel Window Institute c/o Thomas Associates, Inc. 1300 Sumner Ave. Cleveland, OH 44115-2851	(216) 241-7333
SWPA	Submersible Wastewater Pump Assoc. 600 S. Federal St., Suite 400 Chicago, IL 60605	(312) 922-6222
TCA	Tile Council of America P.O. Box 326 Princeton, NJ 08542-0326	(609) 921-7050
TIMA	Thermal Insulation Manufacturers Assoc. (This Organization is now defunct. See NAIMA)	
TPI	Truss Plate Institute 583 D'Onofrio Dr., Suite 200 Madison, WI 53719	(608) 833-5900
UL	Underwriters Laboratories 333 Pfingsten Rd. Northbrook, IL 60062	(708) 272-8800
UNI	Uni-Bel PVC Pipe Assoc. 2655 Villa Creek Dr., Suite 155 Dallas, TX 75234	(214) 243-3902
USP	U.S. Pharmacopoeial Convention 12601 Twinbrook Parkway Rockville, MD 20852	(301) 881-0666

WA	Wallcoverings Assoc. 401 N. Michigan Ave. Chicago, IL 60611-4267	(312) 644-6618
WCLIB	West Coast Lumber Inspection Bureau P.O. Box 23145 Portland, OR 97281	(503) 639-0651
WCMA	Window Covering Manufacturers Assoc. 355 Lexington Ave., 17th Floor New York, NY 10017	(212) 661-4261
WIC	Woodwork Institute of California P.O. Box 11428 Fresno, CA 93773-1428	(209) 233-9035
WLPDIA	Western Lath, Plaster, Drywall Industries Assoc. (Formerly California Lath & Plaster Assoc.) 8635 Navajo Rd. San Diego, CA 92119	(619) 229-8307
WRI	Wire Reinforcement Institute 1101 Connecticut Ave. NW, Suite 700 Washington, DC 20036-4303	(202) 429-5125
WSC	Water Systems Council 600 S. Federal St., Suite 400 Chicago, IL 60605	(312) 922-6222
WSFI	Wood and Synthetic Flooring Institute 4415 W. Harrison St., Suite 242-C Hillside, IL 60162	(708) 449-2933
WWPA	Western Wood Products Assoc. Yeon Building 522 SW 5th Ave. Portland, OR 97204-2122	(503) 224-3930
WWPA	Woven Wire Products Assoc. 2515 N. Nordica Ave. Chicago, IL 60635	(312) 637-1359

G. Federal Government Agencies: Names and titles of federal government standard- or Specification-producing agencies are often abbreviated. The following acronyms or abbreviations referenced in the Contract Documents indicate names of standard- or Specification-producing agencies of the federal government. Names and addresses are subject to change and are believed, but are not assured, to be accurate and up-to-date as of the date of the Contract Documents.

CE	Corps of Engineers (U.S. Department of the Army) Chief of Engineers - Referral Washington, DC 20314	(202) 272-0660
CFR	Code of Federal Regulations	

	(Available from the Government Printing Office) N. Capitol St. between G and H St., NW Washington, DC 20402 (Material is usually first published in the "Federal Register")	(202) 783-3238
CPSC	Consumer Product Safety Commission 5401 Westbard Ave. Bethesda, MD 20207	(800) 638-2772
CS	Commercial Standard (U.S. Department of Commerce) Government Printing Office Washington, DC 20402	(202) 783-3238
DOC	Department of Commerce 14th St. and Constitution Ave., NW Washington, DC 20230	(202) 482-2000
DOT	Department of Transportation 400 Seventh St., SW Washington, DC 20590	(202) 366-4000
EPA	Environmental Protection Agency 401 M St., SW Washington, DC 20460	(202) 382-2090
FAA	Federal Aviation Administration (U.S. Department of Transportation) 800 Independence Ave., SW Washington, DC 20590	(202) 366-4000
FCC	Federal Communications Commission 1919 M St., NW Washington, DC 20554	(202) 632-7000
FDA	Food and Drug Administration 5600 Fishers Lane Rockville, MD 20857	(301) 443-1544
FHA	Federal Housing Administration (U.S. Department of Housing and Urban Development) 451 Seventh St., SW Washington, DC 20201	(202) 708-1422
FS	Federal Specification (from GSA) Specifications Unit (WFSIS) 7th and D St., SW Washington, DC 20407	(202) 708-9205
GSA	General Services Administration F St. and 18th St., NW Washington, DC 20405	(202) 708-5082

MIL	Military Standardization Documents (U.S. Department of Defense) Naval Publications and Forms Center 5801 Tabor Ave. Philadelphia, PA 19120	
NIST	National Institute of Standards and Technology (U.S. Department of Commerce) Gaithersburg, MD 20899	(301) 975-2000
OSHA	Occupational Safety and Health Administration (U.S. Department of Labor) 200 Constitution Ave., NW Washington, DC 20210	(202) 219-6091
PS	Product Standard of NBS (U.S. Department of Commerce) Government Printing Office Washington, DC 20402	(202) 783-3238
REA	Rural Electrification Administration (U.S. Department of Agriculture) 14th St. and Independence Ave., SW Washington, DC 20250	(202) 447-2791
USDA	U.S. Department of Agriculture Independence Ave. between 12th St. and 14th St., SW Washington, DC 20250	(202) 720-2791
USPS	U.S. Postal Service 475 L'Enfant Plaza, SW Washington, DC 20260-0010	(202) 268-2000

1.5 GOVERNING REGULATIONS AND AUTHORITIES

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.

1.6 SUBMITTALS

A. Permits, Licenses, and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established in conjunction with compliance with standards and regulations bearing upon performance of the Work.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 4200

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SECTION 014500 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for quality-control services.

B. Quality-control services include inspections, tests, and related actions, including reports performed by Contractor, by independent agencies, and by governing authorities. They do not include contract enforcement activities performed by Architect.

C. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with Contract Document requirements.

D. Requirements of this Section relate to customized fabrication and installation procedures, not production of standard products.

1. Specific quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
2. Specified inspections, tests, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with Contract Documents. Requirements.
3. Requirements for Contractor to provide quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

E. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 1 Section "Cutting and Patching" specifies requirements for repair and restoration of construction disturbed by inspection and testing activities.
2. Division 1 Section "Submittals" specifies requirements for development of a schedule of required tests and inspections.

F. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements, comply with the most stringent requirement. Refer uncertainties to Architect for a decision.

G. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum. The actual installation may exceed the minimum within reasonable limits. Indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision.

H. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, notices, receipts for fee payments, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

I. Testing Agency Qualifications: An independent agency with the experience and capability to conduct testing and inspecting indicated; and where required by authorities having jurisdiction, that is acceptable to authorities.

J. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

K. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Promptly notify Architect and Contractor of irregularities or deficiencies in the Work observed during performance of its services.
2. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.
3. Do not perform any duties of Contractor.

L. Associated Services: Cooperate with testing agencies and provide reasonable auxiliary services as requested. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Security and protection for samples and for testing and inspecting equipment.

M. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.3 RESPONSBILITIES

A. Contractor Responsibilities: Unless otherwise indicated as the responsibility of another identified entity, Contractor shall provide inspections, tests, and other quality-control services specified elsewhere in the Contract Documents and required by authorities having jurisdiction. Costs for these services are included in the Contract Sum.

1. Where individual Sections specifically indicate that certain inspections, tests, and other quality-control services are the Contractor’s responsibility, the Contractor shall employ and pay a qualified independent testing agency to perform quality-control services. Costs for these services are included in the Contract Sum.
2. Where individual Sections specifically indicate that certain inspections, tests, and other quality-control services are the Owner’s responsibility, the Owner will employ and pay a qualified independent testing agency to perform those services.
3. Where individual Sections specifically indicate that certain inspections, tests, and other quality-control services are the Owner’s responsibility, the Owner will engage the services of a qualified independent testing agency to perform those services. Payment for these services will be made from the Inspection and Testing Allowance, as authorized by Change Orders.

a. Where the Owner has engaged a testing agency for testing and inspecting part of the Work, and the Contractor is also required to engage an entity for the same or related element, the Contractor shall not employ the entity engaged by the Owner, unless agreed to in writing by the Owner.

B. Retesting: The Contractor is responsible for retesting where results of inspections, tests, or other quality-control services prove unsatisfactory and indicate noncompliance with Contract Document requirements, regardless of whether the original test was Contractor's responsibility.

1. The cost of retesting construction, revised or replaced by the Contractor, is the Contractor's responsibility where required tests performed on original construction indicated noncompliance with Contract Document requirements.

C. Associated Services: Cooperate with agencies performing required inspections, tests, and similar services, and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include, but are not limited to, the following.

1. Provide access to the Work.
2. Furnish incidental labor and facilities necessary to facilitate inspections and tests.
3. Take adequate quantities of representative samples of materials that require testing or assist the agency in taking samples.
4. Provide facilities for storage and curing of test samples.
5. Deliver samples to testing laboratories.
6. Provide the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.
7. Provide security and protection of samples and test equipment at the Project Site.

D. Duties of the testing Agency: The independent agency engaged to perform inspections, sampling, and testing of materials and construction specified in individual Sections shall cooperate with the Architect, and the Contractor in performance of the agency's duties. The testing agency shall provide qualified personnel to perform required inspections and tests.

1. The agency shall notify the Architect, and the Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. The agency is not authorized to release, revoke, alter or enlarge requirements of the Contract Documents or approve or accept any portion of the Work.
3. The agency is not authorized to release, revoke, alter or enlarge requirements of the Contract Documents or approve or accept any portion of the Work.

E. Coordination: Coordinate the sequence of activities to accommodate required services with a minimum of delay.

1. Coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.
2. The Architect is responsible for scheduling times for inspections tests, taking samples, and similar activities.

1.4 SUBMITTALS

A. Unless the Contractor is responsible for this service, the independent testing agency shall submit a certified written report, induplicate, of each inspection, test, or similar service through the Contractor.

1. Submit additional copies of each written report directly to the governing authority, when the authority so directs.
2. Report Data: Written reports of each inspection, test, or similar service include, but are not limited to, the following:

    a. Date of issue.
    b. Project title and number.
    c. Name, address, and telephone number of testing agency.
    d. Dates and locations of samples and tests or inspections.
    e. Names of individuals making the inspection or test.
    f. Designation of the Work and test method.
    g. Identification of product and Specification Section.
    h. Complete inspection or test data.
    i. Test results and an interpretations of test results.
    j. Ambient conditions at the time of sample taking and testing.
    k. Comments or professional opinion on whether inspected or tested Work complies with Contract document requirements.
    l. Name and signature of laboratory inspector.
    m. Recommendations on retesting.

1.5 QUALITY ASSURANCE

A. Qualifications for Service Agencies: Engage inspection and testing service agencies, including independent testing laboratories, that are pre-qualified as complying with the American Council of Independent Laboratories "Recommended Requirements for Independent Laboratory Qualification" and that specialize in the types of inspections and test to be performed.

1. Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the state where the project is located.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

A. General: Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes. Comply with Contract Document requirements for Division 1 Section "Cutting and Patching."

B. Protect construction exposed by or for quality-control service activities, and protect repaired construction.

C. Repair and protection is Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

END OF SECTION 014500

SECTION 01 50 00 – TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Sections include the following:

1. Division 01 Section "Summary of Work" for limitations on utility interruptions and other work restrictions.
2. Division 01 Section "Submittal Procedures" for procedures for submitting copies of implementation and termination schedule and utility reports.
3. Division 01 Section "Execution" for progress cleaning requirements.

1.3 DEFINITIONS

A. Permanent Enclosure: As determined by Architect, exterior walls are insulated and weathertight; and all openings are closed with permanent construction or substantial temporary closures.

1.4 USE CHARGES

A. General: Cost or use charges for temporary facilities shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.

B. Water Service: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

C. Electric Power: Owner shall supply single-phase electric power from existing building distribution systems for use by all Prime Contracts, for each Phased building area.

1. EC shall install temporary facilities as outlined in their Scope of Work and related Division 01.
2. Owner shall not be responsible for supplying temporary three-phase power.
3. Staging Area Power: The Owner shall be responsible for all power use charges associated with this facility; the Prime Contract shall enforce power conservation measures with their facilities and those of their sub-contractors.

D. Telephone/Internet: Each Prime Contract shall be responsible for use charges associated with their respective telephone and internet access requirements.

1.5 SUBMITTALS

A. Site Plan: Show temporary facilities, egress plans, utility hookups, staging areas, and parking areas for construction personnel.

All contractors are required to provide "egress plans" for both interior and exterior work for locations where work will close off any exits, corridors, pathways, roads, and any access way. These plans are to be provided in advance at least 2 months before work commences in that area, no work shall be started in any manner without approval of such plan. The failure to provide such plan for coordinating and scheduling will result into back charges to the prime(s) involved. These plans must include all locations and details where scaffolding, fencing and all temporary construction barriers are required.

1.6 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.7 PROJECT CONDITIONS

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

B. Owner's Facilities: Contractors are <u>not</u> allowed to use the Owner's facilities (toilets, telephone, food service, etc.) for their own benefit. Prime Contract Superintendents shall enforce this policy with their respective work forces.

1. Parking will be restricted to an area determined by the Owner. Owner reserves the right to remove from their property, unauthorized vehicles occupying unauthorized areas, at respective Contractors' expense.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Chain-Link Fencing: Minimum 2 inch, 0.148 inch thick, galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts; minimum 2-3/8 inch OD line posts and 2-7/8 inch OD corner and pull posts.

1. Provide gate openings to accommodate vehicle delivery traffic or as noted. Install gateposts in sizes required for support gates.

2. All temp fencing is to receive privacy screening.

B. Yodock barriers may be provided by the contractor as substitution to fence with driven post. If site conditions or pace of work do not allow for typical fence with driven post, then the contractor is responsible to provide Yodock barriers. This is at the sole discretion of the construction manager.

C. Gypsum Board: Minimum 5/8 inch thick by 48 inches wide by maximum available lengths; regular-type panels with tapered edges. Comply with ASTM C 36/C 36M.

D. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

2.2 TEMPORARY FACILITIES

A. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

1. Store combustible materials apart from building.

B. Porta-jons.: Contractors are not permitted to use the owners toilets facilities unless given permission by the construction manager. The contractor will be required to provide temporary toilet facilities as required for its workforce. Location to be determined by the construction manager.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures. Comply with applicable codes for quantities required. Comply with NFPA for recommended classes for exposure; extinguishers shall be inspected and appropriately tagged prior to being brought on site. Provide stands, painted bright orange, sturdy enough to carry the extinguisher, and built as not to create a tipping hazard.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where directed by site coordinator and where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work and when directed by the Construction Site Coordinator at no additional cost to the owner.

1. Locate facilities to limit site disturbance as specified in Division 01 Section "Summary of Work."

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.

1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.

C. Water Service: Use of Owner's existing water service facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

1. Where installations below an outlet might be damaged by spillage or leakage, provide a drip pan of suitable size to minimize water damage. Drain accumulated water promptly from pans.

D. Heating: Provide temporary heating required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

E. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.

F. Electric Power Service: Use of Owner's existing single phase electric power service will be permitted, as long as equipment is maintained in a condition acceptable to Owner.

1. See Section 011000 for additional requirements.

G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
2. See Section 011000 for additional requirements.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide incombustible construction for offices, shops, and sheds located within construction area or within 30 feet of building lines. Comply with NFPA 241.
2. Maintain support facilities until near Substantial Completion. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Traffic Controls: Comply with requirements of authorities having jurisdiction.

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

C. Parking: Parking will be restricted to an area determined by the Owner. Owner reserves the right to remove from their property, unauthorized vehicles occupying unauthorized areas, at respective Contractors' expense.

D. Project Identification and Temporary Signs: Provide Project identification and other signs. Install signs where indicated to inform public and individuals seeking entrance to Project. Unauthorized signs are not permitted.

1. Provide temporary, directional signs for construction personnel and visitors.
2. Maintain and touchup signs so they are legible at all times.

E. Waste Disposal Facilities: Comply with requirements specified in Division 01 Section "Construction Waste Management and Disposal" and Section 011200, "Summary of Work."

F. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with Division 01 Section "Execution" for progress cleaning requirements.

G. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.

1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

H. Existing Stair Usage: Use of Owner's existing stairs will be permitted, as long as stairs are protected, cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to no less than condition existing before initial use.

1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If, despite such protection, stairs become damaged, restore damaged areas so no evidence remains of correction work.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

1. Comply with work restrictions specified in Division 01 Section "Multiple Contract Summary."

2. Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

B. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Obtain extended warranty for Owner. Perform control operations lawfully, using environmentally safe materials.

C. Security Enclosure and Lockup: Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.

1. Refer to Section 011200, "Multiple Contract Summary" for additional information.
2. All site contractors are to have a 24hr available emergency contact person available to fix and correct areas that have been compromised after hours, weekends and holidays. Upon notification of such incident, the contractor is required to deploy workers as necessary within 1-2 hours maximum to be on site to correct such matter reported. Emergency personnel contact information shall be submitted within 2 weeks of Notice to Proceed.

3.

D. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
1. Yodock barriers are to be furnished and installed around all site construction zones with chain link fencing panels, posts and signage. All entries to sites are to have lockable gates.
2. Contractor shall ensure that all chain link safety fencings around the work zone are closed off to any adjacent structure, building, etc. at all times.
3. All contractors storing any materials and/or equipment on site shall be fenced in with secured chain link fencing.

E. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

1. Where heating or cooling is required and permanent enclosure is not complete, insulate temporary enclosures.

F. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.

1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant plywood on construction operations side.
2. Construct dustproof partitions with 2 layers of 3 mil polyethylene sheet on each side. Cover floor with 2 layers of 3 mil polyethylene sheet, extending sheets 18 inches up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant plywood.
    a. Construct vestibule and airlock at each entrance through temporary partition with not less than 48 inches between doors. Maintain water-dampened foot mats in vestibule.
3. Insulate partitions to provide noise protection to occupied areas.
4. Seal joints and perimeter. Equip partitions with dustproof doors with exit device, closer and security locks.
5. Protect air-handling equipment.
6. Weather strip openings.
7. Provide walk-off mats at each entrance through temporary partition.

G. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.

1. Prohibit smoking within 50 feet of all school property.
2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
3. Develop and supervise an overall fire-prevention and protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.5 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
2. Remove temporary paving not intended for or acceptable for integration into permanent paving. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
3. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 Section "Closeout Procedures."

END OF SECTION 015000

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SECTION 01 60 00 – PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements governing the Contractor's selection of products for use in the Project.
   1. Single Prime Contract: Provisions of this Section apply to the construction activities of each prime contractor.

B. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Division 1 Section "Electronic Submittal Procedures" specifies requirements for submittal of the Contractor's Construction Schedule and the Submittal Schedule.
   2. Division 1 Section "Substitution Procedures" specifies administrative procedures for handling requests for substitutions made after award of the Contract.

1.3 DEFINITIONS

A. Definitions used in this Article are not intended to change the meaning of other terms used in the Contract Documents, such as "specialties," "systems," "structure," "finishes," "accessories," and similar terms. Such terms are self-explanatory and have well-recognized meanings in the construction industry.
   1. "Products" are items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
      a. "Named Products" are items identified by the manufacturer's product name, including make or model number or other designation, shown or listed in the manufacturer's published product literature, that is current as of the date of the Contract Documents.
   2. "Materials" are products substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.
   3. "Equipment" is a product with operational parts, whether motorized or manually operated, that requires service connections, such as wiring or piping.

1.4 QUALITY ASSURANCE

A. Source Limitations: To the fullest extent possible, provide products of the same kind from a single source.

1. When specified products are available only from sources that do not, or cannot, produce a quantity adequate to complete project requirements in a timely manner, consult with the Architect to determine the most important product qualities before proceeding. Qualities may include attributes, such as visual appearance, strength, durability, or compatibility. When a determination has been made, select products from sources producing products that possess these qualities, to the fullest extent possible.

B. Compatibility of Options: When the Contractor is given the option of selecting between 2 or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.
   1. Each prime contractor is responsible for providing products and construction methods that are compatible with products and construction methods of other prime or separate contractors.
   2. If a dispute arises between prime contractors over concurrently selectable, but incompatible products, the Architect will determine which products shall be retained and which are incompatible and must be replaced.

C. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products that will be exposed to view in occupied spaces or on the exterior.
   1. Labels: Locate required product labels and stamps on concealed surfaces or, where required for observation after installation, on accessible surfaces that are not conspicuous.
   2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface that is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data:
      a. Name of product and manufacturer.
      b. Model and serial number.
      c. Capacity.
      d. Speed.
      e. Ratings.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products according to the manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.
   1. Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction spaces.
   2. Coordinate delivery with installation time to assure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
   3. Deliver products to the site in an undamaged condition in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
   4. Inspect products upon delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
   5. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.
   6. Store heavy materials away from the Project structure in a manner that will not endanger the supporting construction.
   7. Store products subject to damage by the elements above ground, under cover in a weathertight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, new at the time of installation.
   1. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for a complete installation and the intended use and effect.
   2. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.

B. Product Selection Procedures: The Contract Documents and governing regulations govern product selection. Procedures governing product selection include the following:
   1. Nonproprietary Specifications: When Specifications list products or manufacturers that are available and may be incorporated in the Work, but do not restrict the Contractor to use of these products only, the Contractor may propose any available product that complies with Contract requirements. Comply with Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.
   2. Descriptive Specification Requirements: Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.
   3. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements and are recommended by the manufacturer for the application indicated.
   4. Manufacturer's recommendations may be contained in published product literature or by the manufacturer's certification of performance.
   5. Compliance with Standards, Codes, and Regulations: Where Specifications only require compliance with an imposed code, standard, or regulation, select a product that complies with the standards, codes, or regulations specified.
   6. Visual Matching: Where Specifications require matching an established Sample, the Architect's decision will be final on whether a proposed product matches satisfactorily.
   7. Where no product available within the specified category matches satisfactorily and complies with other specified requirements, comply with provisions of the Contract Documents concerning "substitutions" for selection of a matching product in another product category.
   8. Visual Selection: Where specified product requirements include the phrase "... as selected from manufacturer's standard colors, patterns, textures ..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Architect will select the color, pattern, and texture from the product line selected.
   9. Allowances: Refer to individual Specification Sections and "Allowance" provisions in Division 1 for allowances that control product selection and for procedures required for processing such selections.

PART 3 - EXECUTION

3.1 INSTALLATION OF PRODUCTS

A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other Work.

1. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

END OF SECTION 01 60 00

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SECTION 017329 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for cutting and patching.

B. Definition: "Cutting and patching" includes cutting into existing construction to provide for the installation or performance of other work and subsequent fitting and patching required to restore surfaces to their original condition, and does not apply to new construction procedures, except when new construction is already completed and must be cut and patched due to incorrect sequencing of work and/or improper coordination.

C. Multiple Prime Contracts: Provisions of this Section apply to the construction activities of each prime Contractor.

D. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Division 1 Section "Coordination" for procedures for coordinating cutting and patching with other construction activities.
   2. Refer to other Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
      a. Requirements of this Section apply to mechanical and electrical installations. Refer to Division 15 and 16 Sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

1.2 RESPONSIBILITIES

A. General: Each Prime Contractor is responsible to perform cutting and patching for their portion of the Work. Patching work shall restore surfaces to original condition including paint, ceramic, tile, masonry, EIFS, VCT flooring, terrazzo flooring, gypsum wallboard ceilings and walls, etc. The requirements of this section apply to all Prime Contractors, even though certain items of work may be applicable to a specific Prime Contractor.

B. Cutting and patching of completed new construction required due to out of sequence construction and/or improper coordination is the responsibility of the prime Contractor responsible for the out of sequence construction or improper coordination. Cutting and patching of new construction for these purposes shall be accomplished by the Contractor for General Work and shall be paid for by the prime Contractor responsible. The Architect shall be the sole judge of the responsibility for such cutting and patching, and shall prepare change orders to delete monies from the Contract of the responsible prime Contractor and credit those monies to the Contractor for General Work.
   1. Contractor for General Work shall cooperate with Architect and other Contractors to accomplish this cutting and patching with minimal disruption to construction and at reasonable costs.

1.3 SUBMITTALS:

A. Cutting and Patching Proposal: Submit a plan describing procedures well in advance of the time cutting and patching will be performed if the Owner requires approval of these procedures before proceeding. Request approval to proceed. Include the following information, as applicable, in the proposal:

1. Describe the extent of cutting and patching required. Show how it will be performed and indicate why it cannot be avoided.

2. Describe anticipated results in terms of changes to existing construction. Include changes to structural elements and operating components as well as changes in the building's appearance and other significant visual elements.

3. List products to be used and firms or entities that will perform Work.

4. Indicate dates when cutting and patching will be performed.

5. Utilities: List utilities that cutting and patching procedures will disturb or affect. List utilities that will be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.

6. Where cutting and patching involves adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with the original structure.

7. Approval by the Architect to proceed with cutting and patching does not waive the Architect's right to later require complete removal and replacement of unsatisfactory work.

1.4 QUALITY ASSURANCE:

A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would change their load-carrying capacity or load-deflection ratio.

1. Obtain approval of the cutting and patching proposal before cutting and patching the following structural elements:
   a. Foundation construction.
   b. Bearing and retaining walls.
   c. Structural concrete.
   d. Structural steel.
   e. Lintels.
   f. Timber and primary wood framing.
   g. Structural decking.
   h. Stair systems.
   i. Miscellaneous structural metals.
   j. Exterior curtain-wall construction.
   k. Equipment supports.
   l. Piping, ductwork, vessels, and equipment.
   m. Structural systems of special construction in Division 13 Sections.

B. Operational Limitations: Do not cut and patch operating elements or related components in a manner that would result in reducing their capacity to perform as intended. Do not cut and patch operating elements or related components in a manner that would result in increased maintenance or decreased operational life or safety.

1. Obtain approval of the cutting and patching proposal before cutting and patching the following operating elements or safety related systems:
   a. Primary operational systems and equipment.
   b. Air or smoke barriers.

c. Water, moisture, or vapor barriers.
d. Membranes and flashings.
e. Fire protection systems.
f. Noise and vibration control elements and systems.
g. Control systems.
h. Communication systems.
i. Conveying systems.
j. Electrical wiring systems.
k. Operating systems of special construction.

C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities. Do not cut and patch construction in a manner that would result in visual evidence of cutting and patching. Remove and replace construction cut and patched in a visually unsatisfactory manner.

1. If possible retain the original Installer or fabricator to cut and patch the exposed Work listed below. If it is impossible to engage the original Installer or fabricator, engage another recognized experienced and specialized firm.
   a. Processed concrete finishes.
   b. Stonework and stone masonry.
   c. Ornamental metal.
   d. Matched-veneer woodwork.
   e. Preformed metal panels.
   f. Firestopping.
   g. Window wall system.
   h. Stucco and ornamental plaster.
   i. Acoustical ceilings.
   j. Terrazzo.
   k. Finished wood flooring.
   l. Fluid-applied flooring.
   m. Carpeting.
   n. Aggregate wall coating.
   o. Wall covering.
   p. Swimming pool finishes

1.5 WARRANTY:

A. Existing Warranties: Replace, patch, and repair material and surfaces cut or damaged by methods and with materials in such a manner as not to void any warranties required or existing.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL:

A. Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible if identical materials are unavailable or cannot be used. Use materials whose installed performance will equal or surpass that of existing materials.

PART 3 - EXECUTION

3.1 INSPECTION:

A. Examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed before cutting. If unsafe or unsatisfactory conditions are encountered, take corrective action before proceeding.

1. Before proceeding, meet at the Project Site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

3.2 PREPARATION:

A. Temporary Support: Provide temporary support of work to be cut, including shoring, lumber, plywood, etc.

B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.

C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D. Avoid cutting existing pipe, conduit, or ductwork serving the building but scheduled to be removed or relocated until provisions have been made to bypass them.

3.3 PERFORMANCE:

A. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.

1. Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.

B. Cutting: Cut existing construction using methods least likely to damage elements retained or adjoining construction. Where possible, review proposed procedures with the original Installer; comply with the original Installer's recommendations.

1. In general, where cutting, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.

3. Cut through concrete and masonry using a cutting machine, such as a Carborundum saw or a diamond-core drill. (Do not overcut.)

4. Comply with requirements of applicable Division 2 Sections where cutting and patching requires excavating and backfilling.

5. Where services are required to be removed, relocated, or abandoned, by-pass utility services, such as pipe or conduit, before cutting. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal the remaining portion of pipe or

conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.

6. Existing electric and plumbing lines are located beneath floor areas. Contractor will trace out these items and proceed with caution so that existing utilities are not damaged by cutting / demolition.

C. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.

1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.

2. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

3. Where removing walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
   a. Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing the patch after the area has received primer and second coat.

4. Patch, repair, or re-hang existing ceilings as necessary to provide an even-plane surface of uniform appearance.

3.4 CLEANING:

A. Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar items. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.

END OF SECTION 017329

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SECTION 017423 – CLEANING UP

PART 1 - GENERAL

1.1 Description of Work:

A. The work of this section relates to the following:

1. Maintain premises and public properties and roadways free from accumulations of waste, debris, dirt, mud and rubbish caused by operations.
2. At completion of work, remove waste materials, rubbish tools, equipment, machinery and surplus materials, and clean all sight exposed surfaces; leave project clean and ready for occupancy.
3. Remove all overspray caused by construction operations from adjacent construction, surfaces and vehicles.

B. Related Requirements Specified Elsewhere

1. Summary of work: Section 01 10 00
2. Cutting and Patching: Section 01 73 29
3. Cleaning for Specific Products or Work: the respective sections of the specifications:

1.2 Safety Requirements

A. Standards: Maintain project in accord with safety and insurance standards.

B. Hazard Control

1. Store volatile waste in covered metal containers and remove from premises daily.
2. Prevent accumulations of waste 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 burn or bury rubbish and waste materials on project site.
2. Do not dispose of volatile waste such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
3. Do not dispose of waste into streams or waterways.

PART 2 - PRODUCTS

2.1 Materials: Use only cleaning materials recommended by manufacturer of surface to be cleaned.

PART 3 - EXECUTION

3.1 During Construction Each Contract Shall:

A. Execute daily cleaning to ensure that building, grounds, and public properties and roadways are maintained free from accumulations of waste materials, rubbish, dirt and mud.

B. Wet down dry materials and rubbish to lay dust and prevent blowing dust. Erect dustproof barriers to keep dust from drifting through the building.

C. Each day, all contractors shall affect the following:

1. Areas of intense activity, such as cutting and sawing must be swept clean and reorganized at the end of each day.
2. Areas of moderate activity such as installation of plumbing, ductwork, electrical work must be returned to good order at the end of each day.
3. Debris below scaffolds (and shoring/re-shoring) must at all time, be kept sufficiently consolidated to keep walkways free of tripping hazards. These work areas must also be swept clean immediately upon removal of scaffolds.
4. All swept up debris, waste materials, and packing must be removed and placed in the dumpster by noon of the following workday.
5. All sorted material must be kept in good order.
6. As portions of the work are completed, all used and excess materials must be removed promptly.
7. Daily Clean-up and good housekeeping is the responsibility of each contractor individually and will be monitored by the Construction Manager.
8. Contractors shall promptly comply with requests to organize scatted materials.

D. Each contractor is responsible for furnishing all dumpsters or other such containers as required for collection, storage and legal disposal of all debris and rubbish resultant from the construction operation. The Construction Manager shall locate, maintain and move such containers as necessary and legally dispose of waste as containers are filled. Separate and recycle as required authorities and regulations.

E. Vacuum clean interior building areas when ready to receive finish painting, and continue vacuum cleaning on an as needed basis until building is ready for Substantial Completion or occupancy.

F. Handle materials in a controlled manner with as few handlings as possible; do not drop or throw materials from heights.

G. Schedule cleaning operations so that dust and other containment resulting from cleaning process will not fall on wet, newly painted surfaces.

3.2 FINAL CLEANING

A. Each Contractor Shall:

1. Employ experienced workmen, or professional cleaners, for final cleaning.
2. In preparation for substantial completion or occupancy, conduct final inspection of sight exposed interior and exterior surfaces, and of concealed spaces.
3. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials form sight-exposed interior and exterior finished surfaces; polish surface so designated to shine finish.
4. Maintain cleaning until project, or portion thereof, is occupied by owner.
5. Repair, patch and touch up marred surfaces to specified finish, to match adjacent surfaces.

B. General Work Contractor shall complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or portion of Project:

1. Wash all transparent materials including mirrors and glass in doors and windows (inside and out).
2. Vacuum clean carpeting and epoxy flooring.
3. Wash & wax resilient tile floors.
4. Wash and polish all terrazzo and ceramic tile.
5. Dust/ clean all finished surfaces including casework, window sills, toilet partitions/ accessories, hardware, specialties, etc.
6. Restoration of any lawn areas disturbed by construction operations.

C. Mechanical Work Contractor shall complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or portion of Project:
1. Restoration of any lawn areas disturbed by construction operations.
2. Replace disposable filters on HVAC units. Clean permanent air filters.
3. Clean ducts, blowers and coils if dusty/ soiled during construction process
4. Final clean surfaces of all HVAC equipment including dust, paint, taping compound, mortar droppings, etc. (Unit ventilators, unit heaters, convectors, fintube, diffusers/ grills, etc).

D. Electrical Work Contractor shall complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or portion of Project:

1. Clean light fixtures, lamps, globes & reflectors. Replace burned out bulbs, noisy starters, etc.
2. Clean surfaces of all electrical equipment.

3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

A. General: Recycle paper and beverage containers used by on-site workers.

B. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type.

1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

2. Remove recyclable waste from Owner's property and transport to recycling receiver or processor.

3.4 RECYCLING DEMOLITION AND CONSTRUCTION WASTE

A. Recycle demolition and construction waste at local recycling centers where reasonable.

3.5 DISPOSAL OF WASTE

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

B. Disposal: Remove waste materials from Owner's property and legally dispose of them.

END OF SECTION 017423

SECTION 01 77 00 - EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for contract closeout including, but not limited to, the following:

1. Inspection procedures.
2. Project record document submittal.
3. Operation and maintenance manual submittal.
4. Submittal of warranties.
5. Final cleaning.

B. Closeout requirements for specific construction activities are included in the appropriate Sections.

C. Multiple Prime Contracts: Provisions of this Section apply to the construction activities of each Prime Contractor.

1.3 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete the following. List exceptions in the request.

1. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed as substantially complete.

    a. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.
    b. If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.

2. Advise the Owner of pending insurance changeover requirements.
3. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.
4. Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.

5. Submit record drawings, maintenance manuals, final project photographs, damage or settlement surveys, property surveys, and similar final record information.
6. Deliver tools, spare parts, extra stock, and similar items.
7. Make final changeover of permanent locks and transmit keys to the Owner. Advise the Owner's personnel of changeover in security provisions.
8. Complete startup testing of systems and instruction of the Owner's operation and maintenance personnel. Discontinue and remove temporary facilities from the site, along with mockups, construction tools, and similar elements.
9. Complete final cleanup requirements, including touchup painting.
10. Touch up and otherwise repair and restore marred, exposed finishes.

B. Inspection Procedures: On receipt of a request for inspection, the Architect will either proceed with inspection or advise the Contractor of unfilled requirements. The Architect will prepare the Certificate of Substantial Completion following inspection or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.

1. The Architect will repeat inspection when requested and assured that the Work is substantially complete.
2. Results of the completed inspection will form the basis of requirements for final acceptance.

1.4 FINAL ACCEPTANCE

A. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.

1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include insurance certificates for products and completed operations where required.
2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
3. Submit a certified copy of the Architect's final inspection list of items to be completed or corrected, endorsed and dated by the Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance and shall be endorsed and dated by the Architect.
4. Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Substantial Completion or when the Owner took possession of and assumed responsibility for corresponding elements of the Work.
5. Submit consent of surety to final payment.
6. Submit a final liquidated damages settlement statement.
7. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

B. Re-inspection Procedure: The Architect will re-inspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to the Architect.

1. Upon completion of re-inspection, the Architect will prepare a certificate of final acceptance. If the Work is incomplete, the Architect will advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
2. If necessary, re-inspection will be repeated, but may be chargeable to the Owner and back-chargeable to the Contractor in conditions within his control.

1.5 RECORD DOCUMENT SUBMITTALS

A. General: Do not use record documents for construction purposes. Protect record documents from deterioration and loss in a secure, fire-resistant location. Provide access to record documents for the Architect's reference during normal working hours.

B. Record Drawings: Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark which drawing is most capable of showing conditions fully and accurately. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.

1. Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work.
2. Mark new information that is important to the Owner but was not shown on Contract Drawings or Shop Drawings.
3. Note related change-order numbers where applicable.
4. Organize record drawing sheets into manageable sets. Bind sets with durable-paper cover sheets; print suitable titles, dates, and other identification on the cover of each set.

C. Record Specifications: Maintain one complete copy of the Project Manual, including addenda. Include with the Project Manual one copy of other written construction documents, such as Change Orders and modifications issued in printed form during construction.

1. Mark these documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications.
2. Give particular attention to substitutions and selection of options and information on concealed construction that cannot otherwise be readily discerned later by direct observation.
3. Note related record drawing information and Product Data.
4. Upon completion of the Work, submit record Specifications to the Architect for the Owner's records.

D. Record Product Data: Maintain one copy of each Product Data submittal. Note related Change Orders and markup of record drawings and Specifications.

1. Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site and from the manufacturer's installation instructions and recommendations.
2. Give particular attention to concealed products and portions of the Work that cannot otherwise be readily discerned later by direct observation.
3. Upon completion of markup, submit complete set of record Product Data to the Architect for the Owner's records.

E. Record Sample Submitted: Immediately prior to Substantial Completion, the Contractor shall meet with the Architect and the Owner's personnel at the Project Site to determine which Samples are to be transmitted to the Owner for record purposes. Comply with the Owner's instructions regarding delivery to the Owner's Sample storage area.

F. Miscellaneous Record Submittals: Refer to other Specification Sections for requirements of miscellaneous record keeping and submittals in connection with actual performance of the Work. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order. Identify miscellaneous records properly and

bind or file, ready for continued use and reference. Submit to the Architect for the Owner's records.

G. Maintenance Manuals: 3 copies required. Organize operation and maintenance data into suitable sets of manageable size. Bind properly indexed data in individual, heavy-duty, 2-3 inch, 3-ring, vinyl-covered binders, with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder. Include the following types of information:

1. Emergency instructions.
2. Spare parts list.
3. Copies of warranties.
4. Wiring diagrams.
5. Recommended "turn-around" cycles.
6. Inspection procedures.
7. Shop Drawings and Product Data.
8. Fixture lamping schedule.

H. Waivers, guarantees, certification letters, AIA documents, etc.: See checklist attachment at the end of this section

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 CLOSEOUT PROCEDURES

A. Operation and Maintenance Instructions: Arrange for each Installer of equipment that requires regular maintenance to meet with the Owner's personnel to provide instruction in proper operation and maintenance. Provide instruction by manufacturer's representatives if installers are not experienced in operation and maintenance procedures. Include a detailed review of the following items:

1. Maintenance manuals.
2. Record documents.
3. Spare parts and materials.
4. Tools.
5. Lubricants.

6. Fuels.

7. Identification systems.

8. Control sequences.

9. Hazards.

10. Cleaning.

11. Warranties and bonds.

12. Maintenance agreements and similar continuing commitments.

B. As part of instruction for operating equipment, demonstrate the following procedures:

1. Startup.

2. Shutdown.

3. Emergency operations.

4. Noise and vibration adjustments.

5. Safety procedures.

6. Economy and efficiency adjustments.

7. Effective energy utilization.

C. Record "As-Built" Drawings

1. Upon completion of the work, and review of the record drawings by the Architect, prepare a final set of record drawings using reproducible mylar or vellum. Submit final set of transparencies to Architect.

2. The cost of furnishing above prints and preparing these record drawings shall be included in the contract price

3.2 FINAL CLEANING

A. General: The General Conditions require general cleaning during construction. Regular site cleaning is included in Division 1 Section “Temporary Facilities and Controls."

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion.

a. Remove labels that are not permanent labels.

b. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.

c. Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition. Leave concrete floors broom clean. Vacuum carpeted surfaces.

d. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.

e. Clean the site, including landscape development areas, of rubbish, litter, and other foreign substances. Sweep paved areas broom clean; remove stains, spills, and other foreign deposits. Rake grounds that are neither paved nor planted to a smooth, even-textured surface.

C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid the Project of rodents, insects, and other pests.

D. Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.

E. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from the site and dispose of lawfully.

1. Where extra materials of value remain after completion of associated Work, they become the Owner's property. Dispose of these materials as directed by the Owner.

3.3 DEMONSTRATION AND TRAINING

A. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system. Arrange for three separate days of training, each separated by a minimum of two weeks covering all systems and equipment. Include a detailed review of the following:

1. Include instruction for basis of system design and operational requirements, review of documentation, emergency procedures, operations, adjustments, troubleshooting, maintenance, and repairs.

2. All owner training sessions to be recorded to DVD by the contractor and shall be of sufficient quality to allow the DVD to serve as a training guide for new employees. Contractor will provide 3 copies of each DVD in their closeout submittal.

3.4 CLOSEOUT CHECKLIST

A. See attached checklist for required wage & supplements, lien release, guarantee / warranties, etc.

END OF SECTION 017700

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SECTION 01 77 01 - CHECKLIST FOR PROJECT CLOSEOUT AND PROCESSING OF FINAL PAYMENT

PART 1 - GENERAL

1.1 Final payment will not be processed until all items indicated are received in accordance with Section 01 77 00 - EXECUTION AND CLOSEOUT REQUIREMENTS.

1.2 Close-Out Submittals:

1. [ ] Wage & Supplements Verification Form from prime and subcontractors (copy attached).
2. [ ] Three (3) bound, hard cover, 3-ring binder brochures of Operation and Maintenance. Manuals for all equipment installed on the project:
3. [ ] Typed or printed instructions covering the care and operations of equipment and systems furnished and installed.
4. [ ] Manufacturers instruction books, diagrams, spare parts lists covering all equipment.
5. [ ] Instruction of Owner's Representative in care and maintenance of new equipment.
6. [ ] All approved shop drawings.
7. [ ] Certificates of compliance and inspection. (Where applicable - electric, elevator, etc.)
8. [ ] Spare parts and Maintenance Materials.
9. [ ] Evidence of compliance with requirements of governing authorities (Certificates of Inspection for Electrical).
10. [ ] Certificates of insurance for products and completed operations.
11. [ ] Notarized statement that only non-asbestos materials were installed on this project.
12. [ ] Fully executed certificate of substantial completion: AIA G734.
13. [ ] Contractor's written Two-year warranty and extended warranties (if any required).
14. [ ] Project Record Documents: Section 01 7700.
15. [ ] As-Built Drawings.

1.3 Evidence of Payments and Release of Liens:

1. [ ] Contractor's Affidavit of Payment of Debts and Claims: AIA G706.
2. [ ] Contractor's Affidavit of Release of Liens - AIA G706A with:
3. [ ] Separate written releases of waivers and liens for subcontractors, suppliers, and others with lien rights against the property of owner, together with a list of those parties – AIA G706A.
4. [ ] Contractor's written release or waiver of lien upon payment to the Contractor pursuant to New York State lien law.
5. [ ] Consent of Surety to Final Payment: AIA G707.

END OF SECTION 017701

Nanuet Union Free School District

Contractor Wage and Supplement Certification

I _____ am an officer

of_____ (Prime Contractor)

and I am duly authorized to make this affidavit for the Public Contract for the Nanuet Union Free School District.

That I fully comprehend the terms and provisions of section 220-1 of the Labor Law.

That I have been issued a copy of the schedule of Wages and Supplements, as specified in the project manual.

That I agree to pay the applicable Prevailing Wage and will pay or provide the supplements specified.

_____
Contractor

_____
Signature

_____
Print Name

_____
President

ACKNOWLEDGMENT:

STATE OF NEW YORK
COUNTY OF _____:SS.:

On this _____ day of _____, 20___before me personally came _____ to me known and known to me to be the person described in and who executed the foregoing instrument and acknowledged that he executed the same.

_____
Notary Public

_____
County

Nanuet Union Free School District

Subcontractor Wage and Supplement Certification

That I am an officer of _____ and am duly authorized to make

this affidavit on behalf of the Subcontract to _____

(Prime Contractor) on Public Contract for the Nanuet Union Free School District.

That I fully comprehend the terms and provisions of section 220-1 of the Labor Law.

That I have been issued a copy of the schedule of Wages and Supplements, as specified in the project manual.

That I agree to pay the applicable Prevailing Wage and will pay or provide the supplements specified.

_____
Subcontractor

_____
Signature

_____
Print Name

_____
President

ACKNOWLEDGMENT:

STATE OF NEW YORK
COUNTY OF _____:SS.:

On this _____ day of _____, 20___before me personally came

_____ to me known and known to me to be the person described in and who executed the foregoing instrument and acknowledged that he executed the same.

_____
Notary Public

_____
County

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SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory.
2. Emergency manuals.
3. Operation manuals for systems, subsystems, and equipment.
4. Maintenance manuals for the care and maintenance of products, materials, and finishes and systems and equipment.

1.3 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 SUBMITTALS

A. Initial Submittal: Submit 2 draft copies of each manual at least 15 days before requesting inspection for Substantial Completion. Include a complete operation and maintenance directory. Architect will return one copy of draft and mark whether general scope and content of manual are acceptable.

B. Final Submittal: Submit four of each manual in final form at least 15 days before final inspection. Architect will return copy with comments within 15 days after final inspection.

1.5 COORDINATION

A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

A. Organization: Include a section in the directory for each of the following:

1. List of documents.
2. List of systems.
3. List of equipment.
4. Table of contents.

B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.

C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.

D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.2 MANUALS, GENERAL

A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name, address, and telephone number of Contractor.
6. Name and address of Architect.
7. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2 by11 inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
   a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
   b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.
2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.
4. Supplementary Text: Prepared on 8-1/2 by 11 inch white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
   a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
   b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.3 EMERGENCY MANUALS

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

1. Type of emergency.
2. Emergency instructions.
3. Emergency procedures.

B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire.
2. Flood.
3. Gas leak.
4. Water leak.
5. Power failure.

6. Water outage.
7. System, subsystem, or equipment failure.
8. Chemical release or spill.

C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

D. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

2.4 OPERATION MANUALS

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions.
2. Performance and design criteria if Contractor is delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

1. Product name and model number.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.

4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.5 PRODUCT MAINTENANCE MANUAL

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in manual, identified by product name, and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

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

2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name, and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

1. Standard printed maintenance instructions and bulletins.
2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training videotape, if available.

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

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

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.

B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.

1. Do not use original Project Record Documents as part of operation and maintenance manuals.
2. Comply with requirements of newly prepared Record Drawings in Division 01 Section "Project Record Documents."

G. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 017823

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SECTION 017836 - WARRANTIES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for warranties required by the Contract Documents, including manufacturer's standard warranties on products and special warranties.
   1. Refer to the General Conditions for terms of the Contractor's period for correction of the Work.
B. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Division 1 Section "Submittals" specifies procedures for submitting warranties.
   2. Division 1 Section "Execution and closeout requirements" specifies contract closeout procedures.
   3. Divisions 2 through 33 Sections for specific requirements for warranties on products and installations specified to be warranted.
   4. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.
C. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.
D. Separate Prime Contracts: Each prime contractor is responsible for warranties related to its own contract.

1.2 DEFINITIONS

A. Standard product warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.
B. Special warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

1.3 WARRANTY REQUIREMENTS

A. Related Damages and Losses: When correcting failed or damaged warranted construction, remove and replace construction that has been damaged as a result of such failure or must be removed and replaced to provide access for correction of warranted construction.
B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.
D. Owner's Recourse: Expressed warranties made to the Owner are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available under the law. Expressed warranty periods shall not be interpreted as limitations on the time in which the Owner can enforce such other duties, obligations, rights, or remedies.

1. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selection to products with warranties not in conflict with requirements of the Contract Documents.

E. Where the Contract Documents require a special warranty, or similar commitment on the Work or part of the Work, the Owner reserves the right to refuse to accept the Work, until the Contractor presents evidence that entities required to countersign such commitments are willing to do so.

1.4 SUBMITTALS

A. Submit written warranties to the Architect prior to the date certified for Substantial Completion. If the Architect's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Architect.
   1. When a designated portion of the Work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Architect within 15 days of completion of that designated portion of the Work.

B. When the Contract Documents require the Contractor, or the Contractor and a subcontractor, supplier or manufacturer to execute a special warranty, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner, through the Architect, for approval prior to final execution.
   1. Refer to Divisions 2 through 16 Sections for specific content requirements and particular requirements for submitting special warranties.

C. Form of Submittal: At Final Completion compile 2 copies of each required warranty properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.

D. Bind warranties and bonds in heavy-duty, commercial-quality, durable 3-ring, vinyl-covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch(115-by-280-mm) paper.
   1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address, and telephone number of the Installer.
   2. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project title or name, and name of the Contractor.
   3. When warranted construction requires operation and maintenance manuals, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

PART 2 - PRODUCTS (Not used)

PART 3 - EXECUTION (Not used)

END OF SECTION 017836

Request for Shutdown

PROJECT	Nanuet Union Free School District – Phase 4 Projects	**DATE**	
		CONTRACT NO.	
KSQ PROJ. # 2111003.00		**CONTRACT FOR**	

CONTRACTOR REQUEST		
Contractor Name:		
Foreman:		Emergency Phone:
Type (electrical, etc.):		
Area Affected (room, building, etc.):		
Reason for Shutdown:		
1) Date Requested	From Time:	To Time:
2) Date Requested	From Time:	To Time:
3) Date Requested	From Time:	To Time:
4) Date Requested	From Time:	To Time:
Send to: **Jacobs**, **ATTN:**		

OWNER'S REMARKS

Owner's Remarks:

Owner's Signature of Approval: _____ Date: _____

PLEASE NOTIFY ALL AFFECTED!

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Daily Report Cover

PROJECT Nanuet Union Free School District –Phase 4 Projects	**DATE**
	CONTRACT NO.
KSQ PROJ. # 2111003.00	**CONTRACT FOR**

	7:00 AM	Noon	3:30 PM
Temperature			
Weather			

PERSONNEL (list by trade or attach daily time sheet)

SUBCONTRACTORS / PERSONNEL

EQUIPMENT

Send to: Jacobs

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Two Week Look-Ahead Schedule

PROJECT Nanuet Union Free School District – Phase 4 Projects	**DATE** **CONTRACT #**
KSQ PROJ. # 2111003.00	**WORK AREA**

MONTH/YEAR _____

DATES											COMMENTS/NOTES

Send to: Jacobs

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Submittal Schedule

PROJECT: NANUET UNION FREE SCHOOL DISTRICT PHASE 4 PROJECTS

KSQ PROJ. # 2111003.00

SECTION	SUBMITTAL TYPE												DATE SUBMIT	DATE RETURN	ACTION	COMMENT
	Product Data	Shop Drawings	Samples	Certificates	Qualification Data	Test Reports	Pre-Install conference	Maintenance Data	Warranty	Inspection Report	O&M Data	Demo & Training				

SECTION 020800
ASBESTOS ABATEMENT PROCEDURES

AT: BARR MIDDLE SCHOOL
143 CHURCH STREET
NANUET, NY 10954
SED #50-01-08-03-0-004-021

OWNER: NANUET UNION FREE SCHOOL DISTRICT
103 CHURCH STREET
NANUET, NY 10954
PH. (845) 627-9880
FX. (845) 624-5338

CONSULTANT: QUALITY ENVIRONMENTAL SOLUTIONS & TECHNOLOGIES, INC. (QUES&T)
1376 ROUTE 9
WAPPINGERS FALLS, NEW YORK 12590
PH. (845) 298-6031
FX. (845) 298-6251



SPECIFICATION DATED: February 6, 2024
Design conforms to all applicable provisions of the NYS Uniform Fire Prevention and Building Code, NYS Energy Conservation Construction Code and Education Department Building Standards.

PART I – GENERAL

1.01 DESCRIPTION

A. All work under this contract shall be performed in strict accordance with the specifications and all applicable laws for asbestos removal projects. The Abatement Contractor shall furnish all labor, materials, supervision, services, insurance and equipment necessary for the complete and total removal of Asbestos-containing Materials (ACM) as described herein, in attachments to the specification, Job Specific Variance(s) and/or as directed by Nanuet Union Free School District (here-in-after the "Owner") and/or the Owners Representative(s) to support the to the following Nanuet School District projects:

- Barr Middle School
  143 Church Street
  Nanuet, NY 10954
  SED #50-01-08-03-0-004-021

B. Abatement Contractor shall provide for personnel air monitoring to satisfy OSHA regulation 29 CFR Parts 1926.1101(f). All work performed shall be in strict accordance with applicable provisions and regulations promulgated under New York State Department of Labor, Industrial Code 56 (ICR-56).

C. The Abatement Contractor shall satisfy the requirements for asbestos projects issued by the New York State Department of Labor concerning licensing and certification; notification; equipment; removal and disposal procedures; engineering controls; work area preparation; decontamination and clean-up procedures; and personnel air monitoring.

D. The Abatement Contractor shall be responsible for submittal of asbestos project notification(s) and applicable fees to EPA and NYSDOL concerning this project. Project notification(s) shall be made for the cumulative total of ACM to be removed as required by ICR-56-3.4. Work practices for each individual work area established shall be consistent with the quantity of ACM contained within that work area as defined in ICR-56-2.

E. The scope of work under this contract shall include the following:

1. All asbestos-containing materials (ACM) shall be removed in accordance with these specifications. The Abatement Contractor is responsible for field verification of estimated quantities, locations and other site conditions that may affect work.

2. All fixed objects remaining within the work area(s) shall be protected as required by Title 12 NYCRR Section 56-7.10(b) and as described in these specifications.

3. The containerization, labeling and disposal of all asbestos waste in accordance with applicable city, state and federal regulations and these specifications.

4. The Abatement Contractor will be responsible for repairing all building components damaged during abatement including, but not limited to, ceiling tiles, ceiling finishes, wall finishes and/or floor finishes, etc.

5. The Abatement Contractor shall be responsible for any and all demolition required to access materials identified in scope of work and on associated drawings.

6. Concealed conditions that are exposed and may require additional work shall be brought to the attention of the Owner(s) immediately. The Abatement Contractor shall not abate these areas without a written notice to proceed. If the Abatement Contractor removes additional asbestos prior to the order to proceed the additional work will not be acknowledged.

7. Permissible working hours shall be Monday through Friday 7:00 A.M. to 4:00 P.M. with one (1) hour for lunch and/or as defined by the Owner. Holidays shall be considered weekends and not included for working days. Upon written approval from the Owner, the Abatement Contractor may work past these hours. The Abatement Contractor will incur any and all costs associated for work performed beyond the defined schedule including, but not limited to: abatement activities, project/air monitoring, custodial/staffing labor, overtime, mobilizations, etc.

8. Buildings will be turned over to the Abatement Contractor as is. At that time, all electrical services and HVAC systems in the proposed work areas will be shut down. Electricity and water supply will be maintained in the building for use by the Abatement Contractor. The Abatement Contractor is responsible for securing all power in the work area(s) and establishing all temporary GFCI hookups necessary to complete his work.

9. The Abatement Contractor shall remove identified asbestos-containing floor coverings to the building substrate beneath; in areas indicted. Subsequent to final air clearances, the substrate(s) shall be washed with a neutralizing agent to prepare the substrate to accept new floor covering and eliminate residual odors.

10. The Abatement Contractor must coordinate location of waste containers with the Facility and the Owner. Deliveries and storage of equipment must be coordinated with the Facility and the Owner.

11. All “Large” and “Small” asbestos abatement projects, as defined by 12 NYCRR56 shall not be performed while the building is occupied. The term “building” means a wing or major section of a building that can be completely isolated from the rest of the building with sealed non-combustible construction. The isolated portion of the building must contain exists that do not pass through the occupied portion(s) and ventilation systems must be physically separated and sealed at the isolation barriers.

1.02 PRE-CONTRACT SUBMITTALS

Within three (3) days after bids are opened, the three (3) apparent low bidders shall be required to submit the following documentation:

A. Resume: Shall include the following:

1. Provide a list of projects of similar nature performed within the past two (2) years and include the dollar value of all projects. Provide project references to include owner, consultant, and air monitoring firms' name, contact person, address, and phone number, include location of project and date of completion.

2. Abatement Contractor license issued by New York State Department of Labor for asbestos work in accordance with ICR-56-3.

3. A list of owned equipment available to be used in the performance of the project.

4. The number of years engaged in asbestos removal.

5. An outline of the worker training courses and medical surveillance program conducted by the Abatement Contractor.

6. A standard operating procedures manual describing work practices and procedures, equipment, type of decontamination facilities, respirator program, special removal techniques, etc.

7. Documentation to the satisfaction of the Owner pertaining to the Abatement Contractor's financial resources available to perform the project. Such data shall include, but not be limited to, the firm's balance sheet for the last fiscal year.

B. Citations/Violations/Legal Proceedings

1. Submit a notarized statement describing any citations, violations, criminal charges, or legal proceedings undertaken or issued by any law enforcement, regulatory agency, or consultant concerning performance on previous asbestos abatement contracts. Briefly describe the circumstances citing the project and involved persons and agencies as well as the outcome of any actions.

2. Answer the question: "Has your firm or its agents been issued a Stop Work order on any project within the last two years?" If "Yes" provide details as discussed above.

3. Answer the question: "Are you now, or have you been in the past, a party to any litigation or arbitrations arising out of your performance on Asbestos Abatement Contracts?" If "Yes" provide details as discussed in 1. above.

4. Describe any liquidated damages assessed within the last two years.

C. Preliminary Schedule

1. Provide a detailed schedule including work dates, work shift times, estimate of manpower to be utilized and the start and completion date for completion of each major work area.

1.03 DOCUMENTATION

A. The Abatement Contractor shall be required to submit the following and receive the Consultant's approval prior to commencing work on this project:

1. Provide documentation of worker training for each person assigned to the project. Documentation shall include copies of each workers valid New York State asbestos handler certificates (for those employees who may perform asbestos removal), documentation of current respirator fit test and current OSHA required training and medical examination.

2. The attached "Asbestos Employee Medical Examination Statement" and "Asbestos Employee Training Statement" forms shall be completed, signed and submitted for each worker assigned to the project. Records of all employee training and medical surveillance shall be maintained for at least forty (40) years. Copies of the records shall be submitted to the Consultant prior to commencement.

3. The Abatement Contractor shall submit proof of a current, valid license issued by the New York State Department of Labor pursuant to the authority vested in the Commissioner by section 906 of the Labor Laws, and that the employees performing asbestos related work on this project are certified by the State of New York as required in Part 56 of Title 12 of the Official Compilation of Codes, Rules and Regulations of the State of New York latest edition. Copies of all licenses shall be submitted prior to the commencement of the project.

4. The Abatement Contractor shall submit a written respiratory protection program meeting the requirements of 29 CFR 1910.134 to the Consultant.

5. The name, address, social security number and NYS DOL certificate number of the person(s) who will supervise the asbestos project.

6. The name and address of the deposit or waste disposal site or sites where the asbestos materials are to be deposited or disposed of. This site must be approved by the Owner. The manifesting procedure must also be specified.

7. The name, address and New York State Dept. of Environmental Conservation ID Number of any transporters that are to be used to transport waste.

8. A written Standard Operation Procedure (SOP) that is designed and implemented to maximize protection against human exposure to asbestos dust. The SOP shall take into consideration the workers, visitors, building employees, general public and environment. As a minimum the procedures must include the following:

   a. Security for all work areas on an around-the-clock basis against unauthorized access.

   b. Project organization chart including the phone numbers of at least two responsible persons who shall be authorized to dispatch men and equipment to the project in the event of an emergency; including weekends.

   c. Description of protective clothing and NIOSH approved respirators to be used.

   d. Description of all removal methods to be used, including HEPA air filtration and decontamination sequence with special emphasis on any procedure that may deviate from these specifications.

   e. A list of manufacturers' certificates stating that all vacuums, negative air filtration equipment, respirators and air supply equipment meet OSHA and EPA requirements.

   f. A list of all materials proposed to be furnished and used under this contract.

   g. Emergency evacuation procedures in the event of fire, smoke or accidents such as injury from falling, heat exposure, electrical shock, etc.

   h. The name, address and ELAP number of the New York State Department of Health Certified Analytical Testing Laboratory the Contractor proposes to use for the OSHA monitoring.

9. A detailed plan, in triplicate, for the phasing of the project, division of work areas and location of decontamination facilities, waste containers and temporary office.

10. Work schedule, identifying firm dates and completion for actual areas. Bar chart or critical path chart indicating phases is required.

B. The Abatement Contractor shall post their NYS DOL contractor's license and maintain a daily log documenting the dates and time of the following items within each personal decontamination unit:

1. Meetings; purpose, attendants, discussion (brief)

2. Sign-in and sign-out of all persons entering the work area including name, date, time, social security number, position or function and general description of daily activity.

3. Testing of barriers and enclosure systems using smoke tubes prior to the beginning of abatement activities and at least once a day thereafter until satisfactory clearance air monitoring results have been achieved.

4. Inspection of all plastic barriers, twice daily, by the asbestos supervisor.

5. Loss of enclosure integrity; special or unusual events, barrier breaches, equipment failures, etc.

6. Daily cleaning of enclosures.

7. Personnel air monitoring test results for OSHA Compliance. Results shall be posted at the work site within 24 hours of testing and copies supplied to the Owner within five (5) days of testing. Abnormalities shall be supplied to the Owner immediately.

C. Documentation with confirmation signature of Consultant's representative of the following shall be provided by the Abatement Contractor at the final closeout of the project.

1. Testing of barriers and enclosure systems using smoke tubes shall be performed prior to the beginning of abatement activities and at least once a day thereafter until satisfactory clearance air monitoring results have been achieved.

2. Inspection of all plastic barriers.

3. Removal of all polyethylene barriers.

4. Consultant's inspections prior to encapsulation.

5. Removal of waste materials.

6. Decontamination of equipment (list items).

7. Consultant's final inspection/final air tests.

D. The Abatement Contractor shall provide records of all project information, to include the following which shall be submitted upon completion of the project and prior to approval of the Abatement Contractor's payment application:

1. The location and description of the abatement project.

2. The name, address and social security number of the person(s) who supervised the asbestos project.

3. Certified payroll documentation Pursuant to Article 8, Section 220 of the NYS Labor Law

4. Copies of EPA/NYSDOL Asbestos Certificates for all Workers and Supervisors employed on the Project.

5. Copies of Medical Approval and Respirator Fit-testing for all Asbestos Workers and Supervisors employed on the Project.

6. Copies of Abatement Contractors Daily Sign-In Sheets & Logs for persons entering and leaving the work area. – Title 12 NYCRR Part 56-7.3.

7. Copies of Abatement Contractor's personal air sampling laboratory results.

8. The amounts and type of asbestos materials that was removed, enclosed, encapsulated, or disturbed.
9. The name and address of the deposit or waste disposal site or sites where the asbestos waste materials were deposited or disposed of and all related manifests, receipts and other documentation associated with the disposal of asbestos waste.

10. The name and address of any transporters used to transport waste and all related manifests, receipts and other documentation associated with the transport of asbestos waste.

11. All other information that may be required by state, federal or local regulations.

12. Copy of the Supervisor's Daily Project Log of events as described in 1.03 B, above.

1.04 NOTIFICATIONS AND PERMITS

A. The Abatement Contractor shall be required to prepare and submit notifications to the following agencies at least ten (10) days prior to the commencement of the project:

1. Asbestos NESHAPS Contact
   U.S. Environmental Protection Agency
   NESHAPS Coordinator, Air Facilities Branch
   26 Federal Plaza
   New York, New York 10007
   (212) 264-7307

2. State of New York Department of Labor
   Division of Safety and Health
   Asbestos Control Bureau
   State Office Building Campus, Building 12, Room 454
   Albany, New York 12240

3. Owner(s): Nanuet Union Free School District
   103 Church Street
   Nanuet, NY 10954
   ATTN: Rudy Villanyi
   Ph. (845) 620-3999
   Fx. (845) 620-3934
   E-mail: rvillanyi@nanuetsd.net

4. Owner's Representative(s): KSQ Design
   215 W 40th Street 15th Floor
   New York, Ny 10018
   ATTN: Ofe Clarke
   Ph. (646) 435-0660
   E-mail. oclarke@ksq.design

5. Environmental Consultant(s): Quality Environmental Solutions & Technologies, Inc. (QuES&T)
   1376 Route 9
   Wappingers Falls, New York 12590
   ATTN: Todd McAfee
   Ph. (845) 298-6031
   Fx. (845) 298-6251
   E-mail. tmcafee@qualityenv.com

B. The notification shall include but not be limited to the following information:

1. Name and address of Owner.

2. Name, address and asbestos handling license number of the Abatement Contractor.

3. Address and description of the building, including size, age, and prior use of the building or area; the amount, in square feet or linear feet of asbestos material to be removed; room designation numbers or other local information where asbestos material is found, including the type of asbestos material (friable or non-friable).

4. Scheduled starting and completion dates for removal.

5. Methods to be employed in abating asbestos containing materials.

6. Procedures and equipment, including ventilating/exhaust systems, that will be employed to comply with the Code of Federal Regulation (CFR) Title 40, Part 61 of the U.S. Environmental Protection Agency.

7. The name and address of the carting company and of the waste disposal site where the asbestos waste will be deposited.

NOTE: Notifications shall be submitted using standard forms as may be used by the respective agency.

For DOL (NYS) include "Asbestos Project Notification" form (DOSH-483) with proper fee, if required. For EPA include "Notification of Demolition and Renovation"; 40 CFR Part 61.

C. The Abatement Contractor shall secure any permits required by the city, town, county, or state that may be required and the cost for obtaining the permit shall be included in his base bid.

D. The Abatement Contractor shall erect warning signs around the work space at every point of potential entry into the work area in accordance with OSHA 1926.58k (2), (i). These signs shall bear the following information:

DANGER
ASBESTOS
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
AUTHORIZED PERSONNEL ONLY

In addition, where the use of respirators and protective clothing is required in the regulated area under this section, the warning signs shall include the following:

WEAR RESPIRATORS PROTECTION AND PROTECTIVE CLOTHING IN THIS AREA

E. The Abatement Contractor shall post at entrances to the work place and immediate adjacent areas, notifications to building occupants, which include the name and license number of the contractor, project location and size, amount and type of ACM, abatement procedures, dates of expected occurrence and name and address of the air monitor and laboratory in compliance with ICR 56-3.6.

F. The Abatement Contractor shall post a list of emergency telephone numbers at the job site which shall include the Owner's Representative, police, emergency squad, local hospital, Environmental Protection Agency, N.Y. State Department of Labor, Occupational Safety and Health Administration and the local Department of Health.

1.05 APPLICABLE STANDARDS

Except to the extent that more explicit or more stringent requirements are written directly into the contract documents, applicable standards of the construction industry have the same force and effects (and are made a part of contract documents by reference) as if copied directly into contract documents, or as if published copies were bound herewith. Resolution of overlapping and conflicting requirements, which result from the application of several different industry standards to the same unit of work, shall be by adherence to the most stringent requirement.

A. Applicable standards listed in these Specifications form a part of this Specification and include, but are not necessarily limited to, standards promulgated by the following agencies and organizations:

1. ANSI:
   American National Standards Institute
   1430 Broadway
   New York, New York 10018

2. ASHRAE:
   American Society for Heating, Refrigerating
   and Air Conditioning Engineers
   1791 Tullie Circle NE
   Atlanta, Georgia 30329

3. ASTM:
   American Society for Testing and Materials
   1916 Race Street
   Philadelphia, Pennsylvania 19103

4. CFR
   Code of Federal Regulations Available
   from Government Printing Office
   Washington, District of Columbia 20402

5. CGA
   Compressed Gas Association
   1235 Jefferson Davis Highway
   Arlington, Virginia 22202

6. CS
   Commercial Standard of NBS
   (US Dept. of Commerce)
   Government Printing Office

7. EPA
   Environmental Protection Agency, Region II
   26 Federal Plaza
   New York, New York 10007
   Asbestos Coordinator - Room 802
   (212) 264-9538
   Part 61, Sub-Parts A & B
   National Emission Standard for Asbestos

8. FEDERAL SPECS
   Federal Specification (General Services Administration)
   7th and D Street, SW
   Washington, District of Columbia 20406

9. NBS
   National Bureau of Standards
   (US Department of Commerce)
   Gaithersburg, Maryland 20234

10. NEC
    National Electrical Code (by NFPA)

11. NFPA
    National Fire Protection Association
    Batterymarch Park
    Quincy, Massachusetts 02269

12. NIOSH
    National Institute for Occupational Safety and Health
    26 Federal Plaza
    New York, New York 10007

13. NYSDOH
    New York State Department of Health
    Bureau of Toxic Substance Assessment
    Room 359 - 3rd Floor
    Tower Building Empire State Plaza
    Albany, New York 12237

14. NYSDEC
    New York State Department of Environmental Conservation
    Room 136
    50 Wolf Road
    Albany, New York 12233-3245

15. NYSDOL
    State of New York Department of Labor
    Division of Safety and Health
    Asbestos Control Program
    State Campus
    Building 12
    Albany, New York 12240

16. OSHA
    Occupational Safety and Health Administration
    (US Department of Labor)
    New York Regional Office - room 3445
    1515 Broadway
    New York, New York 10036

17. UL

Underwriters Laboratories
333 Pfingsten Road
Northbrook, Illinois 60062

B. Federal Regulations: Those which govern asbestos abatement work or hauling and disposal of asbestos waste materials:

1. U.S. Department of Labor, Occupational Safety and Health Administration, (OSHA):

a. Asbestos Regulations
Title 29, Part 1910, of the Code of Federal Regulations.

b. Respiratory Protection
Title 29, Part 1910, Section 134 of the Code of Federal Regulations.

c. Construction Industry
Title 29, Part 1926, of the Code of Federal Regulations.

d. Access to Employee Exposure & Medical Records
Title 29, Part 1910, Section 20 of the Code of Federal Regulations.

e. Hazard Communication
Title 29, Part 1910, Section 1200 of the Code of Federal Regulations.

f. Specifications for Accident Prevention Signs and Tags
Title 29, Part 1910, section 145 of the Code of Federal Regulations.

2. U.S. Environmental Protection Agency (EPA):

a. Asbestos Hazard Emergency Response Act (AHERA) Regulation Asbestos Containing Materials in Schools Final Rule & Notice Title 40, Part 763, Subpart E of the Code of Federal Regulations.

b. Worker Protection Rule
40 CFR Part 763, Subpart G, CPTS 62044, FLR 2843-9
Federal Register, Vol. 50, No. 134, 7/12/85, P28530-28540

c. Regulation for Asbestos
Title 40, Part 61, Subpart A of the Code of Federal Regulations

d. National Emission Standard for Asbestos
Title 40, Part 61, Subpart M (Revised Subpart B) of the Code of Federal Regulations

e. Resource Conservation and Recovery Act (RCRA) 1976, 1980
Hazardous and Solid Waste Amendments (HSWA) 1984
Subtitle D, Subtitle C

3. U.S. Department of Transportation (DOT):

a. Hazardous Substances: Final Rule Regulation 49 CFR, Part 171 and 172.

C. State Regulations: Those which govern asbestos abatement work or hauling and disposal of asbestos waste materials:

1. New York State Department of Environmental Conservation (DEC) Regulations regarding waste collection registration. Title 6, Part 364 of the New York State Official Compilation of Codes, Rules and Regulations - 6NYCRR 364.

2. New York State Right-To-Know Law

3. New York State Department of Labor Asbestos Regulations Industrial Code Rule 56.

D. Standards: Those which govern asbestos abatement work or hauling and disposal of asbestos waste materials:

1. American National Standards Institute (ANSI)

a. Fundamentals Governing the Design and Operation of Local Exhaust Systems
Publication Z9.2-79

b. Practices for Respiratory Protection
Publication Z88.2-80

E. Guidance Documents: Those that discuss asbestos abatement work or hauling and disposal of asbestos waste materials are listed below only for the Abatement Contractor's information. These documents do not describe the work and are not a part of the work of this contract.

EPA:

1. Guidance for Controlling Asbestos Containing Materials in Buildings (Purple Book) EPA560/5-85-024.

2. Asbestos Waste Management Guidance EPA 530-SW-85-007.

F. Patents and Royalties: The Abatement Contractor shall pay all royalties and/or license fees. The Abatement Contractor shall defend all suits and claims for infringement of any patent rights and save the Owner and Consultant harmless from loss including attorney fees on account thereof.

1.06 DEFINITIONS

As used in or in connection with these specifications the following are terms and definitions.

Abatement - Procedure to control release from asbestos material. This includes removal, encapsulation and enclosure.

Aggressive sampling - A method of sampling in which the person collecting the air sample creates activity by the use of mechanical equipment during the sampling period to stir up settled dust and simulate activity in that area of the building.

AIHA - The American Industrial Hygiene Association, 475 Wolf Ledges Parkway, Akron, Ohio 44311.

Airlock - A system for permitting entrance and exit while restricting air movement between a containment area and an uncontaminated area. It consists of two curtained doorways separated by a distance of at least three feet such that one passes through one doorway into the airlock, allowing the doorway sheeting to overlap and close off the opening before proceeding through the second doorway, thereby preventing flow-through contamination.

Air sampling - The process of measuring the content of a known volume of air collected during a specific period of time.

Amended water - Water to which a surfactant has been added.

Approved asbestos safety program - A program approved by the Commissioner of Health providing training in the various disciplines that may be involved in an asbestos project.

Area air sampling - Any form of air sampling or monitoring where the sampling device is placed at some stationary location.

Asbestos - Any naturally occurring hydrated mineral silicate separable into commercially usable fibers, including chrysotile (serpentine), amosite (cumingtonite-gunerite), crocidolite (riebeckite), tremolite, anthophyllite and actinolite.

Asbestos contract - An oral or written agreement contained in one or more documents for the performance of work on an asbestos project and includes all labor, goods and service.

Asbestos handler - An individual who installs, removes, applies, encapsulates, or encloses asbestos or asbestos material, or who disturbs friable asbestos. Only individuals certified by NYS Department of Labor shall be acceptable for work under this specification.

Asbestos handling certificate - A certificate issued by the Commissioner of Labor of the State of New York, to a person who has satisfactorily completed an approved asbestos safety program.

Asbestos project - Work undertaken by a contractor which involves the installation, removal, encapsulation, application or enclosure of any ACM or the disturbance of friable ACM.

Asbestos Safety Technician (AST) - Individual designated to represent the Consultant, perform third party monitoring and perform compliance monitoring at the job site during the asbestos project.

Asbestos waste material - Asbestos material or asbestos contaminated objects requiring disposal.

Authorized visitor - The building owner, his or her representative or any representative of a regulatory or other agency having jurisdiction over the project.

Background level monitoring - A method used to determine ambient airborne concentrations inside and outside of a building or structure prior to starting an abatement project.

Building owner - The person in whom legal title to the premises is vested unless the premises are held in land trust, in which instance Building Owner means the person in whom beneficial title is vested.

Clean room - An uncontaminated area or room that is a part of the personal decontamination enclosure with provisions for storage of persons' street clothes and protective equipment.

Cleanup - The utilization of HEPA vacuuming to control and eliminate accumulations of asbestos material and asbestos waste material.

Clearance air monitoring - The employment of aggressive sampling techniques with a volume of air collected to determine the airborne concentration of residual fibers upon conclusion of an asbestos abatement project.

Commissioner - Commissioner of the New York State Department of Labor.

Contractor - A company, unincorporated association, firm, partnership or corporation and any owner or operator thereof, which engages in an asbestos project or employs persons engaged in an asbestos project.

Curtained doorway - A device that consists of at least three overlapping sheets of plastic over an existing or temporarily framed doorway. One sheet shall be secured at the top and left side, the second sheet at the top and right side, and the third sheet at the top and the left side. All sheets shall have weights attached to the bottom to insure that the sheets hang straight and maintain a seal over the doorway when not in use.

Decontamination enclosure system - A series of connected rooms, separated from the work area and from each other by air locks, for the decontamination of persons, materials, equipment, and authorized visitors.

Encapsulant (sealant) or encapsulating agent - A liquid material that can be applied to asbestos material and which prevents the release of asbestos from the material by creating a membrane over the surface.

Enclosure - The construction of airtight walls, ceilings and floors between the asbestos material and the facility environment, or around surfaces coated with asbestos materials, or any other appropriate procedure that prevents the release of asbestos materials.

Equipment room - A contaminated area or room that is part of the personal decontamination enclosure system with provisions for the storage of contaminated clothing and equipment.

Fixed object - A unit of equipment, furniture or other fixture in the work area which cannot be readily removed from the work area.

Friable Asbestos Material - That condition of crumbled, pulverized, powdered, crushed or exposed asbestos capable of being released into the air by hand pressure.

Friable material containment - The encapsulation or enclosure of any friable asbestos material.

Glovebag technique - A method for removing asbestos material from heating, ventilating, and air conditioning (HVAC) ducts, piping runs, valves, joints, elbows, and other nonplanar surfaces in a noncontained work area. The glovebag assembly is a manufactured device consisting of a glovebag constructed of at least six mil transparent plastic, two inward-projecting longsleeve gloves, which may contain an inward projecting waterwand sleeve, an internal tool pouch, and an attached, labeled receptacle or portion for asbestos waste. The glovebag is constructed and installed in such a manner that it surrounds the object or area to be decontaminated and to contain all asbestos fibers released during the abatement process.

HEPA filter - A high efficiency particulate air filter capable of trapping and retaining 99.97 percent of particulate greater than 0.3 microns equivalent aerodynamic diameter.

HEPA vacuum equipment - Vacuuming equipment with a high efficiency particulate air filtration system.

Holding area - A chamber in the waste decontamination enclosure located between the washroom and an adjacent uncontaminated area.

Homogeneous work area - A site within the abatement work area that contains one type of asbestos material and where one type of abatement is used.

Large asbestos project - An asbestos project involving the installation, removal, disturbance, enclosure, or encapsulation of 160 square feet or more of asbestos or asbestos material or 260 linear feet or more of asbestos or asbestos material.

Minor asbestos project - An asbestos project involving the installation, removal, disturbance, enclosure, or encapsulation of 10 square feet or less of asbestos or asbestos material, or 25 linear feet or less of asbestos or asbestos material.

Movable object - A unit of equipment, furniture or fixture in the work area that can be readily removed from the work area.

Negative air pressure equipment - A local exhaust system equipped with HEPA filtration. The system shall be capable of creating and maintaining a negative pressure differential between the outside and the inside of the work area.

Non-asbestos material - Any material containing one percent or less asbestos by weight.

Occupied area - Any frequented portion of the work site where abatement is not taking place.

Outside air - The air outside the building or structure.

Personal air monitoring - A method used to determine an individuals exposure to airborne contaminants. The sample is collected outside the respirator in the person's breathing zone.

Plasticize - To cover floors, walls, ceilings and other surfaces with 6 mil fire retardant plastic sheeting as herein specified.

Project - Any form of work performed in connection with the abatement of asbestos or alteration, renovation, modification or demolition of a building or structure that may disturb asbestos or asbestos material.

Removal - The stripping of any asbestos material.

Repair - Corrective action using required work practices to control fiber release from damaged areas.

Respiratory protection - Respiratory protection required of licensed asbestos workers and authorized visitors in accordance with the applicable laws.

Satisfactory clearance air monitoring results - For all post- abatement samples, airborne concentrations of total fibers that are less than 0.01 fibers per cubic centimeter or background levels, whichever are greater, using phase contrast microscopy (PCM).

Shower room - A room between the clean room and the equipment room in the personal decontamination enclosure with hot and cold running water controllable at the top and arranged for complete showering during decontamination.

Small asbestos project - An asbestos project involving the installation, removal, disturbances, enclosure, or encapsulation of more than 10 and less than 160 square feet of asbestos or asbestos material of more than 25 and less than 260 linear feet of asbestos or asbestos material.

Staging area - The area near the waste transfer airlock where containerized asbestos waste has been placed prior to removal from the work area.

Surfactant - A chemical wetting agent added to water to improve its penetration.

Visible emissions - An emissions of particulate material that can be seen without the aid of instruments.

Washroom - A room between the work area and the holding area in the waste decontamination enclosure system, where equipment and waste containers are wet cleaned and/or HEPA vacuumed.

Waste decontamination enclosure system - An area, consisting of a washroom and a holding area, designated for the controlled transfer of materials and equipment.

Wet cleaning - The process of eliminating asbestos contamination from surfaces, equipment or other objects by using cloths, mops, or other cleaning tools.

Work area - Designated rooms, spaces, or areas where asbestos abatement takes place.

Work site - Premises where asbestos abatement is taking place.

Work Surface - Substrate surface from which asbestos-containing material has been removed.

1.07 UTILITIES, SERVICE AND TEMPORARY FACILITIES

A. The Owner shall make available to the Abatement Contractor all reasonable amounts of water and electrical power at no charge.

B. The Abatement Contractor shall provide, at his own expense, all electrical, water, and waste connections, extensions, and construction materials, supplies, etc. All connections must be approved in advance by the Owner and all work relative to the utilities must be in accordance with the applicable building codes.

C. The Abatement Contractor shall provide scaffolding, ladders and staging, etc. as necessary to accomplish the work of this contract. The type, erection and use of all scaffolding, ladders and staging, etc. shall comply with all applicable OSHA provisions.

D. All connections to the Owner's water system shall include reduced pressure backflow protection or double check and double gate valves. Valves shall be temperature and pressure rated for operation of the temperatures and pressures encountered. After completion of use, connections and fittings shall be removed without damage or alteration to existing water piping and equipment. Leaking or dripping valves shall be piped to the nearest drain or located over an existing sink or grade where water will not damage existing finishes or equipment.

E. The Abatement Contractor shall use only heavy duty abrasion resistant hoses with a pressure rating greater than the maximum pressure of the water distribution system to provide water to each work area and to each decontamination unit. Provide fittings as required to allow for connection to existing wall hydrants or spouts, as well as temporary water heating equipment, branch piping,

showers, shut-off nozzles and equipment. All water must be shut off at the end of each shift.

F. The Abatement Contractor shall provide service to decontamination unit electrical subpanel with minimum 60 amp, 2 pole circuit breaker or fused disconnect and ground-fault circuit interrupters (GFCI), reset button and pilot light, connected to the building's main distribution panel. Subpanel and disconnect shall be sized and equipped to accommodate all electrical equipment required for completion of the work. This electrical subpanel shall be used for hot water heater, PAPR battery recharging and air sampling pumps.

G. The Abatement Contractor shall provide UL rated 40-gallon electric hot water heater to supply hot water for the decontamination unit shower. Activate from 30 amp circuit breaker on the electrical subpanel located within the decontamination unit. Provide with relief valve compatible with water heater operation; relief valve down to drip pan on floor with type L copper. Wiring of the hot water heater shall be in compliance with NEMA, NEC, and UL standards.

H. The Abatement Contractor shall provide identification warning signs at power outlets, which are other than 110-120 volt power. Provide polarized outlets for plug-in type outlets, to prevent insertion of 110-120 plugs into higher voltage outlets. Dry transformers shall be provided where required to provide voltages necessary for work operations. All outlets or power supplies shall be protected by ground fault circuit interrupter (GFCI) at the power source.

I. The Abatement Contractor shall use only grounded extension cords; use "hard-service" cords where exposed to abrasion and traffic. Use single lengths or use waterproof connectors to connect separate lengths of electric cords, if single lengths will not reach areas of work.

J. The Abatement Contractor shall provide general service incandescent lamps of wattage indicated or required for adequate illumination; Protect lamps with guard cages or tempered glass enclosures; Provide exterior fixtures where fixtures are exposed to moisture.

K. The Abatement Contractor shall provide temporary heat or air conditioning as necessary to maintain comfortable working temperatures inside and immediately outside the work areas. Heating and A/C equipment shall have been tested and labeled by UL, FM or another recognized trade association related to the fuel being used. Fuel burning heaters shall not be used inside containment areas. The Contractor shall also provide a comfortable working environment for occupied areas that are impacted by the asbestos removal.

L. The Abatement Contractor shall comply with recommendations of the NFPA standard in regard to the use and application of fire extinguishers. Locate fire extinguishers where they are most convenient and effective for their intended purpose, but provide not less than one extinguisher in each work area, equipment room, clean room and outside the work area.

1.08 REMOVAL OF FIXTURES

A. In locations where the Abatement Contractor is directed to dispose of fixtures he shall either decontaminate the fixtures and dispose of them as non-asbestos containing materials or he shall place them in an appropriate container and dispose of them as asbestos containing material.

B. In locations where the Abatement Contractor is directed to remove and reinstall fixtures, the fixtures shall be removed, decontaminated, labeled, protected with plastic and stored by the contractor in a location as directed by the Owner.

C. Upon completion of the asbestos removal and upon receiving satisfactory clearance air monitoring results, all items to be replaced shall be restored to their original location and reinstalled by the Abatement Contractor.

PART 2 – PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. GENERAL REQUIREMENTS

1. Materials shall be stored off the ground, away from wet or damp surfaces and under protective cover to prevent damage or contamination.

2. Damaged or deteriorating materials shall not be used and shall be removed from the premises.

3. Power tools used to drill, cut into, or otherwise disturb asbestos material shall be equipped with HEPA filtered local exhaust ventilation.

4. The Abatement Contractor shall make available to authorized visitors, ladders and/or scaffolds of sufficient dimension and quantity so that all work surfaces can be easily and safely reached for inspection. Scaffold joints and ends shall be sealed with tape to prevent incursion of asbestos. Scaffolds and ladders shall comply with all applicable codes.

B. PLASTIC BARRIERS (POLYETHYLENE)

1. In sizes and shapes to minimize the number of joints.

   a. Six mil. (.006") fire-retardant for vertical protection (walls, entrances and openings).

   b. Six mil. (.006") fire-retardant for horizontal protection (fixed equipment) and heating grilles.

   c. Six mil. (.006") reinforced fire-retardant for floors of decon units.

2. Provide two (2) layers over all roof, wall and ceiling openings. Floor penetrations shall be sealed with a rigid material prior to plasticizing to prevent tripping and fall hazards. All seams within a layer shall be separated by a minimum distance of six feet and sealed airtight. All seams between layers shall be staggered.

3. Barrier Attachment - Commercially available duct tape (fabric or paper) and spray-on adhesive. Duct tape shall be capable of sealing joints of adjacent sheets of plastic, facilitating attachment of plastic sheets to finished or unfinished surfaces of dissimilar materials and adhering under both dry and wet conditions.

C. SIGNS

1. Danger signs shall be provided and shall conform to 29 CFR 1926.1101 and be 14" x 20". These signs shall bear the following information:

DANGER **ASBESTOS** **MAY CAUSE CANCER** **CAUSES DAMAGE TO LUNGS** **AUTHORIZED PERSONNEL ONLY**

In addition, where the use of respirators and protective clothing is required in the regulated area under this section, the warning signs shall include the following:

WEAR RESPIRATORS PROTECTION AND PROTECTIVE CLOTHING IN THIS AREA

D. DANGER LABELS AND TAPE

1. Labels shall be affixed to any asbestos contaminated material in accordance with the requirements of 29 CFR 1910.1200 (f) of OSHA's Hazard Communication Standard, and shall contain the following information:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID BREATHING DUST
CANCER AND LUNG DISEASE HAZARD

2. A label shall be affixed on each container of asbestos waste in accordance with the requirements of 49 CFR Parts 171 and 172, Hazardous Substances; Final Rule (U.S. Department of Transportation), and shall contain the following information:

RQ HAZARDOUS SUBSTANCE
SOLID, NOS, ORM-E, NA 9188
(ASBESTOS)

3. A label shall be affixed on each container of asbestos waste in accordance with the requirements of 40 CFR Part 61.150, NESHAP; Asbestos; Final Rule (USEPA) and shall contain the name of the waste generator and the location at which the waste was generated.

   NOTE: All containers marked as above (1, 2 and 3) shall be disposed of as asbestos waste.

4. Provide 3" red barrier tape printed with black lettered "DANGER ASBESTOS REMOVAL". Locate barrier tape across all corridors, entrances and access routes to asbestos work area.

PROTECTIVE EQUIPMENT

1. Respiratory Requirements

   a. Where fiber levels permit, and in compliance with regulatory requirements, Powered Air Purifying Respirators are the minimum allowable respiratory protection permitted to be utilized during removal operations.

   b. Where not in violation of NIOSH, OSHA, and any other regulatory requirements, the Abatement Contractor shall provide the following minimum respiratory protection to the maximum use concentrations indicated:

MSHA/NIOSH Approved Respiratory Protection	Maximum Use Concentration
Half-Mask Air Purifying with HEPA Filters	10x PEL
Full-Facepiece Air Purifying HEPA Filters and Quantitative Fit Test	10x PEL
Powered Air Purifying (PAPR), Loose fitting Helmet or Hood, HEPA Filter	25x PEL
Powered Air Purifying (PAPR), Full Facepiece, HEPA Filter	50x PEL
Supplied Air, Continuous Flow Loose fitting Helmet or Hood	25x PEL
Supplied Air, Continuous Flow Full Facepiece, HEPA Filter	50x PEL
Full Facepiece-Supplied Air Pressure Demand, HEPA Filter	100x PEL
Full Facepiece-Supplied Air Pressure Demand, with Aux. SCBA, Pressure Demand or Continuous Flow	>100x PEL

2. Disposable Clothing -"Tyvek" manufactured by Dupont or approved equal.

3. NIOSH approved safety goggles to protect eyes.

4. Polyethylene bags, 6 mil. (.006") thick (use double bags).

NOTE: Workers must wear disposable coveralls and respirator masks at all times while in the work area. Contaminated coveralls or equipment must be left in work area and not worn into other parts of the building.

TOOLS AND EQUIPMENT

1. Airless Sprayer - An airless sprayer, suitable for application of encapsulating material, shall be used.

2. Scaffolding - Scaffolding, as required to accomplish the specified work, shall meet all applicable safety regulations.

3. Transportation Equipment - Transportation equipment, as required, shall be suitable for loading, temporary storage, transport and unloading of contaminated waste without exposure to persons or property. Water tight, hard wall containers shall be provided to retain and dispose of any asbestos waste material with sharp-edged components that may tear plastic bags or sheeting. The containers shall be marked with danger labels.

4. Surfactant - Wetting Agents - "Asbestos-Wet" - Aquatrols Corp. of America or approved equal, and shall be non- carcinogenic.

5. Portable (negative air pressure) asbestos filtration system - by Micro-Trap, or approved equal.

6. Vacuum, HEPA type equal to "Nilfisk" #GA73, or "Pullman/Holt" #75 ASA.

7. Amended Water Sprayer - The water sprayer shall be an airless or other low-pressure sprayer for amended water application.

8. Other Tools and Equipment - The Abatement Contractor shall provide other suitable tools for the stripping, removal, encapsulation, and disposal activities including but not limited to: hand-held scrapers, nylon brushes, sponges, rounded edge shovels, brooms, and carts.

PART 3 – EXECUTION

3.01 PRE-ABATEMENT WORK AREA PREPARATION

A. The work area shall be vacated by the occupants prior to work area preparation and not reoccupied until satisfactory clearance air monitoring results have been achieved.

B. Caution signs shall be posted at all locations and approaches to a location where airborne concentrations of asbestos may exceed ambient background levels. Signs shall be posted that permit a person to read the sign and take the necessary protective measures to avoid exposure.

C. Shut down and lock out electric power to all work areas. The Abatement Contractor shall provide temporary power and lighting and ensure safe installation of temporary power sources and equipment used where high humidity and/or water shall be sprayed in accordance with all applicable codes. All power to work areas shall be brought in from outside the area through a ground-fault interrupter at the source.

D. Isolate the work area HVAC system.

E. The personnel decontamination enclosure system shall be installed or constructed prior to preparatory work in the work area and in particular before the disturbance of asbestos material. The waste decontamination enclosure system shall be installed or constructed prior to commencement of abatement activities.

F. Movable objects within the work area shall be pre-cleaned using HEPA filtered vacuum equipment

an/or wet cleaning and such objects shall be removed from the work area to an uncontaminated location. If disposed of as asbestos waste material, cleaning is not required.

G. Fixed objects and other items, which are to remain within the work area, shall be pre-cleaned using HEPA filtered vacuum equipment and/or wet cleaning. Such objects shall be enclosed with two layers of at least six mil plastic sheeting and sealed with tape.

H. The work area shall be pre-cleaned using HEPA filtered vacuum equipment and/or wet cleaning. Methods that raise dust, such as dry sweeping or vacuuming with equipment not equipped with HEPA filters, shall be prohibited. Asbestos material shall not be disturbed during pre-cleaning.

I. Isolation barriers that seal off all openings, including windows, corridors, doorways, ducts, and any other penetrations of the work area, shall be constructed using two layers of at least six mil fire-retardant plastic sheeting sealed with tape. Also, all seams in mechanical system components that pass through the work area shall be sealed. Doorways and corridors, which shall not be used for passage during work, shall also be sealed.

J. Removal of mounted objects. After isolation barriers are in place, objects such as light fixtures, electrical track, alarm systems, ventilation equipment and other items not previously sealed, shall be double sealed with six mil fire-retardant plastic sheeting. Localized HEPA filtered vacuum equipment shall be used during fixture removal to reduce asbestos dispersal.

K. Individual roof and floor drains shall be sealed watertight using two layers of 6-mil fire-retardant plastic sheeting and tape prior to plasticizing. Openings in floor shall be fully covered with plywood sheeting secured to the floor in such a way as to minimize a tripping hazard prior to plasticizing.

L. Emergency and fire exits from the work area shall be maintained or alternate exits shall be established according to all applicable codes.

M. Adequate toilet facilities shall be supplied by the Abatement Contractor and shall be located either in the clean area of the personnel decontamination enclosure or shall be readily accessible to the personnel decontamination enclosure.

3.02 LARGE ASBESTOS PROJECT PERSONNEL DECONTAMINATION ENCLOSURE SYSTEM (ICR 56-7.5)

A. The personnel decontamination enclosure shall be constructed prior to preparatory work in the work area and in particular before the disturbance of asbestos material.

1. Construction and use of personnel decontamination enclosure systems shall be in accordance with ICR-56 and any Applicable or Site Specific Variances utilized on this project. Such systems may consist of existing rooms outside of the work area, if the layout is appropriate, that can be enclosed is plastic sheeting and are accessible from the work area. When this situation does not exist, enclosure systems may be constructed out of metal, wood or plastic support.

2. The personnel decontamination enclosure system shall consist of a clean room, a shower room, and an equipment room, in series, separated from each other and from the work area by three airlocks.

3. There shall be one shower per six full shift abatement persons calculated on the basis of the largest shift.

4. The personnel decontamination enclosure system shall be fully framed, sheathed for safety and constructed to prevent unauthorized entry.

5. Personnel decontamination enclosure systems constructed at the work site shall utilize at least six mil fire-retardant opaque plastic sheeting. At least two layers of six mil fire-retardant reinforced plastic sheeting shall be used for the flooring of this area.

6. All prefabricated decontamination units shall be completely decontaminated and sealed prior to separation and removal from the work area. Mobile decontamination units shall remain in place until satisfactory clearance results have been attained.

7. The clean room shall be sized to accommodate all authorized persons. Benches, lockers and hooks shall be provided for street clothes. Shelves for storing respirators shall also be provided. Clean clothing, replacement filters for respirators, towels and other necessary items shall be provided. The clean room shall not be used for the storage of tools, equipment or materials. It shall not be used for office space. A lockable door shall be provided to permit access to the clean room from outside the work area or enclosure. It shall be used to secure the work area and decontamination enclosure during off-shift hours.

8. The shower room shall contain one or more showers. Each shower head shall be supplied with hot and cold water adjustable at the tap. The shower enclosure shall be constructed to ensure against leakage of any kind. Uncontaminated soap, shampoo and towels shall be available at all times. Shower water shall be drained, collected and filtered through a system with at least 5.0 micron particle size collection capability. A system containing a series of several filters with progressively smaller pore sizes shall be used to avoid rapid clogging of the filtration system by large particles. Filtered wastewater shall be discharged in accordance with applicable codes. Contaminated filters shall be disposed of as asbestos waste. The shower room shall be constructed in such way that travel through the decontamination unit shall be through the shower.

9. The equipment room shall be used for the storage of equipment and tools after decontamination using a HEPA filtered vacuum and/or wet cleaning. A one day supply of replacement filters, in sealed containers, for HEPA vacuums and negative pressure ventilation equipment, extra tools, containers of surfactant and other materials and equipment that may be required during the abatement project may also be stored here. A walk-off pan filled with water shall be located in the work area just outside the equipment room for persons to clean foot covering when leaving

the work area. A drum lined with a labeled, at least six mil plastic bag is required for collection of clothing and shall be located in this room. Contaminated footwear and work clothes shall be stored in this area.

3.03 WASTE DECONTAMINATION ENCLOSURE SYSTEM (ICR 56-7.5)

A. General Requirements

1. A waste decontamination enclosure system shall consist of the following:

   a. A washroom/cleanup room shall be constructed with an airlock doorway to the work area and another airlock doorway to the holding area.

   b. The holding area shall be constructed with an airlock doorway to the washroom/cleanup room and another lockable door to the outside.

2. Where there is only one egress from the work area, the holding area of the waste decontamination enclosure system may branch off from the equipment decontamination room, which doubles as a waste washroom, of the personnel decontamination enclosure.

3. The waste washroom shall be equipped with a drain installed to collect water and deliver it to the shower drain where it shall be filtered through a system with at least 5.0 micron particle size collection capability. A system containing a series of several filters with progressively smaller pore sizes shall be used to avoid rapid clogging of the filtration system by large particles. Filtered wastewater shall be discharged in accordance with applicable codes. Contaminated filters shall be disposed of as asbestos waste.

4. The waste washroom shall be constructed in such a way that travel through the rooms shall be through the waste washroom

3.04 WORK AREA ENTRY AND EXIT PROCEDURES

A. The following procedures shall be followed throughout the asbestos abatement project until satisfactory clearance air monitoring results have been achieved:

1. All persons shall enter and exit the work area through the personnel decontamination enclosure system.

2. All persons who enter the work area or an enclosure shall sign the entry/exit log, located in the clean room, upon every entry and exit.

3. All persons, before entering the work area, or an enclosure shall read and be familiar with all posted regulations, personal protection requirements, including work area entry and exit procedures, and emergency procedures. The entry/exit log headings shall indicate, and the signatures shall be used to acknowledge, that these have been reviewed and understood by all persons prior to entry.

4. All persons shall proceed first to the clean room, remove all street clothing, store these items in clean sealable plastic bags or lockers and don coveralls, head covering, foot covering and gloves. All persons shall also don NIOSH approved respiratory protection. Clean respirators and protective clothing shall be utilized, by each person, for each separate entry into the work area. Respirators shall be inspected prior to each use and tested for proper seal using quantitative or qualitative fit checks.

5. Persons wearing designated personal protective equipment shall proceed from the clean room through the shower room to the equipment room, where necessary tools are collected and any additional clothing shall be donned, before entry into the work area.

6. Before leaving the work area, all persons shall remove gross contamination from the outside of respirators and protective clothing by brushing, wet cleaning, and/or HEPA vacuuming.

7. Persons shall proceed to the equipment room where all coveralls, head covering, foot covering and gloves shall be removed. Disposable clothing shall be deposited into labeled containers for disposal. Reusable contaminated clothing, footwear, head gear and gloves shall be stored in the equipment room when not being used in the work area.

8. Still wearing respirators, persons shall proceed to the shower area, clean the outside of the respirator and the exposed face area under running water prior to removal of the respirator, and then fully and vigorously shower and shampoo to remove residual asbestos contamination. Respirators shall be washed thoroughly with soap and water. Some types of respirators will require slight modification of these procedures. An airline respirator with HEPA filtered disconnect protection shall be disconnected in the equipment room and worn into the shower. A powered air-purifying respirator facepiece shall be disconnected from the filter/power pack assembly prior to entering the shower.

9. After showering and drying, all persons shall proceed to the clean room and don clean personal protective equipment if returning to the work area or street clothing if exiting the enclosure.

3.05 EQUIPMENT AND WASTE CONTAINER DECONTAMINATION & REMOVAL PROCEDURES

A. The following procedures shall be followed throughout the asbestos abatement project until satisfactory clearance air monitoring results have been achieved.

1. External surfaces of contaminated containers and equipment shall be cleaned by wet cleaning and/or HEPA vacuuming in the work area before moving such items into the waste decontamination enclosure system airlock by persons assigned to this duty. These work area persons shall not enter the airlock.

2. These contaminated items shall be removed from the airlock by persons stationed in the washroom during waste removal operations. These washroom persons shall remove gross contamination from the exterior of their respirators and protective clothing by brushing, HEPA vacuuming and/or wet cleaning.

3. Once in the waste decontamination enclosure system, external surfaces of contaminated containers and equipment shall be cleaned a second time by wet cleaning.

4. The cleaned containers of asbestos material and equipment are to be dried of any excessive pooled or beaded liquid, placed in uncontaminated plastic bags or sheeting and sealed airtight.

5. The clean recontainerized items shall be moved into the airlock that leads to the holding area. The washroom persons shall not enter this airlock or the work area until waste removal is finished for that period.

6. Containers and equipment shall be moved from the airlock and into the holding area by persons dressed in clean personal protective equipment, who have entered from uncontaminated areas.

7. The cleaned containers of asbestos material and equipment shall be placed in water tight carts with doors or tops that shall be closed and secured. These carts shall be held in the holding area pending removal. The carts shall be wet cleaned and/or HEPA vacuumed at least once each day.

8. The exit from the decontamination enclosure system shall be secured to prevent unauthorized entry.

9. Where the waste removal enclosure is part of the personnel decontamination enclosure, waste removal shall not occur during shift changes or when otherwise occupied. Precautions shall be taken to prevent short circuiting and cycling of air outward through the shower and clean room.

10. Containers labeled with Asbestos hazard warnings shall not be used to dispose of non asbestos waste.

3.06 ENGINEERING CONTROLS

A. Ventilation.

1. The Abatement Contractor shall employ HEPA equipped vacuums or negative air pressure equipment for ventilation as required.

2. All negative air pressure equipment ventilation units shall be equipped with HEPA filtration. The Contractor shall provide a manufacturer's test certificate for each unit documenting the capability of trapping and retaining 99.97 percent of asbestos fibers greater than 0.3 microns equivalent aerodynamic diameter.

3. A power supply shall be available to satisfy the requirements of the total of all ventilating units.

4. On electric power failure, abatement shall stop immediately and shall not resume until power is restored and exhaust units are operating fully. On extended power failure, longer than one hour, the decontamination facilities, after the evacuation of all persons from the work area, shall be sealed airtight.

5. If extending the exhaust of the ventilation units 50 feet from the building would result in an exhaust location either in the road, blocking driveway access to the facility or within 50 feet of other buildings, a second unit will be run in series with the primary unit.

3.07 MAINTENANCE OF DECONTAMINATION ENCLOSURE SYSTEMS AND WORK AREA BARRIERS

A. GENERAL REQUIREMENTS

1. The Consultant must review and approve installation before commencement of work. Upon completion of the construction of all plastic barriers and decontamination system enclosures and prior to beginning actual abatement activities.

2. All plastic barriers inside the work area, in the personnel decontamination enclosure system, in the waste decontamination enclosure system and at partitions constructed to isolate the work area from occupied areas, shall be inspected by the asbestos supervisor at least twice daily. The barriers shall be inspected before the start of and following the completion of the day's abatement activities. Inspections and observations shall be documented in the project log.

3. Damage and defects in the barriers and/or enclosure systems shall be repaired immediately upon discovery and prior to resumption of abatement activities.

4. At any time during the abatement activities, if visible emissions are observed outside of the work area of if damage occurs to the barriers, work shall be stopped, repairs made and visible residue immediately cleaned up using HEPA vacuuming methods prior to the resumption of abatement activities.

5. The Abatement Contractor shall HEPA vacuum and/or wet clean the waste decontamination enclosure system and the personnel decontamination enclosure system at the end of each day of abatement activities.

3.08 HANDLING AND REMOVAL PROCEDURES

The Abatement Contractor may utilize existing provisions of ICR-56, Applicable Variances or a Site Specific Variance, approved by the Owner's Consultant, to permit the conduct of this work.

3.09 ABATEMENT PROCEDURES

A. AIR SAMPLING - By Owner

1. Air sampling and analysis shall be conducted according to the requirements of Subpart 56-4 before the start, during and after the completion of the asbestos removal project.

2. In addition to the requirements of Subpart 56-4, air monitoring shall be conducted in accordance with any approved job specific variance(s) or applicable variance utilized.

3. Clearance samples may be analyzed using PCM to maintain compliance with ICR-56.

4. If applicable, clearance samples will be analyzed using TEM to maintain compliance with ICR-56 and 40 CFR 763.90[i].

B. The provisions of the Applicable Variances or a Job Specific Variance shall apply only in those areas where approval has been granted by the NYS DOL and the Contractor has obtained concurrence from the Owner's Consultant. All other applicable provisions of Industrial Code Rule 56-1 through 56-12 shall be complied.

C. A copy of the NYS DOL Job Specific or Applicable Variance, if applicable, shall be conspicuously posted at the work area(s).

D. The Abatement Contractor shall construct a decontamination unit at the work site. The Abatement Contractor shall, as a minimum, comply with the requirements of 29 CFR 1926.1101(j); Hygiene facilities and practices for employees.

3.10 ENCAPSULATION PROCEDURES

The following procedures shall be followed to seal in non-visible residue, after obtaining satisfactory clearance air monitoring results, while conducting lockdown encapsulation on any surfaces which were the subject of removal or other remediation activities:

A. Only encapsulants rated as acceptable or marginally acceptable on the basis of Battelle Columbus Laboratory test procedures and rating requirements developed under the 1978 USEPA contract shall be used for lockdown encapsulation.

B. Sealants considered for use in encapsulation shall first be tested to ensure that the sealant is adequate for its intended use. A section of the work surface shall be evaluated following this initial test application of the sealant to quantitatively determine the sealant's effectiveness in terms of penetrating and locking down the asbestos fibers. The American Society of Testing and Materials (ASTM) Committee E06.21.06E on Encapsulation of Building Materials has developed a guidance document to assist in the selection of an encapsulant.

C. The encapsulant solvent or vehicle shall not contain a volatile hydrocarbon.

D. Encapsulants shall be applied using airless spray equipment.

1. Spraying is to occur at the lowest pressure range possible to minimize fiber release from encapsulant impact at the surface. It shall be applied with a consistent horizontal or vertical motion.

E. Encapsulation shall be utilized as a surface sealant once all asbestos containing materials have been removed in a work area. In no event shall encapsulant be applied to any surface that was the subject of removal or other remediation activities prior to obtaining satisfactory clearance air monitoring.

3.11 CLEANUP PROCEDURES

A. The following cleanup procedures shall be required.

1. Cleanup of accumulations of loose asbestos material shall be performed whenever enough loose asbestos materials have been removed to fill a single leak tight container of the type commensurate with the material properties. In no case shall cleanup be performed less than once prior to the close of each working day. Asbestos material shall be kept wet until cleaned up.

2. Accumulations of dust shall be cleaned off all surfaces on a daily basis using HEPA vacuum cleaning methods.

3. Decontamination enclosures shall be HEPA vacuumed at the end of each shift.

4. Accumulations of asbestos waste material shall be containerized utilizing HEPA vacuums or rubber or plastic dust pans, squeegees or shovels. Metal shovels shall not be used to pick up or move waste.

5. Excessive water accumulation or flooding in the area shall require work to stop until the water is collected and disposed of properly.

B. The following cleanup procedures shall be required after completion of all removal activities.

1. All accumulations of asbestos waste material shall be containerized utilizing HEPA vacuums or rubber or plastic dust pan, squeegees or shovels. Metal shovels shall not be used to pick up or move waste. HEPA vacuums shall be used to clean all surfaces after gross cleanup.

2. Cleaning. All surfaces in the work area shall be HEPA vacuumed. To pick up excess liquid and wet debris, a wet purpose shop vacuum may be used and shall be decontaminated prior to removal from the work area.

3. Windows, doors, HVAC system vents and all other openings shall remain sealed. Decontamination enclosure systems shall remain in place and be utilized.

4. All containerized waste shall be removed from the work area and the holding area.

5. All tools and equipment shall be decontaminated and removed from the work area.

6. A final visual inspection and clearance air monitoring, as per the schedule for air sampling and analysis, shall be conducted.

7. The isolation barriers and decontamination unit shall be removed only after satisfactory

8. clearance air monitoring results have been achieved.

3.12 SAFETY MONITORING – CONSULTANT:

The Consultant will designate an Asbestos Safety Technician (AST) to represent the Owner during the removal program. The AST must be on the job site at all times during abatement work. Absolutely no abatement or preparation work will occur without the presence of the AST.

The AST will conduct four (4) milestone inspections.

1. Pre-commencement inspection shall be conducted as follows:

   a. Notification in writing to the Consultant shall be made by the Abatement Contractor to request a pre-commencement inspection at least 48 hours in advance of the desired date of inspection. This inspection shall be requested prior to beginning preparatory work in another work area.

   b. The AST shall ensure that:

      i. The job site is properly prepared and that all containment measures are in place;

      ii. The designated supervisor shall present to the inspector a valid supervisor's license issued by the New York Department of Labor;

      iii. All workers shall present to the inspector a valid handler's license issued by the New York Department of Labor;

      iv. Measures for the disposal of removed asbestos material are in place and shall conform to the adopted standards;

      v. The Abatement Contractor has a list of emergency telephone numbers at the job site which shall include the monitoring firm employed by the Owner and telephone numbers for fire, police, emergency squad, local hospital and health officer.

   c. If all is in order, the AST shall issue a written notice to proceed in the field. If the job site is not in order, then any needed corrective action must be taken before any work is to commence. Conditional approvals shall not be granted.

Progress inspection shall be conducted as follows:

   a. Primary responsibility for ensuring that the abatement work progresses in accordance with these technical specifications and regulatory requirements rests with the Abatement Contractor. The AST shall continuously be present to observe the progress of work and perform required tests.

   b. If the AST observes irregularities at any time, he shall direct such corrective action as may be necessary. If the Abatement Contractor fails to take the corrective action required, or if the Abatement Contractor or any of their employees habitually and/or excessively violate the requirements of any regulation, then the AST shall inform the Owner who shall issue a Stop Work Order to the Abatement Contractor and have the work site secured until all violations are abated.

Clean-up inspections shall be conducted as follows:

   a. Notice for clean-up inspection shall be requested by the Abatement Contractor at least 24 hours in advance of the desired date of inspection;

   b. The clean-up inspection shall be conducted prior to the removal of any isolation or critical

barriers and before final air clearance monitoring;

c. The AST shall ensure that:

i. The work site has been properly cleaned and is free of visible asbestos containing material and debris.

ii. All removed asbestos has been properly placed in a locked secure container outside of the work area.

d. If all is in order, the AST shall issue a written notice of authorization to remove surface barriers from the work area. All isolation barriers shall remain in place until satisfactory clearance air sampling has been completed.

4. Clearance Visual Inspection shall be conducted after the removal of non-critical plastic sheeting. The AST shall insure that:

a. The work area is free of all visible asbestos or suspect asbestos debris and residue.

b. All waste has been properly bagged and removed from the work area.

c. Should clearance visual inspection identify residual debris, as determined by the AST, the Abatement Contractor is responsible for recleaning the area at his own cost and shall bear all costs of reinspection until acceptable levels are achieved.

B. The Abatement Contractor shall be required to receive written approval before proceeding after each milestone inspection.

3.13 PERSONNEL AIR MONITORING – CONTRACTOR (29 CFR 1926.1101)

A. Personnel air monitoring shall be provided to determine both short-term (STEL) and full shift during when abatement activities occur. Personnel sampling shall be performed in each work area in order to accurately determine the concentrations of airborne asbestos to which workers may be exposed.

B. The Abatement Contractor shall have a qualified "Competent Person" (as specified in 29 CFR 1926 OSHA) to conduct personnel air monitoring.

C. The laboratory performing the air sample analysis shall be certified by NYS DOH ELAP and approved by the consultant.

D. Personnel air monitoring test results for OSHA Compliance. Results shall be posted at the work site within 24 hours of testing and copies supplied to the Owner within five (5) days of testing. Abnormalities shall be supplied to the Owner immediately.

3.14 CLEARANCE AIR MONITORING

A. Air samples will be collected in and around the work areas at the completion of abatement activities.

B. Clearance samples may be analyzed using PCM to maintain compliance with ICR-56.

C. If applicable, clearance samples will be analyzed using TEM to maintain compliance with ICR-56 and 40 CFR part 763 “Asbestos-Containing Materials in Schools; Final Rule and Notice” section 763.90.

D. ***RETESTING***
Should clearance air monitoring yield fiber concentrations above the “Clearance” criteria of either 0.01 fibers per CC and/or background levels (PCM) –OR- seventy (70) structures per square millimeter (TEM/AHERA), the Abatement Contractor is responsible for re-cleaning the area at his own cost and shall bear all costs associated with the retesting of the work area(s) including monitoring labor, sampling, analysis, etc. until such levels are achieved.

3.15 RESPIRATORY PROTECTION REQUIREMENT

A. Respiratory protection shall be worn by all individuals inside the work area from the initiation of the asbestos project until all areas have successfully passed clearance air monitoring in accordance with these specifications. The Abatement Contractor shall keep available at all times two PAPR's with new filters and charged batteries for use by authorized visitors.

B. All respiratory protection shall be MSHA/NIOSH approved in accordance with the provisions of 30 CFR Part II. All respiratory protection shall be provided by the Abatement Contractor, and used by workers in conjunction with the written respiratory protection program.

C. The Abatement Contractor shall provide respirators that meet the requirements of 29 CFR Parts 1910 and 1926.

1. Full facepiece Type C supplied-air respirators operated in pressure demand mode equipped with an auxiliary self- contained breathing apparatus, operated in pressure demand or continuous flow, shall be worn during gross removal, demolition, renovation and/or other disturbance of ACM whenever airborne fiber concentrations inside the work area are greater than 10.0 f/cc.

2. Full facepiece Type C supplied-air respirators operated in pressure demand mode with HEPA filter disconnect protection shall be work during gross removal, demolition, renovation and/or other disturbance of ACM with an amphibole content and/or whenever airborne fiber concentrations inside the work area are equal to or greater than 0.5 f/cc and less than or equal to 10.0 f/cc.

3. Full facepiece powered air-purifying respirators (PAPR) equipped with HEPA filters shall be worn during the removal, encapsulation, enclosure, repair and/or other disturbance of friable ACM if airborne fiber concentrations inside the work area are less than 0.5 f/cc. A supply of charged replacement batteries, HEPA filters and flow test meter shall be available in the clean room for use with powered air-purifying respirators. HEPA filters shall be changed daily or as flow testing indicates change is necessary. Any Type C supplied-air respirator operated in continuous flow, with HEPA filter disconnect protection, may be substituted for a powered air-purifying respirator.

4. Loose fitting helmets or hoods with powered air-purifying respirators (PAPR) equipped with HEPA filters may be worn during the removal, encapsulation, enclosure, repair and/or other disturbance of friable ACM if airborne fiber concentrations inside the work area are less than 0.25 f/cc. A supply of charged replacement batteries, HEPA filters and flow test meter shall be available in the clean room for use with powered air-purifying respirators. HEPA filters shall be changed daily or as flow testing indicates change is necessary. Any Type C supplied-air respirator operated in continuous flow may be substituted for a powered air- purifying respirator.

5. Half-mask or full-face air-purifying respirators with HEPA filters shall be worn only during the preparation of the work area and final clean up procedures provided airborne fiber concentrations inside the work area are less than 0.1 f/cc.

6. Use of single use dust respirators is prohibited for the above respiratory protection.

D. Workers shall be provided with personally issued and individually marked respirators. Respirators shall not be marked with any equipment that will alter the fit of the respirator in any way. Only waterproof identification markers shall be used.

E. The Abatement Contractor shall ensure that the workers are qualitatively or quantitatively fit tested by an Industrial Hygienist initially and every six months thereafter with the type of respirator he/she will be using.

F. Whenever the respirator design permits, workers shall perform the positive and negative air pressure fit test each time a respirator is worn. Powered air-purifying respirators shall be tested for adequate flow as specified by the manufacturer.

G. No facial hair, which interferes with the face-to-mask sealing surface, shall be permitted to be worn when wearing respiratory protection that requires a mask-to-face seal.

H. Contact lenses shall not be worn in conjunction with respiratory protection.

I. If a worker wears glasses, a spectacle kit to fit their respirator shall be provided by the Abatement Contractor at the Abatement Contractor's expense.

J. Respiratory protection maintenance and decontamination procedures shall meet the following requirement:

1. Respiratory protection shall be inspected and decontaminated on a daily basis in accordance with OSHA 29 CFR 1910.134(b); and

2. HEPA filters for negative pressure respirators shall be changed after each shower; and

3. Respiratory protection shall be the last piece of worker protection equipment to be removed. Workers must wear respirators in the shower when going through decontamination procedures; and

4. Airline respirators with HEPA filtered disconnect shall be disconnected in the equipment room and worn into the shower. Powered air-purifying respirator facepieces shall be worn into the shower. Filtered/power pack assemblies shall be decontaminated in accordance with manufacturers' recommendations; and

5. Respirators shall be stored in a dry place and in such a manner that the facepiece and exhalation valves are not distorted; and

6. Organic solvents shall not be used for washing of respirators.

K. No visitors shall be allowed to enter the contaminated area if they do not have their medical certification and training certificate. Authorized visitors shall be provided with suitable PAPR respirators and instructions on the proper use of respirators whenever entering the work area.

3.16 DISPOSAL OF WASTE

A. APPLICABLE REGULATIONS

1. All asbestos waste shall be stored, transported and disposed of as per, but not limited to, the following Regulations:

   a. NYS Code Rule 56

   b. U.S. Department of Transportation (DOT)
   Hazardous Substances
   Title 29, Part 171 and 172 of the code of Federal Regulations
   regarding waste collector registration

   c. Regulations regarding waste collector registration Title 6, part 364 of the New York State Official Compilation of Codes, Rules and Regulations – 6 NYCRR 364

   d. USEPA NESHAPS 40 CRF 61

   e. USEPA ASBESTOS WASTE MANAGEMENT GUIDANCE EPA/530-SW-85-007

B. TRANSPORTER OR HAULER - The Abatement Contractor shall bear full responsibility for proper characterization, transportation and disposal of all solid or liquid waste, generated during the project, in a legal manner. The Owner shall approve all transportation and disposal methods.

1. The Abatement Contractor's Transporter (hauler) and disposal site shall be approved by the Owner. The Abatement Contractor shall remove within 48 hours all asbestos waste from the site after completing the clean up.

2. The Transporter must possess and present to the Owner's representative a valid New York State Department of Environmental Conservation Part 364 asbestos hauler's permit to verify license plate and permit numbers. The Owner's representative will verify the authenticity of the hauler's permit with the proper authority.

3. The Abatement Contractor shall give 24 hour notification prior to removing any waste from the site. All waste shall be removed from site only during normal working hours. No waste may be taken from the site without authorization from the Owner's representative.

4. The Abatement Contractor shall have the Transporter give the date and time of arrival at the disposal site.

5. The Transporter with the Abatement Contractor and Owner's consultant shall inspect all material in the transport container prior to taking possession and signing the Waste Manifest. The Transporter shall not have any off site transfers or be combined with any other off-site asbestos material.

6. The Transporter must travel directly to the disposal site with no unauthorized stops.

C. WASTE STORAGE CONTAINER

1. During loading and on site storage, the asbestos waste container shall be labeled with EPA Danger signage:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

2. The NYS DEC Hauler's Permit number shall be on both sides and back of the container.

3. The Container will not be permitted to leave the site without the proper signage.

4. A copy of the completed waste manifest shall be forwarded directly to the Owner's Consultant by the disposal facility.

5. Packaging of Non-friable Asbestos. Use of an open top container shall require written request, by the Contractor, and written approval by the Owners Representative, and be performed in compliance with all applicable regulations.

   a) A chute, if used, shall be air/dust tight along its lateral perimeter and at the terminal connection to the dumpster at ground level (solid wall and top container). The upper end of the chute shall be furnished with a hinged lid, to be closed when the chute is not being used.

   b) The container shall be lined with a minimum of two (2) layers of 6 mil. Fire-retardant polyethylene draped loosely over the sides so as to facilitate being wrapped over the top of the load and sealed prior to transport from the site.

   c) Prior to transport from the work site the Dumpster will be disconnected from the chute and sealed air/dust tight utilizing six mil plastic and tape. The waste material will be transported as an asbestos containing material by appropriate legal methods.

6. Packaging Friable Asbestos.

   a) The container shall be a solid wall, hard top and lockable container.

   b) The container shall be locked upon arrival at the site to restrict access. Security shall be provided at the entrance to the container during the loading process and immediately locked upon completion.

   c) The interior walls, floor and ceiling shall be lined with two (2) layers of 6 mil. Fire-retardant polyethylene.

   d) The waste shall be loaded in such a manner as to protect the integrity of the individual waste packages.

   e) Prior to transport from the work site the interior of the Dumpster will sealed air/dust tight utilizing six mil plastic and tape. The waste material will be transported as an asbestos containing material by appropriate legal methods.

D. WASTE DISPOSAL MANIFEST

1. The Asbestos Waste Manifest shall be equivalent to the “Waste Shipment Record” included in 40 CFR 61. A copy of the Contractor’s manifest shall be reviewed by the Owner’s Consultant and shall be the only manifest used.

2. The Manifest shall be verified by the Owner’s Consultant indicating that all the information and amounts are accurate and the proper signatures are in place.

3. The Manifest shall have the signatures of the Abatement Contractor and the Transporter prior to any waste being removed from the site.

4. The Manifest shall be signed by the Disposal Facility owner or operator to certify receipt of asbestos containing materials covered by the manifest.

5. A copy of the completed manifest shall be provided by the Abatement Contractor to the Owner’s Consultant and remain on site for inspection.

6. Abatement Contractor shall maintain a waste disposal log which indicates load number, date and time left site, container size, type of waste, quantity of waste, name of hauler, NYS DES permit number, trailer and tractor license number, and date manifest was returned to Consultant.

7. The Disposal Facility owner or operator shall return a signed copy of the Waste Manifest directly to:

Nanuet Union Free School District

103 Church Street

Nanuet, New York 10954

ATTN: Rudy Villanyi

8. Copies of the completed Waste Manifest are to be sent by the disposal facility to the Hauler and Abatement Contractor.

9. Submit signed dump tickets and manifests with final payment request.

10. Final payment request will not be honored without signed dump ticket or manifests accounting for all asbestos waste removed from the site.

E. VIOLATIONS OF SPECIFICATIONS

1. Violations of the safety, hygiene, environmental, procedures herein, any applicable federal, state of local requirement s or failure to cooperate with the Owner’s representative shall be grounds for dismissal and/or termination of this contract.

F. VIOLATIONS OF NO SMOKING POLICY

1. The Federal Pro Children Act of 1994 prohibits School District Officials from smoking in any buildings or on the grounds that is property of the School District. The District shall be considered smoke free. The School District strongly enforces its' No Smoking Policy. It is the Contractor's responsibility to inform all workers of this policy. Any worker(s) involved with this project that are found smoking or using tobacco products will be informed that they are in violation of the Federal and State Law and School Board Policy and will be removed from site.

3.17 LOCATION OF "BARR MIDDLE SCHOOL – PHASE 4" WORK –
(Please see attached Drawings for approximate locations)

1) <u>Barr Middle School – 1st & 2nd Floors Bathrooms – Concealed ACM Pipe Insulation – Base Bid</u>

- Asbestos Abatement Contractor responsible for probing non-ACM masonry walls, non-ACM sheetrock ceilings and/or non-ACM terrazzo floors for concealed Asbestos-containing Pipe Insulation and/or Asbestos-containing Mudded Joint Packing on metal piping. If ACM Pipe Insulation and/or ACM Mudded Joint Packing is discovered, Abatement Contractor shall remove and dispose of ACM Pipe Insulation and/or ACM Mudded Joint Packing to facilitate upcoming bathroom renovations. Prior to abatement activities and as required, the Owner and/or General Contractor to shall perform all required non-asbestos plumbing disconnects of building components potentially affected. Areas of concealed ACM Piping Probes/abatement:
  1) Boy's Toilet C139
  2) Girl's Toilet C140
  3) Girl's Toilet 258
  4) Boy's Toilet 259
  5) Staff/ADA Toilet 260

  *Note: Abatement contractor to coordinate with General Contractor for exact locations of probes prior to work area preparation.

END OF LOCATION OF WORK

3.18 GENERAL

A. The Abatement Contractor will be responsible for repairing all building components damaged during abatement including, but not limited to: ceiling tiles, ceiling finishes, wall finishes, floor finishes, etc.

B. The Abatement Contractor shall be responsible for all demolition required to access materials identified in scope of work and on associated drawings.

C. Concealed conditions that are exposed and may require additional work shall be brought to the attention of the Owner immediately. The Abatement Contractor shall not abate these areas without a written notice to proceed. Additional asbestos abatement performed prior to the order to proceed will not be acknowledged.

D. The Abatement Contractor shall remove asbestos-containing floor covering to the building substrate beneath; in areas indicted. Subsequent to final air clearance the substrate shall be washed with a neutralizing agent to prepare the substrate to accept new floor covering and eliminate residual odors.

E. Power tools used to drill, cut into or otherwise disturb asbestos containing material shall be equipped with HEPA filtered local exhaust ventilation.

F. The Abatement Contractor shall provide access to GFCI electrical power, required to perform the area air monitoring for this project, within and immediately adjacent to each work area.

G. Unwrapped or unbagged ACM shall be immediately placed in an impermeable waste bag or wrapped in plastic sheeting.

H. Coordinate all removal operations with the Owner.

RETURN THIS EXECUTED FORM WITH COMPLETED BID SHEET

Asbestos Employee Medical Examination Statement

Certificate of Worker Release
Asbestos Employee Training Statement
CERTIFICATE OF WORKERS'S ACKNOWLEDGEMENT

PROJECT NAME: **Barr Middle School**

CONTRACTOR'S NAME:_____

WORKING WITH ASBESTOS INVOLVES POTENTIAL EXPOSURE TO AIRBORNE ASBESTOS FIBERS. INHALING ASBESTOS FIBERS HAS BEEN LINKED WITH VARIOUS TYPES OF CANCER AND RESPIRATORY DISEASES. SMOKING CIGARETTES AND INHALATION OF ASBESTOS FIBERS INCREASES THE RISK THAT YOU WILL DEVELOP LUNG CANCER ABOVE THAT OF THE NON-SMOKING PUBLIC.

The Contract for this project requires the Abatement Contracting Company to: 1) supply proper respiratory protection devices, and training on their use, to their employees; 2) provide training on safe work practices, and on use of the equipment used on the project, to their employees; and, 3) provide annual medical examinations to their employees meeting the requirements of 29 CFR 1926.1101. The Abatement Contracting Company's signature on this certificate, documents that these contractual obligations are fulfilled, and that you understand the information presented to you.

**************DO NOT SIGN THIS FORM UNLESS YOU FULLY UNDERSTAND THIS INFORMATION**************

RESPIRATORY PROTECTION: I have been trained in the proper use and limitations of the type of respiratory protection devices to be used on this project. I have reviewed the written respiratory protection program manual and a copy is available for my use. Respiratory protection equipment has been proved, by the Contractor, at no cost to me.

TRAINING COURSE: I have been trained in the risks and dangers associated with handling asbestos, breathing asbestos dust, proper work procedures, personal protection and engineering controls. I have satisfactorily completed and Asbestos Safety Training Program for New York State and have been issued a New York State Department of Health Certificate of Asbestos Safety Training.

MEDICAL EXAMINATION: I have satisfactorily completed a medical examination within the last 12 months that meets the OSHA requirement for an asbestos worker and included at least 1) medical history 2) pulmonary function 3) medical examination 4) approval to wear respiratory protection devises and may have included an evaluation of a chest x-ray.

Signature:_____Date_____

Printed Name:_____SS#:_____

Witness:_____Date:_____

RETURN THIS EXECUTED FORM WITH COMPLETED BID SHEET

RETURN THIS EXECUTED FORM WITH COMPLETED BID SHEET

ESTIMATE OF ACM QUANTITIES

PROJECT NAME: **Barr Middle School**

****

EACH ABATEMENT CONTRACTOR SHALL READ AND ACKNOWLEDGE THE FOLLOWING NOTICE. A SIGNED AND DATED COPY OF THIS ACKNOWLEDGMENT SHALL BE SUBMITTED WITH THE ABATEMENT CONTRACTOR'S BID FOR THIS PROJECT. FAILURE TO DO SO MAY, AT THE SOLE DISCRETION OF THE OWNER, RESULT IN THE BID BEING CONSIDERED NON-RESPONSIVE AND RESULT IN DISQUALIFICATION OF THE ABATEMENT CONTRACTOR'S BID ON THIS PROJECT.

****

***** NOTICE *****

The linear and square footages listed within this specification are approximates. Abatement Contractor is required to visit the work locations prior to bid submittal in order to take actual field measurements within each listed location. The Abatement Contractor shall base their bid on actual quantities determined, by them, at the site walkthrough. Estimates provided in these specifications are for informational purposes only and shall not be considered a basis for Change Orders on this project.

****

Acknowledgment: I have read and understand the above **NOTICE** regarding removal quantity estimates and understand that estimates provided in these specifications are for informational purposes only and shall not be considered a basis for Change Orders on this project. The Abatement Contractor's signatory represents to the Owner that he/she has the authority of the entity he/she represents to sign this agreement on its behalf.

Company Name: _____
Type or Print

BY: _____ _____ _____
Signature Title Date

Print Name: _____

RETURN THIS EXECUTED FORM WITH COMPLETED BID SHEET

ASSOCIATED ASBESTOS REMOVAL LOCATION DRAWINGS

- ***Nanuet Union Free School District: Barr Middle School***
  DRAWING #ASB-01 – 1st Floor Abatement
  DRAWING #ASB-02 – 2nd Floor Abatement

END OF SPECIFICATION
SECTION 02080

SECTION 020800
ASBESTOS ABATEMENT PROCEDURES

AT: NANUET HIGH SCHOOL
103 CHURCH STREET
NANUET, NY 10954
SED #50-01-08-03-0-003-035

OWNER: NANUET UNION FREE SCHOOL DISTRICT
103 CHURCH STREET
NANUET, NY 10954
PH. (845) 627-9880
FX. (845) 624-5338

CONSULTANT: QUALITY ENVIRONMENTAL SOLUTIONS & TECHNOLOGIES, INC. (QUES&T)
1376 ROUTE 9
WAPPINGERS FALLS, NEW YORK 12590
PH. (845) 298-6031
FX. (845) 298-6251



SPECIFICATION DATED: February 6, 2024
Design conforms to all applicable provisions of the NYS Uniform Fire Prevention and Building Code, NYS Energy Conservation Construction Code and Education Department Building Standards.

PART I – GENERAL

1.01 DESCRIPTION

A. All work under this contract shall be performed in strict accordance with the specifications and all applicable laws for asbestos removal projects. The Abatement Contractor shall furnish all labor, materials, supervision, services, insurance and equipment necessary for the complete and total removal of Asbestos-containing Materials (ACM) as described herein, in attachments to the specification, Job Specific Variance(s) and/or as directed by Nanuet Union Free School District (here-in-after the "Owner") and/or the Owners Representative(s) to support the to the following Nanuet School District projects:

- Nanuet High School
  103 Church Street
  Nanuet, NY 10954
  SED #50-01-08-03-0-003-036

B. Abatement Contractor shall provide for personnel air monitoring to satisfy OSHA regulation 29 CFR Parts 1926.1101(f). All work performed shall be in strict accordance with applicable provisions and regulations promulgated under New York State Department of Labor, Industrial Code 56 (ICR-56).

C. The Abatement Contractor shall satisfy the requirements for asbestos projects issued by the New York State Department of Labor concerning licensing and certification; notification; equipment; removal and disposal procedures; engineering controls; work area preparation; decontamination and clean-up procedures; and personnel air monitoring.

D. The Abatement Contractor shall be responsible for submittal of asbestos project notification(s) and applicable fees to EPA and NYSDOL concerning this project. Project notification(s) shall be made for the cumulative total of ACM to be removed as required by ICR-56-3.4. Work practices for each individual work area established shall be consistent with the quantity of ACM contained within that work area as defined in ICR-56-2.

E. The scope of work under this contract shall include the following:

1. All asbestos-containing materials (ACM) shall be removed in accordance with these specifications. The Abatement Contractor is responsible for field verification of estimated quantities, locations and other site conditions that may affect work.

2. All fixed objects remaining within the work area(s) shall be protected as required by Title 12 NYCRR Section 56-7.10(b) and as described in these specifications.

3. The containerization, labeling and disposal of all asbestos waste in accordance with applicable city, state and federal regulations and these specifications.

4. The Abatement Contractor will be responsible for repairing all building components damaged during abatement including, but not limited to, ceiling tiles, ceiling finishes, wall finishes and/or floor finishes, etc.

5. The Abatement Contractor shall be responsible for any and all demolition required to access materials identified in scope of work and on associated drawings.

6. Concealed conditions that are exposed and may require additional work shall be brought to the attention of the Owner(s) immediately. The Abatement Contractor shall not abate these areas without a written notice to proceed. If the Abatement Contractor removes additional asbestos prior to the order to proceed the additional work will not be acknowledged.

7. Permissible working hours shall be Monday through Friday 7:00 A.M. to 4:00 P.M. with one (1) hour for lunch and/or as defined by the Owner. Holidays shall be considered weekends and not included for working days. Upon written approval from the Owner, the Abatement Contractor may work past these hours. The Abatement Contractor will incur any and all costs associated for work performed beyond the defined schedule including, but not limited to: abatement activities, project/air monitoring, custodial/staffing labor, overtime, mobilizations, etc.

8. Buildings will be turned over to the Abatement Contractor as is. At that time, all electrical services and HVAC systems in the proposed work areas will be shut down. Electricity and water supply will be maintained in the building for use by the Abatement Contractor. The Abatement Contractor is responsible for securing all power in the work area(s) and establishing all temporary GFCI hookups necessary to complete his work.

9. The Abatement Contractor shall remove identified asbestos-containing floor coverings to the building substrate beneath; in areas indicted. Subsequent to final air clearances, the substrate(s) shall be washed with a neutralizing agent to prepare the substrate to accept new floor covering and eliminate residual odors.

10. The Abatement Contractor must coordinate location of waste containers with the Facility and the Owner. Deliveries and storage of equipment must be coordinated with the Facility and the Owner.

11. All “Large” and “Small” asbestos abatement projects, as defined by 12 NYCRR56 shall not be performed while the building is occupied. The term “building” means a wing or major section of a building that can be completely isolated from the rest of the building with sealed non-combustible construction. The isolated portion of the building must contain exists that do not pass through the occupied portion(s) and ventilation systems must be physically separated and sealed at the isolation barriers.

1.02 PRE-CONTRACT SUBMITTALS

Within three (3) days after bids are opened, the three (3) apparent low bidders shall be required to submit the following documentation:

A. Resume: Shall include the following:

1. Provide a list of projects of similar nature performed within the past two (2) years and include the dollar value of all projects. Provide project references to include owner, consultant, and air monitoring firms' name, contact person, address, and phone number, include location of project and date of completion.

2. Abatement Contractor license issued by New York State Department of Labor for asbestos work in accordance with ICR-56-3.

3. A list of owned equipment available to be used in the performance of the project.

4. The number of years engaged in asbestos removal.

5. An outline of the worker training courses and medical surveillance program conducted by the Abatement Contractor.

6. A standard operating procedures manual describing work practices and procedures, equipment, type of decontamination facilities, respirator program, special removal techniques, etc.

7. Documentation to the satisfaction of the Owner pertaining to the Abatement Contractor's financial resources available to perform the project. Such data shall include, but not be limited to, the firm's balance sheet for the last fiscal year.

B. Citations/Violations/Legal Proceedings

1. Submit a notarized statement describing any citations, violations, criminal charges, or legal proceedings undertaken or issued by any law enforcement, regulatory agency, or consultant concerning performance on previous asbestos abatement contracts. Briefly describe the circumstances citing the project and involved persons and agencies as well as the outcome of any actions.

2. Answer the question: "Has your firm or its agents been issued a Stop Work order on any project within the last two years?" If "Yes" provide details as discussed above.

3. Answer the question: "Are you now, or have you been in the past, a party to any litigation or arbitrations arising out of your performance on Asbestos Abatement Contracts?" If "Yes" provide details as discussed in 1. above.

4. Describe any liquidated damages assessed within the last two years.

C. Preliminary Schedule

1. Provide a detailed schedule including work dates, work shift times, estimate of manpower to be utilized and the start and completion date for completion of each major work area.

1.03 DOCUMENTATION

A. The Abatement Contractor shall be required to submit the following and receive the Consultant's approval prior to commencing work on this project:

1. Provide documentation of worker training for each person assigned to the project. Documentation shall include copies of each workers valid New York State asbestos handler certificates (for those employees who may perform asbestos removal), documentation of current respirator fit test and current OSHA required training and medical examination.

2. The attached "Asbestos Employee Medical Examination Statement" and "Asbestos Employee Training Statement" forms shall be completed, signed and submitted for each worker assigned to the project. Records of all employee training and medical surveillance shall be maintained for at least forty (40) years. Copies of the records shall be submitted to the Consultant prior to commencement.

3. The Abatement Contractor shall submit proof of a current, valid license issued by the New York State Department of Labor pursuant to the authority vested in the Commissioner by section 906 of the Labor Laws, and that the employees performing asbestos related work on this project are certified by the State of New York as required in Part 56 of Title 12 of the Official Compilation of Codes, Rules and Regulations of the State of New York latest edition. Copies of all licenses shall be submitted prior to the commencement of the project.

4. The Abatement Contractor shall submit a written respiratory protection program meeting the requirements of 29 CFR 1910.134 to the Consultant.

5. The name, address, social security number and NYS DOL certificate number of the person(s) who will supervise the asbestos project.

6. The name and address of the deposit or waste disposal site or sites where the asbestos materials are to be deposited or disposed of. This site must be approved by the Owner. The manifesting procedure must also be specified.

7. The name, address and New York State Dept. of Environmental Conservation ID Number of any transporters that are to be used to transport waste.

8. A written Standard Operation Procedure (SOP) that is designed and implemented to maximize protection against human exposure to asbestos dust. The SOP shall take into consideration the workers, visitors, building employees, general public and environment. As a minimum the procedures must include the following:

   a. Security for all work areas on an around-the-clock basis against unauthorized access.

   b. Project organization chart including the phone numbers of at least two responsible persons who shall be authorized to dispatch men and equipment to the project in the event of an emergency; including weekends.

   c. Description of protective clothing and NIOSH approved respirators to be used.

   d. Description of all removal methods to be used, including HEPA air filtration and decontamination sequence with special emphasis on any procedure that may deviate from these specifications.

   e. A list of manufacturers' certificates stating that all vacuums, negative air filtration equipment, respirators and air supply equipment meet OSHA and EPA requirements.

   f. A list of all materials proposed to be furnished and used under this contract.

   g. Emergency evacuation procedures in the event of fire, smoke or accidents such as injury from falling, heat exposure, electrical shock, etc.

   h. The name, address and ELAP number of the New York State Department of Health Certified Analytical Testing Laboratory the Contractor proposes to use for the OSHA monitoring.

9. A detailed plan, in triplicate, for the phasing of the project, division of work areas and location of decontamination facilities, waste containers and temporary office.

10. Work schedule, identifying firm dates and completion for actual areas. Bar chart or critical path chart indicating phases is required.

B. The Abatement Contractor shall post their NYS DOL contractor's license and maintain a daily log documenting the dates and time of the following items within each personal decontamination unit:

1. Meetings; purpose, attendants, discussion (brief)

2. Sign-in and sign-out of all persons entering the work area including name, date, time, social security number, position or function and general description of daily activity.

3. Testing of barriers and enclosure systems using smoke tubes prior to the beginning of abatement activities and at least once a day thereafter until satisfactory clearance air monitoring results have been achieved.

4. Inspection of all plastic barriers, twice daily, by the asbestos supervisor.

5. Loss of enclosure integrity; special or unusual events, barrier breaches, equipment failures, etc.

6. Daily cleaning of enclosures.

7. Personnel air monitoring test results for OSHA Compliance. Results shall be posted at the work site within 24 hours of testing and copies supplied to the Owner within five (5) days of testing. Abnormalities shall be supplied to the Owner immediately.

C. Documentation with confirmation signature of Consultant's representative of the following shall be provided by the Abatement Contractor at the final closeout of the project.

1. Testing of barriers and enclosure systems using smoke tubes shall be performed prior to the beginning of abatement activities and at least once a day thereafter until satisfactory clearance air monitoring results have been achieved.

2. Inspection of all plastic barriers.

3. Removal of all polyethylene barriers.

4. Consultant's inspections prior to encapsulation.

5. Removal of waste materials.

6. Decontamination of equipment (list items).

7. Consultant's final inspection/final air tests.

D. The Abatement Contractor shall provide records of all project information, to include the following which shall be submitted upon completion of the project and prior to approval of the Abatement Contractor's payment application:

1. The location and description of the abatement project.

2. The name, address and social security number of the person(s) who supervised the asbestos project.

3. Certified payroll documentation Pursuant to Article 8, Section 220 of the NYS Labor Law

4. Copies of EPA/NYSDOL Asbestos Certificates for all Workers and Supervisors employed on the Project.

5. Copies of Medical Approval and Respirator Fit-testing for all Asbestos Workers and Supervisors employed on the Project.

6. Copies of Abatement Contractors Daily Sign-In Sheets & Logs for persons entering and leaving the work area. – Title 12 NYCRR Part 56-7.3.

7. Copies of Abatement Contractor's personal air sampling laboratory results.

8. The amounts and type of asbestos materials that was removed, enclosed, encapsulated, or disturbed.
9. The name and address of the deposit or waste disposal site or sites where the asbestos waste materials were deposited or disposed of and all related manifests, receipts and other documentation associated with the disposal of asbestos waste.

10. The name and address of any transporters used to transport waste and all related manifests, receipts and other documentation associated with the transport of asbestos waste.

11. All other information that may be required by state, federal or local regulations.

12. Copy of the Supervisor's Daily Project Log of events as described in 1.03 B, above.

1.04 NOTIFICATIONS AND PERMITS

A. The Abatement Contractor shall be required to prepare and submit notifications to the following agencies at least ten (10) days prior to the commencement of the project:

1. Asbestos NESHAPS Contact
   U.S. Environmental Protection Agency
   NESHAPS Coordinator, Air Facilities Branch
   26 Federal Plaza
   New York, New York 10007
   (212) 264-7307

2. State of New York Department of Labor
   Division of Safety and Health
   Asbestos Control Bureau
   State Office Building Campus, Building 12, Room 454
   Albany, New York 12240

3. Owner(s): Nanuet Union Free School District
   103 Church Street
   Nanuet, NY 10954
   ATTN: Rudy Villanyi
   Ph. (845) 620-3999
   Fx. (845) 620-3934
   E-mail: rvillanyi@nanuetsd.net

4. Owner's Representative(s): KSQ Design
   215 W 40th Street 15th Floor
   New York, Ny 10018
   ATTN: Ofe Clarke
   Ph. (646) 435-0660
   E-mail. oclarke@ksq.design

5. Environmental Consultant(s): Quality Environmental Solutions & Technologies, Inc. (QuES&T)
   1376 Route 9
   Wappingers Falls, New York 12590
   ATTN: Todd McAfee
   Ph. (845) 298-6031
   Fx. (845) 298-6251
   E-mail. tmcafee@qualityenv.com

B. The notification shall include but not be limited to the following information:

1. Name and address of Owner.

2. Name, address and asbestos handling license number of the Abatement Contractor.

3. Address and description of the building, including size, age, and prior use of the building or area; the amount, in square feet or linear feet of asbestos material to be removed; room designation numbers or other local information where asbestos material is found, including the type of asbestos material (friable or non-friable).

4. Scheduled starting and completion dates for removal.

5. Methods to be employed in abating asbestos containing materials.

6. Procedures and equipment, including ventilating/exhaust systems, that will be employed to comply with the Code of Federal Regulation (CFR) Title 40, Part 61 of the U.S. Environmental Protection Agency.

7. The name and address of the carting company and of the waste disposal site where the asbestos waste will be deposited.

NOTE: Notifications shall be submitted using standard forms as may be used by the respective agency.

For DOL (NYS) include "Asbestos Project Notification" form (DOSH-483) with proper fee, if required. For EPA include "Notification of Demolition and Renovation"; 40 CFR Part 61.

C. The Abatement Contractor shall secure any permits required by the city, town, county, or state that may be required and the cost for obtaining the permit shall be included in his base bid.

D. The Abatement Contractor shall erect warning signs around the work space at every point of potential entry into the work area in accordance with OSHA 1926.58k (2), (i). These signs shall bear the following information:

DANGER
ASBESTOS
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
AUTHORIZED PERSONNEL ONLY

In addition, where the use of respirators and protective clothing is required in the regulated area under this section, the warning signs shall include the following:

WEAR RESPIRATORS PROTECTION AND PROTECTIVE CLOTHING IN THIS AREA

E. The Abatement Contractor shall post at entrances to the work place and immediate adjacent areas, notifications to building occupants, which include the name and license number of the contractor, project location and size, amount and type of ACM, abatement procedures, dates of expected occurrence and name and address of the air monitor and laboratory in compliance with ICR 56-3.6.

F. The Abatement Contractor shall post a list of emergency telephone numbers at the job site which shall include the Owner's Representative, police, emergency squad, local hospital, Environmental Protection Agency, N.Y. State Department of Labor, Occupational Safety and Health Administration and the local Department of Health.

1.05 APPLICABLE STANDARDS

Except to the extent that more explicit or more stringent requirements are written directly into the contract documents, applicable standards of the construction industry have the same force and effects (and are made a part of contract documents by reference) as if copied directly into contract documents, or as if published copies were bound herewith. Resolution of overlapping and conflicting requirements, which result from the application of several different industry standards to the same unit of work, shall be by adherence to the most stringent requirement.

A. Applicable standards listed in these Specifications form a part of this Specification and include, but are not necessarily limited to, standards promulgated by the following agencies and organizations:

1. ANSI:
   American National Standards Institute
   1430 Broadway
   New York, New York 10018

2. ASHRAE:
   American Society for Heating, Refrigerating
   and Air Conditioning Engineers
   1791 Tullie Circle NE
   Atlanta, Georgia 30329

3. ASTM:
   American Society for Testing and Materials
   1916 Race Street
   Philadelphia, Pennsylvania 19103

4. CFR
   Code of Federal Regulations Available
   from Government Printing Office
   Washington, District of Columbia 20402

5. CGA
   Compressed Gas Association
   1235 Jefferson Davis Highway
   Arlington, Virginia 22202

6. CS
   Commercial Standard of NBS
   (US Dept. of Commerce)
   Government Printing Office

7. EPA
   Environmental Protection Agency, Region II
   26 Federal Plaza
   New York, New York 10007
   Asbestos Coordinator - Room 802
   (212) 264-9538
   Part 61, Sub-Parts A & B
   National Emission Standard for Asbestos

8. FEDERAL SPECS
   Federal Specification (General Services Administration)
   7th and D Street, SW
   Washington, District of Columbia 20406

9. NBS
   National Bureau of Standards
   (US Department of Commerce)
   Gaithersburg, Maryland 20234

10. NEC
    National Electrical Code (by NFPA)

11. NFPA
    National Fire Protection Association
    Batterymarch Park
    Quincy, Massachusetts 02269

12. NIOSH
    National Institute for Occupational Safety and Health
    26 Federal Plaza
    New York, New York 10007

13. NYSDOH
    New York State Department of Health
    Bureau of Toxic Substance Assessment
    Room 359 - 3rd Floor
    Tower Building Empire State Plaza
    Albany, New York 12237

14. NYSDEC
    New York State Department of Environmental Conservation
    Room 136
    50 Wolf Road
    Albany, New York 12233-3245

15. NYSDOL
    State of New York Department of Labor
    Division of Safety and Health
    Asbestos Control Program
    State Campus
    Building 12
    Albany, New York 12240

16. OSHA
    Occupational Safety and Health Administration
    (US Department of Labor)
    New York Regional Office - room 3445
    1515 Broadway
    New York, New York 10036

17. UL

Underwriters Laboratories
333 Pfingsten Road
Northbrook, Illinois 60062

B. Federal Regulations: Those which govern asbestos abatement work or hauling and disposal of asbestos waste materials:

1. U.S. Department of Labor, Occupational Safety and Health Administration, (OSHA):

a. Asbestos Regulations
Title 29, Part 1910, of the Code of Federal Regulations.

b. Respiratory Protection
Title 29, Part 1910, Section 134 of the Code of Federal Regulations.

c. Construction Industry
Title 29, Part 1926, of the Code of Federal Regulations.

d. Access to Employee Exposure & Medical Records
Title 29, Part 1910, Section 20 of the Code of Federal Regulations.

e. Hazard Communication
Title 29, Part 1910, Section 1200 of the Code of Federal Regulations.

f. Specifications for Accident Prevention Signs and Tags
Title 29, Part 1910, section 145 of the Code of Federal Regulations.

2. U.S. Environmental Protection Agency (EPA):

a. Asbestos Hazard Emergency Response Act (AHERA) Regulation Asbestos Containing Materials in Schools Final Rule & Notice Title 40, Part 763, Subpart E of the Code of Federal Regulations.

b. Worker Protection Rule
40 CFR Part 763, Subpart G, CPTS 62044, FLR 2843-9
Federal Register, Vol. 50, No. 134, 7/12/85, P28530-28540

c. Regulation for Asbestos
Title 40, Part 61, Subpart A of the Code of Federal Regulations

d. National Emission Standard for Asbestos
Title 40, Part 61, Subpart M (Revised Subpart B) of the Code of Federal Regulations

e. Resource Conservation and Recovery Act (RCRA) 1976, 1980
Hazardous and Solid Waste Amendments (HSWA) 1984
Subtitle D, Subtitle C

3. U.S. Department of Transportation (DOT):

a. Hazardous Substances: Final Rule Regulation 49 CFR, Part 171 and 172.

C. State Regulations: Those which govern asbestos abatement work or hauling and disposal of asbestos waste materials:

1. New York State Department of Environmental Conservation (DEC) Regulations regarding waste collection registration. Title 6, Part 364 of the New York State Official Compilation of Codes, Rules and Regulations - 6NYCRR 364.

2. New York State Right-To-Know Law

3. New York State Department of Labor Asbestos Regulations Industrial Code Rule 56.

D. Standards: Those which govern asbestos abatement work or hauling and disposal of asbestos waste materials:

1. American National Standards Institute (ANSI)

a. Fundamentals Governing the Design and Operation of Local Exhaust Systems
Publication Z9.2-79

b. Practices for Respiratory Protection
Publication Z88.2-80

E. Guidance Documents: Those that discuss asbestos abatement work or hauling and disposal of asbestos waste materials are listed below only for the Abatement Contractor's information. These documents do not describe the work and are not a part of the work of this contract.

EPA:

1. Guidance for Controlling Asbestos Containing Materials in Buildings (Purple Book) EPA560/5-85-024.

2. Asbestos Waste Management Guidance EPA 530-SW-85-007.

F. Patents and Royalties: The Abatement Contractor shall pay all royalties and/or license fees. The Abatement Contractor shall defend all suits and claims for infringement of any patent rights and save the Owner and Consultant harmless from loss including attorney fees on account thereof.

1.06 DEFINITIONS

As used in or in connection with these specifications the following are terms and definitions.

Abatement - Procedure to control release from asbestos material. This includes removal, encapsulation and enclosure.

Aggressive sampling - A method of sampling in which the person collecting the air sample creates activity by the use of mechanical equipment during the sampling period to stir up settled dust and simulate activity in that area of the building.

AIHA - The American Industrial Hygiene Association, 475 Wolf Ledges Parkway, Akron, Ohio 44311.

Airlock - A system for permitting entrance and exit while restricting air movement between a containment area and an uncontaminated area. It consists of two curtained doorways separated by a distance of at least three feet such that one passes through one doorway into the airlock, allowing the doorway sheeting to overlap and close off the opening before proceeding through the second doorway, thereby preventing flow-through contamination.

Air sampling - The process of measuring the content of a known volume of air collected during a specific period of time.

Amended water - Water to which a surfactant has been added.

Approved asbestos safety program - A program approved by the Commissioner of Health providing training in the various disciplines that may be involved in an asbestos project.

Area air sampling - Any form of air sampling or monitoring where the sampling device is placed at some stationary location.

Asbestos - Any naturally occurring hydrated mineral silicate separable into commercially usable fibers, including chrysotile (serpentine), amosite (cumingtonite-gunerite), crocidolite (riebeckite), tremolite, anthophyllite and actinolite.

Asbestos contract - An oral or written agreement contained in one or more documents for the performance of work on an asbestos project and includes all labor, goods and service.

Asbestos handler - An individual who installs, removes, applies, encapsulates, or encloses asbestos or asbestos material, or who disturbs friable asbestos. Only individuals certified by NYS Department of Labor shall be acceptable for work under this specification.

Asbestos handling certificate - A certificate issued by the Commissioner of Labor of the State of New York, to a person who has satisfactorily completed an approved asbestos safety program.

Asbestos project - Work undertaken by a contractor which involves the installation, removal, encapsulation, application or enclosure of any ACM or the disturbance of friable ACM.

Asbestos Safety Technician (AST) - Individual designated to represent the Consultant, perform third party monitoring and perform compliance monitoring at the job site during the asbestos project.

Asbestos waste material - Asbestos material or asbestos contaminated objects requiring disposal.

Authorized visitor - The building owner, his or her representative or any representative of a regulatory or other agency having jurisdiction over the project.

Background level monitoring - A method used to determine ambient airborne concentrations inside and outside of a building or structure prior to starting an abatement project.

Building owner - The person in whom legal title to the premises is vested unless the premises are held in land trust, in which instance Building Owner means the person in whom beneficial title is vested.

Clean room - An uncontaminated area or room that is a part of the personal decontamination enclosure with provisions for storage of persons' street clothes and protective equipment.

Cleanup - The utilization of HEPA vacuuming to control and eliminate accumulations of asbestos material and asbestos waste material.

Clearance air monitoring - The employment of aggressive sampling techniques with a volume of air collected to determine the airborne concentration of residual fibers upon conclusion of an asbestos abatement project.

Commissioner - Commissioner of the New York State Department of Labor.

Contractor - A company, unincorporated association, firm, partnership or corporation and any owner or operator thereof, which engages in an asbestos project or employs persons engaged in an asbestos project.

Curtained doorway - A device that consists of at least three overlapping sheets of plastic over an existing or temporarily framed doorway. One sheet shall be secured at the top and left side, the second sheet at the top and right side, and the third sheet at the top and the left side. All sheets shall have weights attached to the bottom to insure that the sheets hang straight and maintain a seal over the doorway when not in use.

Decontamination enclosure system - A series of connected rooms, separated from the work area and from each other by air locks, for the decontamination of persons, materials, equipment, and authorized visitors.

Encapsulant (sealant) or encapsulating agent - A liquid material that can be applied to asbestos material and which prevents the release of asbestos from the material by creating a membrane over the surface.

Enclosure - The construction of airtight walls, ceilings and floors between the asbestos material and the facility environment, or around surfaces coated with asbestos materials, or any other appropriate procedure that prevents the release of asbestos materials.

Equipment room - A contaminated area or room that is part of the personal decontamination enclosure system with provisions for the storage of contaminated clothing and equipment.

Fixed object - A unit of equipment, furniture or other fixture in the work area which cannot be readily removed from the work area.

Friable Asbestos Material - That condition of crumbled, pulverized, powdered, crushed or exposed asbestos capable of being released into the air by hand pressure.

Friable material containment - The encapsulation or enclosure of any friable asbestos material.

Glovebag technique - A method for removing asbestos material from heating, ventilating, and air conditioning (HVAC) ducts, piping runs, valves, joints, elbows, and other nonplanar surfaces in a noncontained work area. The glovebag assembly is a manufactured device consisting of a glovebag constructed of at least six mil transparent plastic, two inward-projecting longsleeve gloves, which may contain an inward projecting waterwand sleeve, an internal tool pouch, and an attached, labeled receptacle or portion for asbestos waste. The glovebag is constructed and installed in such a manner that it surrounds the object or area to be decontaminated and to contain all asbestos fibers released during the abatement process.

HEPA filter - A high efficiency particulate air filter capable of trapping and retaining 99.97 percent of particulate greater than 0.3 microns equivalent aerodynamic diameter.

HEPA vacuum equipment - Vacuuming equipment with a high efficiency particulate air filtration system.

Holding area - A chamber in the waste decontamination enclosure located between the washroom and an adjacent uncontaminated area.

Homogeneous work area - A site within the abatement work area that contains one type of asbestos material and where one type of abatement is used.

Large asbestos project - An asbestos project involving the installation, removal, disturbance, enclosure, or encapsulation of 160 square feet or more of asbestos or asbestos material or 260 linear feet or more of asbestos or asbestos material.

Minor asbestos project - An asbestos project involving the installation, removal, disturbance, enclosure, or encapsulation of 10 square feet or less of asbestos or asbestos material, or 25 linear feet or less of asbestos or asbestos material.

Movable object - A unit of equipment, furniture or fixture in the work area that can be readily removed from the work area.

Negative air pressure equipment - A local exhaust system equipped with HEPA filtration. The system shall be capable of creating and maintaining a negative pressure differential between the outside and the inside of the work area.

Non-asbestos material - Any material containing one percent or less asbestos by weight.

Occupied area - Any frequented portion of the work site where abatement is not taking place.

Outside air - The air outside the building or structure.

Personal air monitoring - A method used to determine an individuals exposure to airborne contaminants. The sample is collected outside the respirator in the person's breathing zone.

Plasticize - To cover floors, walls, ceilings and other surfaces with 6 mil fire retardant plastic sheeting as herein specified.

Project - Any form of work performed in connection with the abatement of asbestos or alteration, renovation, modification or demolition of a building or structure that may disturb asbestos or asbestos material.

Removal - The stripping of any asbestos material.

Repair - Corrective action using required work practices to control fiber release from damaged areas.

Respiratory protection - Respiratory protection required of licensed asbestos workers and authorized visitors in accordance with the applicable laws.

Satisfactory clearance air monitoring results - For all post- abatement samples, airborne concentrations of total fibers that are less than 0.01 fibers per cubic centimeter or background levels, whichever are greater, using phase contrast microscopy (PCM).

Shower room - A room between the clean room and the equipment room in the personal decontamination enclosure with hot and cold running water controllable at the top and arranged for complete showering during decontamination.

Small asbestos project - An asbestos project involving the installation, removal, disturbances, enclosure, or encapsulation of more than 10 and less than 160 square feet of asbestos or asbestos material of more than 25 and less than 260 linear feet of asbestos or asbestos material.

Staging area - The area near the waste transfer airlock where containerized asbestos waste has been placed prior to removal from the work area.

Surfactant - A chemical wetting agent added to water to improve its penetration.

Visible emissions - An emissions of particulate material that can be seen without the aid of instruments.

Washroom - A room between the work area and the holding area in the waste decontamination enclosure system, where equipment and waste containers are wet cleaned and/or HEPA vacuumed.

Waste decontamination enclosure system - An area, consisting of a washroom and a holding area, designated for the controlled transfer of materials and equipment.

Wet cleaning - The process of eliminating asbestos contamination from surfaces, equipment or other objects by using cloths, mops, or other cleaning tools.

Work area - Designated rooms, spaces, or areas where asbestos abatement takes place.

Work site - Premises where asbestos abatement is taking place.

Work Surface - Substrate surface from which asbestos-containing material has been removed.

1.07 UTILITIES, SERVICE AND TEMPORARY FACILITIES

A. The Owner shall make available to the Abatement Contractor all reasonable amounts of water and electrical power at no charge.

B. The Abatement Contractor shall provide, at his own expense, all electrical, water, and waste connections, extensions, and construction materials, supplies, etc. All connections must be approved in advance by the Owner and all work relative to the utilities must be in accordance with the applicable building codes.

C. The Abatement Contractor shall provide scaffolding, ladders and staging, etc. as necessary to accomplish the work of this contract. The type, erection and use of all scaffolding, ladders and staging, etc. shall comply with all applicable OSHA provisions.

D. All connections to the Owner's water system shall include reduced pressure backflow protection or double check and double gate valves. Valves shall be temperature and pressure rated for operation of the temperatures and pressures encountered. After completion of use, connections and fittings shall be removed without damage or alteration to existing water piping and equipment. Leaking or dripping valves shall be piped to the nearest drain or located over an existing sink or grade where water will not damage existing finishes or equipment.

E. The Abatement Contractor shall use only heavy duty abrasion resistant hoses with a pressure rating greater than the maximum pressure of the water distribution system to provide water to each work area and to each decontamination unit. Provide fittings as required to allow for connection to existing wall hydrants or spouts, as well as temporary water heating equipment, branch piping,

showers, shut-off nozzles and equipment. All water must be shut off at the end of each shift.

F. The Abatement Contractor shall provide service to decontamination unit electrical subpanel with minimum 60 amp, 2 pole circuit breaker or fused disconnect and ground-fault circuit interrupters (GFCI), reset button and pilot light, connected to the building's main distribution panel. Subpanel and disconnect shall be sized and equipped to accommodate all electrical equipment required for completion of the work. This electrical subpanel shall be used for hot water heater, PAPR battery recharging and air sampling pumps.

G. The Abatement Contractor shall provide UL rated 40-gallon electric hot water heater to supply hot water for the decontamination unit shower. Activate from 30 amp circuit breaker on the electrical subpanel located within the decontamination unit. Provide with relief valve compatible with water heater operation; relief valve down to drip pan on floor with type L copper. Wiring of the hot water heater shall be in compliance with NEMA, NEC, and UL standards.

H. The Abatement Contractor shall provide identification warning signs at power outlets, which are other than 110-120 volt power. Provide polarized outlets for plug-in type outlets, to prevent insertion of 110-120 plugs into higher voltage outlets. Dry transformers shall be provided where required to provide voltages necessary for work operations. All outlets or power supplies shall be protected by ground fault circuit interrupter (GFCI) at the power source.

I. The Abatement Contractor shall use only grounded extension cords; use "hard-service" cords where exposed to abrasion and traffic. Use single lengths or use waterproof connectors to connect separate lengths of electric cords, if single lengths will not reach areas of work.

J. The Abatement Contractor shall provide general service incandescent lamps of wattage indicated or required for adequate illumination; Protect lamps with guard cages or tempered glass enclosures; Provide exterior fixtures where fixtures are exposed to moisture.

K. The Abatement Contractor shall provide temporary heat or air conditioning as necessary to maintain comfortable working temperatures inside and immediately outside the work areas. Heating and A/C equipment shall have been tested and labeled by UL, FM or another recognized trade association related to the fuel being used. Fuel burning heaters shall not be used inside containment areas. The Contractor shall also provide a comfortable working environment for occupied areas that are impacted by the asbestos removal.

L. The Abatement Contractor shall comply with recommendations of the NFPA standard in regard to the use and application of fire extinguishers. Locate fire extinguishers where they are most convenient and effective for their intended purpose, but provide not less than one extinguisher in each work area, equipment room, clean room and outside the work area.

1.08 REMOVAL OF FIXTURES

A. In locations where the Abatement Contractor is directed to dispose of fixtures he shall either decontaminate the fixtures and dispose of them as non-asbestos containing materials or he shall place them in an appropriate container and dispose of them as asbestos containing material.

B. In locations where the Abatement Contractor is directed to remove and reinstall fixtures, the fixtures shall be removed, decontaminated, labeled, protected with plastic and stored by the contractor in a location as directed by the Owner.

C. Upon completion of the asbestos removal and upon receiving satisfactory clearance air monitoring results, all items to be replaced shall be restored to their original location and reinstalled by the Abatement Contractor.

PART 2 – PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. GENERAL REQUIREMENTS

1. Materials shall be stored off the ground, away from wet or damp surfaces and under protective cover to prevent damage or contamination.

2. Damaged or deteriorating materials shall not be used and shall be removed from the premises.

3. Power tools used to drill, cut into, or otherwise disturb asbestos material shall be equipped with HEPA filtered local exhaust ventilation.

4. The Abatement Contractor shall make available to authorized visitors, ladders and/or scaffolds of sufficient dimension and quantity so that all work surfaces can be easily and safely reached for inspection. Scaffold joints and ends shall be sealed with tape to prevent incursion of asbestos. Scaffolds and ladders shall comply with all applicable codes.

B. PLASTIC BARRIERS (POLYETHYLENE)

1. In sizes and shapes to minimize the number of joints.

   a. Six mil. (.006") fire-retardant for vertical protection (walls, entrances and openings).

   b. Six mil. (.006") fire-retardant for horizontal protection (fixed equipment) and heating grilles.

   c. Six mil. (.006") reinforced fire-retardant for floors of decon units.

2. Provide two (2) layers over all roof, wall and ceiling openings. Floor penetrations shall be sealed with a rigid material prior to plasticizing to prevent tripping and fall hazards. All seams within a layer shall be separated by a minimum distance of six feet and sealed airtight. All seams between layers shall be staggered.

3. Barrier Attachment - Commercially available duct tape (fabric or paper) and spray-on adhesive. Duct tape shall be capable of sealing joints of adjacent sheets of plastic, facilitating attachment of plastic sheets to finished or unfinished surfaces of dissimilar materials and adhering under both dry and wet conditions.

C. SIGNS

1. Danger signs shall be provided and shall conform to 29 CFR 1926.1101 and be 14" x 20". These signs shall bear the following information:

DANGER **ASBESTOS** **MAY CAUSE CANCER** **CAUSES DAMAGE TO LUNGS** **AUTHORIZED PERSONNEL ONLY**

In addition, where the use of respirators and protective clothing is required in the regulated area under this section, the warning signs shall include the following:

WEAR RESPIRATORS PROTECTION AND PROTECTIVE CLOTHING IN THIS AREA

D. DANGER LABELS AND TAPE

1. Labels shall be affixed to any asbestos contaminated material in accordance with the requirements of 29 CFR 1910.1200 (f) of OSHA's Hazard Communication Standard, and shall contain the following information:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID BREATHING DUST
CANCER AND LUNG DISEASE HAZARD

2. A label shall be affixed on each container of asbestos waste in accordance with the requirements of 49 CFR Parts 171 and 172, Hazardous Substances; Final Rule (U.S. Department of Transportation), and shall contain the following information:

RQ HAZARDOUS SUBSTANCE
SOLID, NOS, ORM-E, NA 9188
(ASBESTOS)

3. A label shall be affixed on each container of asbestos waste in accordance with the requirements of 40 CFR Part 61.150, NESHAP; Asbestos; Final Rule (USEPA) and shall contain the name of the waste generator and the location at which the waste was generated.

   NOTE: All containers marked as above (1, 2 and 3) shall be disposed of as asbestos waste.

4. Provide 3" red barrier tape printed with black lettered "DANGER ASBESTOS REMOVAL". Locate barrier tape across all corridors, entrances and access routes to asbestos work area.

PROTECTIVE EQUIPMENT

1. Respiratory Requirements

   a. Where fiber levels permit, and in compliance with regulatory requirements, Powered Air Purifying Respirators are the minimum allowable respiratory protection permitted to be utilized during removal operations.

   b. Where not in violation of NIOSH, OSHA, and any other regulatory requirements, the Abatement Contractor shall provide the following minimum respiratory protection to the maximum use concentrations indicated:

MSHA/NIOSH Approved Respiratory Protection	Maximum Use Concentration
Half-Mask Air Purifying with HEPA Filters	10x PEL
Full-Facepiece Air Purifying HEPA Filters and Quantitative Fit Test	10x PEL
Powered Air Purifying (PAPR), Loose fitting Helmet or Hood, HEPA Filter	25x PEL
Powered Air Purifying (PAPR), Full Facepiece, HEPA Filter	50x PEL
Supplied Air, Continuous Flow Loose fitting Helmet or Hood	25x PEL
Supplied Air, Continuous Flow Full Facepiece, HEPA Filter	50x PEL
Full Facepiece-Supplied Air Pressure Demand, HEPA Filter	100x PEL
Full Facepiece-Supplied Air Pressure Demand, with Aux. SCBA, Pressure Demand or Continuous Flow	>100x PEL

2. Disposable Clothing -"Tyvek" manufactured by Dupont or approved equal.

3. NIOSH approved safety goggles to protect eyes.

4. Polyethylene bags, 6 mil. (.006") thick (use double bags).

NOTE: Workers must wear disposable coveralls and respirator masks at all times while in the work area. Contaminated coveralls or equipment must be left in work area and not worn into other parts of the building.

TOOLS AND EQUIPMENT

1. Airless Sprayer - An airless sprayer, suitable for application of encapsulating material, shall be used.

2. Scaffolding - Scaffolding, as required to accomplish the specified work, shall meet all applicable safety regulations.

3. Transportation Equipment - Transportation equipment, as required, shall be suitable for loading, temporary storage, transport and unloading of contaminated waste without exposure to persons or property. Water tight, hard wall containers shall be provided to retain and dispose of any asbestos waste material with sharp-edged components that may tear plastic bags or sheeting. The containers shall be marked with danger labels.

4. Surfactant - Wetting Agents - "Asbestos-Wet" - Aquatrols Corp. of America or approved equal, and shall be non- carcinogenic.

5. Portable (negative air pressure) asbestos filtration system - by Micro-Trap, or approved equal.

6. Vacuum, HEPA type equal to "Nilfisk" #GA73, or "Pullman/Holt" #75 ASA.

7. Amended Water Sprayer - The water sprayer shall be an airless or other low-pressure sprayer for amended water application.

8. Other Tools and Equipment - The Abatement Contractor shall provide other suitable tools for the stripping, removal, encapsulation, and disposal activities including but not limited to: hand-held scrapers, nylon brushes, sponges, rounded edge shovels, brooms, and carts.

PART 3 – EXECUTION

3.01 PRE-ABATEMENT WORK AREA PREPARATION

A. The work area shall be vacated by the occupants prior to work area preparation and not reoccupied until satisfactory clearance air monitoring results have been achieved.

B. Caution signs shall be posted at all locations and approaches to a location where airborne concentrations of asbestos may exceed ambient background levels. Signs shall be posted that permit a person to read the sign and take the necessary protective measures to avoid exposure.

C. Shut down and lock out electric power to all work areas. The Abatement Contractor shall provide temporary power and lighting and ensure safe installation of temporary power sources and equipment used where high humidity and/or water shall be sprayed in accordance with all applicable codes. All power to work areas shall be brought in from outside the area through a ground-fault interrupter at the source.

D. Isolate the work area HVAC system.

E. The personnel decontamination enclosure system shall be installed or constructed prior to preparatory work in the work area and in particular before the disturbance of asbestos material. The waste decontamination enclosure system shall be installed or constructed prior to commencement of abatement activities.

F. Movable objects within the work area shall be pre-cleaned using HEPA filtered vacuum equipment

an/or wet cleaning and such objects shall be removed from the work area to an uncontaminated location. If disposed of as asbestos waste material, cleaning is not required.

G. Fixed objects and other items, which are to remain within the work area, shall be pre-cleaned using HEPA filtered vacuum equipment and/or wet cleaning. Such objects shall be enclosed with two layers of at least six mil plastic sheeting and sealed with tape.

H. The work area shall be pre-cleaned using HEPA filtered vacuum equipment and/or wet cleaning. Methods that raise dust, such as dry sweeping or vacuuming with equipment not equipped with HEPA filters, shall be prohibited. Asbestos material shall not be disturbed during pre-cleaning.

I. Isolation barriers that seal off all openings, including windows, corridors, doorways, ducts, and any other penetrations of the work area, shall be constructed using two layers of at least six mil fire-retardant plastic sheeting sealed with tape. Also, all seams in mechanical system components that pass through the work area shall be sealed. Doorways and corridors, which shall not be used for passage during work, shall also be sealed.

J. Removal of mounted objects. After isolation barriers are in place, objects such as light fixtures, electrical track, alarm systems, ventilation equipment and other items not previously sealed, shall be double sealed with six mil fire-retardant plastic sheeting. Localized HEPA filtered vacuum equipment shall be used during fixture removal to reduce asbestos dispersal.

K. Individual roof and floor drains shall be sealed watertight using two layers of 6-mil fire-retardant plastic sheeting and tape prior to plasticizing. Openings in floor shall be fully covered with plywood sheeting secured to the floor in such a way as to minimize a tripping hazard prior to plasticizing.

L. Emergency and fire exits from the work area shall be maintained or alternate exits shall be established according to all applicable codes.

M. Adequate toilet facilities shall be supplied by the Abatement Contractor and shall be located either in the clean area of the personnel decontamination enclosure or shall be readily accessible to the personnel decontamination enclosure.

3.02 LARGE ASBESTOS PROJECT PERSONNEL DECONTAMINATION ENCLOSURE SYSTEM (ICR 56-7.5)

A. The personnel decontamination enclosure shall be constructed prior to preparatory work in the work area and in particular before the disturbance of asbestos material.

1. Construction and use of personnel decontamination enclosure systems shall be in accordance with ICR-56 and any Applicable or Site Specific Variances utilized on this project. Such systems may consist of existing rooms outside of the work area, if the layout is appropriate, that can be enclosed is plastic sheeting and are accessible from the work area. When this situation does not exist, enclosure systems may be constructed out of metal, wood or plastic support.

2. The personnel decontamination enclosure system shall consist of a clean room, a shower room, and an equipment room, in series, separated from each other and from the work area by three airlocks.

3. There shall be one shower per six full shift abatement persons calculated on the basis of the largest shift.

4. The personnel decontamination enclosure system shall be fully framed, sheathed for safety and constructed to prevent unauthorized entry.

5. Personnel decontamination enclosure systems constructed at the work site shall utilize at least six mil fire-retardant opaque plastic sheeting. At least two layers of six mil fire-retardant reinforced plastic sheeting shall be used for the flooring of this area.

6. All prefabricated decontamination units shall be completely decontaminated and sealed prior to separation and removal from the work area. Mobile decontamination units shall remain in place until satisfactory clearance results have been attained.

7. The clean room shall be sized to accommodate all authorized persons. Benches, lockers and hooks shall be provided for street clothes. Shelves for storing respirators shall also be provided. Clean clothing, replacement filters for respirators, towels and other necessary items shall be provided. The clean room shall not be used for the storage of tools, equipment or materials. It shall not be used for office space. A lockable door shall be provided to permit access to the clean room from outside the work area or enclosure. It shall be used to secure the work area and decontamination enclosure during off-shift hours.

8. The shower room shall contain one or more showers. Each shower head shall be supplied with hot and cold water adjustable at the tap. The shower enclosure shall be constructed to ensure against leakage of any kind. Uncontaminated soap, shampoo and towels shall be available at all times. Shower water shall be drained, collected and filtered through a system with at least 5.0 micron particle size collection capability. A system containing a series of several filters with progressively smaller pore sizes shall be used to avoid rapid clogging of the filtration system by large particles. Filtered wastewater shall be discharged in accordance with applicable codes. Contaminated filters shall be disposed of as asbestos waste. The shower room shall be constructed in such way that travel through the decontamination unit shall be through the shower.

9. The equipment room shall be used for the storage of equipment and tools after decontamination using a HEPA filtered vacuum and/or wet cleaning. A one day supply of replacement filters, in sealed containers, for HEPA vacuums and negative pressure ventilation equipment, extra tools, containers of surfactant and other materials and equipment that may be required during the abatement project may also be stored here. A walk-off pan filled with water shall be located in the work area just outside the equipment room for persons to clean foot covering when leaving

the work area. A drum lined with a labeled, at least six mil plastic bag is required for collection of clothing and shall be located in this room. Contaminated footwear and work clothes shall be stored in this area.

3.03 WASTE DECONTAMINATION ENCLOSURE SYSTEM (ICR 56-7.5)

A. General Requirements

1. A waste decontamination enclosure system shall consist of the following:

   a. A washroom/cleanup room shall be constructed with an airlock doorway to the work area and another airlock doorway to the holding area.

   b. The holding area shall be constructed with an airlock doorway to the washroom/cleanup room and another lockable door to the outside.

2. Where there is only one egress from the work area, the holding area of the waste decontamination enclosure system may branch off from the equipment decontamination room, which doubles as a waste washroom, of the personnel decontamination enclosure.

3. The waste washroom shall be equipped with a drain installed to collect water and deliver it to the shower drain where it shall be filtered through a system with at least 5.0 micron particle size collection capability. A system containing a series of several filters with progressively smaller pore sizes shall be used to avoid rapid clogging of the filtration system by large particles. Filtered wastewater shall be discharged in accordance with applicable codes. Contaminated filters shall be disposed of as asbestos waste.

4. The waste washroom shall be constructed in such a way that travel through the rooms shall be through the waste washroom

3.04 WORK AREA ENTRY AND EXIT PROCEDURES

A. The following procedures shall be followed throughout the asbestos abatement project until satisfactory clearance air monitoring results have been achieved:

1. All persons shall enter and exit the work area through the personnel decontamination enclosure system.

2. All persons who enter the work area or an enclosure shall sign the entry/exit log, located in the clean room, upon every entry and exit.

3. All persons, before entering the work area, or an enclosure shall read and be familiar with all posted regulations, personal protection requirements, including work area entry and exit procedures, and emergency procedures. The entry/exit log headings shall indicate, and the signatures shall be used to acknowledge, that these have been reviewed and understood by all persons prior to entry.

4. All persons shall proceed first to the clean room, remove all street clothing, store these items in clean sealable plastic bags or lockers and don coveralls, head covering, foot covering and gloves. All persons shall also don NIOSH approved respiratory protection. Clean respirators and protective clothing shall be utilized, by each person, for each separate entry into the work area. Respirators shall be inspected prior to each use and tested for proper seal using quantitative or qualitative fit checks.

5. Persons wearing designated personal protective equipment shall proceed from the clean room through the shower room to the equipment room, where necessary tools are collected and any additional clothing shall be donned, before entry into the work area.

6. Before leaving the work area, all persons shall remove gross contamination from the outside of respirators and protective clothing by brushing, wet cleaning, and/or HEPA vacuuming.

7. Persons shall proceed to the equipment room where all coveralls, head covering, foot covering and gloves shall be removed. Disposable clothing shall be deposited into labeled containers for disposal. Reusable contaminated clothing, footwear, head gear and gloves shall be stored in the equipment room when not being used in the work area.

8. Still wearing respirators, persons shall proceed to the shower area, clean the outside of the respirator and the exposed face area under running water prior to removal of the respirator, and then fully and vigorously shower and shampoo to remove residual asbestos contamination. Respirators shall be washed thoroughly with soap and water. Some types of respirators will require slight modification of these procedures. An airline respirator with HEPA filtered disconnect protection shall be disconnected in the equipment room and worn into the shower. A powered air-purifying respirator facepiece shall be disconnected from the filter/power pack assembly prior to entering the shower.

9. After showering and drying, all persons shall proceed to the clean room and don clean personal protective equipment if returning to the work area or street clothing if exiting the enclosure.

3.05 EQUIPMENT AND WASTE CONTAINER DECONTAMINATION & REMOVAL PROCEDURES

A. The following procedures shall be followed throughout the asbestos abatement project until satisfactory clearance air monitoring results have been achieved.

1. External surfaces of contaminated containers and equipment shall be cleaned by wet cleaning and/or HEPA vacuuming in the work area before moving such items into the waste decontamination enclosure system airlock by persons assigned to this duty. These work area persons shall not enter the airlock.

2. These contaminated items shall be removed from the airlock by persons stationed in the washroom during waste removal operations. These washroom persons shall remove gross contamination from the exterior of their respirators and protective clothing by brushing, HEPA vacuuming and/or wet cleaning.

3. Once in the waste decontamination enclosure system, external surfaces of contaminated containers and equipment shall be cleaned a second time by wet cleaning.

4. The cleaned containers of asbestos material and equipment are to be dried of any excessive pooled or beaded liquid, placed in uncontaminated plastic bags or sheeting and sealed airtight.

5. The clean recontainerized items shall be moved into the airlock that leads to the holding area. The washroom persons shall not enter this airlock or the work area until waste removal is finished for that period.

6. Containers and equipment shall be moved from the airlock and into the holding area by persons dressed in clean personal protective equipment, who have entered from uncontaminated areas.

7. The cleaned containers of asbestos material and equipment shall be placed in water tight carts with doors or tops that shall be closed and secured. These carts shall be held in the holding area pending removal. The carts shall be wet cleaned and/or HEPA vacuumed at least once each day.

8. The exit from the decontamination enclosure system shall be secured to prevent unauthorized entry.

9. Where the waste removal enclosure is part of the personnel decontamination enclosure, waste removal shall not occur during shift changes or when otherwise occupied. Precautions shall be taken to prevent short circuiting and cycling of air outward through the shower and clean room.

10. Containers labeled with Asbestos hazard warnings shall not be used to dispose of non asbestos waste.

3.06 ENGINEERING CONTROLS

A. Ventilation.

1. The Abatement Contractor shall employ HEPA equipped vacuums or negative air pressure equipment for ventilation as required.

2. All negative air pressure equipment ventilation units shall be equipped with HEPA filtration. The Contractor shall provide a manufacturer's test certificate for each unit documenting the capability of trapping and retaining 99.97 percent of asbestos fibers greater than 0.3 microns equivalent aerodynamic diameter.

3. A power supply shall be available to satisfy the requirements of the total of all ventilating units.

4. On electric power failure, abatement shall stop immediately and shall not resume until power is restored and exhaust units are operating fully. On extended power failure, longer than one hour, the decontamination facilities, after the evacuation of all persons from the work area, shall be sealed airtight.

5. If extending the exhaust of the ventilation units 50 feet from the building would result in an exhaust location either in the road, blocking driveway access to the facility or within 50 feet of other buildings, a second unit will be run in series with the primary unit.

3.07 MAINTENANCE OF DECONTAMINATION ENCLOSURE SYSTEMS AND WORK AREA BARRIERS

A. GENERAL REQUIREMENTS

1. The Consultant must review and approve installation before commencement of work. Upon completion of the construction of all plastic barriers and decontamination system enclosures and prior to beginning actual abatement activities.

2. All plastic barriers inside the work area, in the personnel decontamination enclosure system, in the waste decontamination enclosure system and at partitions constructed to isolate the work area from occupied areas, shall be inspected by the asbestos supervisor at least twice daily. The barriers shall be inspected before the start of and following the completion of the day's abatement activities. Inspections and observations shall be documented in the project log.

3. Damage and defects in the barriers and/or enclosure systems shall be repaired immediately upon discovery and prior to resumption of abatement activities.

4. At any time during the abatement activities, if visible emissions are observed outside of the work area of if damage occurs to the barriers, work shall be stopped, repairs made and visible residue immediately cleaned up using HEPA vacuuming methods prior to the resumption of abatement activities.

5. The Abatement Contractor shall HEPA vacuum and/or wet clean the waste decontamination enclosure system and the personnel decontamination enclosure system at the end of each day of abatement activities.

3.08 HANDLING AND REMOVAL PROCEDURES

The Abatement Contractor may utilize existing provisions of ICR-56, Applicable Variances or a Site Specific Variance, approved by the Owner's Consultant, to permit the conduct of this work.

3.09 ABATEMENT PROCEDURES

A. AIR SAMPLING - By Owner

1. Air sampling and analysis shall be conducted according to the requirements of Subpart 56-4 before the start, during and after the completion of the asbestos removal project.

2. In addition to the requirements of Subpart 56-4, air monitoring shall be conducted in accordance with any approved job specific variance(s) or applicable variance utilized.

3. Clearance samples may be analyzed using PCM to maintain compliance with ICR-56.

4. If applicable, clearance samples will be analyzed using TEM to maintain compliance with ICR-56 and 40 CFR 763.90[i].

B. The provisions of the Applicable Variances or a Job Specific Variance shall apply only in those areas where approval has been granted by the NYS DOL and the Contractor has obtained concurrence from the Owner's Consultant. All other applicable provisions of Industrial Code Rule 56-1 through 56-12 shall be complied.

C. A copy of the NYS DOL Job Specific or Applicable Variance, if applicable, shall be conspicuously posted at the work area(s).

D. The Abatement Contractor shall construct a decontamination unit at the work site. The Abatement Contractor shall, as a minimum, comply with the requirements of 29 CFR 1926.1101(j); Hygiene facilities and practices for employees.

3.10 ENCAPSULATION PROCEDURES

The following procedures shall be followed to seal in non-visible residue, after obtaining satisfactory clearance air monitoring results, while conducting lockdown encapsulation on any surfaces which were the subject of removal or other remediation activities:

A. Only encapsulants rated as acceptable or marginally acceptable on the basis of Battelle Columbus Laboratory test procedures and rating requirements developed under the 1978 USEPA contract shall be used for lockdown encapsulation.

B. Sealants considered for use in encapsulation shall first be tested to ensure that the sealant is adequate for its intended use. A section of the work surface shall be evaluated following this initial test application of the sealant to quantitatively determine the sealant's effectiveness in terms of penetrating and locking down the asbestos fibers. The American Society of Testing and Materials (ASTM) Committee E06.21.06E on Encapsulation of Building Materials has developed a guidance document to assist in the selection of an encapsulant.

C. The encapsulant solvent or vehicle shall not contain a volatile hydrocarbon.

D. Encapsulants shall be applied using airless spray equipment.

1. Spraying is to occur at the lowest pressure range possible to minimize fiber release from encapsulant impact at the surface. It shall be applied with a consistent horizontal or vertical motion.

E. Encapsulation shall be utilized as a surface sealant once all asbestos containing materials have been removed in a work area. In no event shall encapsulant be applied to any surface that was the subject of removal or other remediation activities prior to obtaining satisfactory clearance air monitoring.

3.11 CLEANUP PROCEDURES

A. The following cleanup procedures shall be required.

1. Cleanup of accumulations of loose asbestos material shall be performed whenever enough loose asbestos materials have been removed to fill a single leak tight container of the type commensurate with the material properties. In no case shall cleanup be performed less than once prior to the close of each working day. Asbestos material shall be kept wet until cleaned up.

2. Accumulations of dust shall be cleaned off all surfaces on a daily basis using HEPA vacuum cleaning methods.

3. Decontamination enclosures shall be HEPA vacuumed at the end of each shift.

4. Accumulations of asbestos waste material shall be containerized utilizing HEPA vacuums or rubber or plastic dust pans, squeegees or shovels. Metal shovels shall not be used to pick up or move waste.

5. Excessive water accumulation or flooding in the area shall require work to stop until the water is collected and disposed of properly.

B. The following cleanup procedures shall be required after completion of all removal activities.

1. All accumulations of asbestos waste material shall be containerized utilizing HEPA vacuums or rubber or plastic dust pan, squeegees or shovels. Metal shovels shall not be used to pick up or move waste. HEPA vacuums shall be used to clean all surfaces after gross cleanup.

2. Cleaning. All surfaces in the work area shall be HEPA vacuumed. To pick up excess liquid and wet debris, a wet purpose shop vacuum may be used and shall be decontaminated prior to removal from the work area.

3. Windows, doors, HVAC system vents and all other openings shall remain sealed. Decontamination enclosure systems shall remain in place and be utilized.

4. All containerized waste shall be removed from the work area and the holding area.

5. All tools and equipment shall be decontaminated and removed from the work area.

6. A final visual inspection and clearance air monitoring, as per the schedule for air sampling and analysis, shall be conducted.

7. The isolation barriers and decontamination unit shall be removed only after satisfactory

8. clearance air monitoring results have been achieved.

3.12 SAFETY MONITORING – CONSULTANT:

The Consultant will designate an Asbestos Safety Technician (AST) to represent the Owner during the removal program. The AST must be on the job site at all times during abatement work. Absolutely no abatement or preparation work will occur without the presence of the AST.

The AST will conduct four (4) milestone inspections.

1. Pre-commencement inspection shall be conducted as follows:

   a. Notification in writing to the Consultant shall be made by the Abatement Contractor to request a pre-commencement inspection at least 48 hours in advance of the desired date of inspection. This inspection shall be requested prior to beginning preparatory work in another work area.

   b. The AST shall ensure that:

      i. The job site is properly prepared and that all containment measures are in place;

      ii. The designated supervisor shall present to the inspector a valid supervisor's license issued by the New York Department of Labor;

      iii. All workers shall present to the inspector a valid handler's license issued by the New York Department of Labor;

      iv. Measures for the disposal of removed asbestos material are in place and shall conform to the adopted standards;

      v. The Abatement Contractor has a list of emergency telephone numbers at the job site which shall include the monitoring firm employed by the Owner and telephone numbers for fire, police, emergency squad, local hospital and health officer.

   c. If all is in order, the AST shall issue a written notice to proceed in the field. If the job site is not in order, then any needed corrective action must be taken before any work is to commence. Conditional approvals shall not be granted.

Progress inspection shall be conducted as follows:

   a. Primary responsibility for ensuring that the abatement work progresses in accordance with these technical specifications and regulatory requirements rests with the Abatement Contractor. The AST shall continuously be present to observe the progress of work and perform required tests.

   b. If the AST observes irregularities at any time, he shall direct such corrective action as may be necessary. If the Abatement Contractor fails to take the corrective action required, or if the Abatement Contractor or any of their employees habitually and/or excessively violate the requirements of any regulation, then the AST shall inform the Owner who shall issue a Stop Work Order to the Abatement Contractor and have the work site secured until all violations are abated.

Clean-up inspections shall be conducted as follows:

   a. Notice for clean-up inspection shall be requested by the Abatement Contractor at least 24 hours in advance of the desired date of inspection;

   b. The clean-up inspection shall be conducted prior to the removal of any isolation or critical

barriers and before final air clearance monitoring;

c. The AST shall ensure that:

i. The work site has been properly cleaned and is free of visible asbestos containing material and debris.

ii. All removed asbestos has been properly placed in a locked secure container outside of the work area.

d. If all is in order, the AST shall issue a written notice of authorization to remove surface barriers from the work area. All isolation barriers shall remain in place until satisfactory clearance air sampling has been completed.

4. Clearance Visual Inspection shall be conducted after the removal of non-critical plastic sheeting. The AST shall insure that:

a. The work area is free of all visible asbestos or suspect asbestos debris and residue.

b. All waste has been properly bagged and removed from the work area.

c. Should clearance visual inspection identify residual debris, as determined by the AST, the Abatement Contractor is responsible for recleaning the area at his own cost and shall bear all costs of reinspection until acceptable levels are achieved.

B. The Abatement Contractor shall be required to receive written approval before proceeding after each milestone inspection.

3.13 PERSONNEL AIR MONITORING – CONTRACTOR (29 CFR 1926.1101)

A. Personnel air monitoring shall be provided to determine both short-term (STEL) and full shift during when abatement activities occur. Personnel sampling shall be performed in each work area in order to accurately determine the concentrations of airborne asbestos to which workers may be exposed.

B. The Abatement Contractor shall have a qualified "Competent Person" (as specified in 29 CFR 1926 OSHA) to conduct personnel air monitoring.

C. The laboratory performing the air sample analysis shall be certified by NYS DOH ELAP and approved by the consultant.

D. Personnel air monitoring test results for OSHA Compliance. Results shall be posted at the work site within 24 hours of testing and copies supplied to the Owner within five (5) days of testing. Abnormalities shall be supplied to the Owner immediately.

3.14 CLEARANCE AIR MONITORING

A. Air samples will be collected in and around the work areas at the completion of abatement activities.

B. Clearance samples may be analyzed using PCM to maintain compliance with ICR-56.

C. If applicable, clearance samples will be analyzed using TEM to maintain compliance with ICR-56 and 40 CFR part 763 “Asbestos-Containing Materials in Schools; Final Rule and Notice” section 763.90.

D. ***RETESTING***
Should clearance air monitoring yield fiber concentrations above the “Clearance” criteria of either 0.01 fibers per CC and/or background levels (PCM) –OR- seventy (70) structures per square millimeter (TEM/AHERA), the Abatement Contractor is responsible for re-cleaning the area at his own cost and shall bear all costs associated with the retesting of the work area(s) including monitoring labor, sampling, analysis, etc. until such levels are achieved.

3.15 RESPIRATORY PROTECTION REQUIREMENT

A. Respiratory protection shall be worn by all individuals inside the work area from the initiation of the asbestos project until all areas have successfully passed clearance air monitoring in accordance with these specifications. The Abatement Contractor shall keep available at all times two PAPR's with new filters and charged batteries for use by authorized visitors.

B. All respiratory protection shall be MSHA/NIOSH approved in accordance with the provisions of 30 CFR Part II. All respiratory protection shall be provided by the Abatement Contractor, and used by workers in conjunction with the written respiratory protection program.

C. The Abatement Contractor shall provide respirators that meet the requirements of 29 CFR Parts 1910 and 1926.

1. Full facepiece Type C supplied-air respirators operated in pressure demand mode equipped with an auxiliary self- contained breathing apparatus, operated in pressure demand or continuous flow, shall be worn during gross removal, demolition, renovation and/or other disturbance of ACM whenever airborne fiber concentrations inside the work area are greater than 10.0 f/cc.

2. Full facepiece Type C supplied-air respirators operated in pressure demand mode with HEPA filter disconnect protection shall be work during gross removal, demolition, renovation and/or other disturbance of ACM with an amphibole content and/or whenever airborne fiber concentrations inside the work area are equal to or greater than 0.5 f/cc and less than or equal to 10.0 f/cc.

3. Full facepiece powered air-purifying respirators (PAPR) equipped with HEPA filters shall be worn during the removal, encapsulation, enclosure, repair and/or other disturbance of friable ACM if airborne fiber concentrations inside the work area are less than 0.5 f/cc. A supply of charged replacement batteries, HEPA filters and flow test meter shall be available in the clean room for use with powered air-purifying respirators. HEPA filters shall be changed daily or as flow testing indicates change is necessary. Any Type C supplied-air respirator operated in continuous flow, with HEPA filter disconnect protection, may be substituted for a powered air-purifying respirator.

4. Loose fitting helmets or hoods with powered air-purifying respirators (PAPR) equipped with HEPA filters may be worn during the removal, encapsulation, enclosure, repair and/or other disturbance of friable ACM if airborne fiber concentrations inside the work area are less than 0.25 f/cc. A supply of charged replacement batteries, HEPA filters and flow test meter shall be available in the clean room for use with powered air-purifying respirators. HEPA filters shall be changed daily or as flow testing indicates change is necessary. Any Type C supplied-air respirator operated in continuous flow may be substituted for a powered air- purifying respirator.

5. Half-mask or full-face air-purifying respirators with HEPA filters shall be worn only during the preparation of the work area and final clean up procedures provided airborne fiber concentrations inside the work area are less than 0.1 f/cc.

6. Use of single use dust respirators is prohibited for the above respiratory protection.

D. Workers shall be provided with personally issued and individually marked respirators. Respirators shall not be marked with any equipment that will alter the fit of the respirator in any way. Only waterproof identification markers shall be used.

E. The Abatement Contractor shall ensure that the workers are qualitatively or quantitatively fit tested by an Industrial Hygienist initially and every six months thereafter with the type of respirator he/she will be using.

F. Whenever the respirator design permits, workers shall perform the positive and negative air pressure fit test each time a respirator is worn. Powered air-purifying respirators shall be tested for adequate flow as specified by the manufacturer.

G. No facial hair, which interferes with the face-to-mask sealing surface, shall be permitted to be worn when wearing respiratory protection that requires a mask-to-face seal.

H. Contact lenses shall not be worn in conjunction with respiratory protection.

I. If a worker wears glasses, a spectacle kit to fit their respirator shall be provided by the Abatement Contractor at the Abatement Contractor's expense.

J. Respiratory protection maintenance and decontamination procedures shall meet the following requirement:

1. Respiratory protection shall be inspected and decontaminated on a daily basis in accordance with OSHA 29 CFR 1910.134(b); and

2. HEPA filters for negative pressure respirators shall be changed after each shower; and

3. Respiratory protection shall be the last piece of worker protection equipment to be removed. Workers must wear respirators in the shower when going through decontamination procedures; and

4. Airline respirators with HEPA filtered disconnect shall be disconnected in the equipment room and worn into the shower. Powered air-purifying respirator facepieces shall be worn into the shower. Filtered/power pack assemblies shall be decontaminated in accordance with manufacturers' recommendations; and

5. Respirators shall be stored in a dry place and in such a manner that the facepiece and exhalation valves are not distorted; and

6. Organic solvents shall not be used for washing of respirators.

K. No visitors shall be allowed to enter the contaminated area if they do not have their medical certification and training certificate. Authorized visitors shall be provided with suitable PAPR respirators and instructions on the proper use of respirators whenever entering the work area.

3.16 DISPOSAL OF WASTE

A. APPLICABLE REGULATIONS

1. All asbestos waste shall be stored, transported and disposed of as per, but not limited to, the following Regulations:

   a. NYS Code Rule 56

   b. U.S. Department of Transportation (DOT)
   Hazardous Substances
   Title 29, Part 171 and 172 of the code of Federal Regulations
   regarding waste collector registration

   c. Regulations regarding waste collector registration Title 6, part 364 of the New York State Official Compilation of Codes, Rules and Regulations – 6 NYCRR 364

   d. USEPA NESHAPS 40 CRF 61

   e. USEPA ASBESTOS WASTE MANAGEMENT GUIDANCE EPA/530-SW-85-007

B. TRANSPORTER OR HAULER - The Abatement Contractor shall bear full responsibility for proper characterization, transportation and disposal of all solid or liquid waste, generated during the project, in a legal manner. The Owner shall approve all transportation and disposal methods.

1. The Abatement Contractor's Transporter (hauler) and disposal site shall be approved by the Owner. The Abatement Contractor shall remove within 48 hours all asbestos waste from the site after completing the clean up.

2. The Transporter must possess and present to the Owner's representative a valid New York State Department of Environmental Conservation Part 364 asbestos hauler's permit to verify license plate and permit numbers. The Owner's representative will verify the authenticity of the hauler's permit with the proper authority.

3. The Abatement Contractor shall give 24 hour notification prior to removing any waste from the site. All waste shall be removed from site only during normal working hours. No waste may be taken from the site without authorization from the Owner's representative.

4. The Abatement Contractor shall have the Transporter give the date and time of arrival at the disposal site.

5. The Transporter with the Abatement Contractor and Owner's consultant shall inspect all material in the transport container prior to taking possession and signing the Waste Manifest. The Transporter shall not have any off site transfers or be combined with any other off-site asbestos material.

6. The Transporter must travel directly to the disposal site with no unauthorized stops.

C. WASTE STORAGE CONTAINER

1. During loading and on site storage, the asbestos waste container shall be labeled with EPA Danger signage:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

2. The NYS DEC Hauler's Permit number shall be on both sides and back of the container.

3. The Container will not be permitted to leave the site without the proper signage.

4. A copy of the completed waste manifest shall be forwarded directly to the Owner's Consultant by the disposal facility.

5. Packaging of Non-friable Asbestos. Use of an open top container shall require written request, by the Contractor, and written approval by the Owners Representative, and be performed in compliance with all applicable regulations.

   a) A chute, if used, shall be air/dust tight along its lateral perimeter and at the terminal connection to the dumpster at ground level (solid wall and top container). The upper end of the chute shall be furnished with a hinged lid, to be closed when the chute is not being used.

   b) The container shall be lined with a minimum of two (2) layers of 6 mil. Fire-retardant polyethylene draped loosely over the sides so as to facilitate being wrapped over the top of the load and sealed prior to transport from the site.

   c) Prior to transport from the work site the Dumpster will be disconnected from the chute and sealed air/dust tight utilizing six mil plastic and tape. The waste material will be transported as an asbestos containing material by appropriate legal methods.

6. Packaging Friable Asbestos.

   a) The container shall be a solid wall, hard top and lockable container.

   b) The container shall be locked upon arrival at the site to restrict access. Security shall be provided at the entrance to the container during the loading process and immediately locked upon completion.

   c) The interior walls, floor and ceiling shall be lined with two (2) layers of 6 mil. Fire-retardant polyethylene.

   d) The waste shall be loaded in such a manner as to protect the integrity of the individual waste packages.

   e) Prior to transport from the work site the interior of the Dumpster will sealed air/dust tight utilizing six mil plastic and tape. The waste material will be transported as an asbestos containing material by appropriate legal methods.

D. WASTE DISPOSAL MANIFEST

1. The Asbestos Waste Manifest shall be equivalent to the “Waste Shipment Record” included in 40 CFR 61. A copy of the Contractor’s manifest shall be reviewed by the Owner’s Consultant and shall be the only manifest used.

2. The Manifest shall be verified by the Owner’s Consultant indicating that all the information and amounts are accurate and the proper signatures are in place.

3. The Manifest shall have the signatures of the Abatement Contractor and the Transporter prior to any waste being removed from the site.

4. The Manifest shall be signed by the Disposal Facility owner or operator to certify receipt of asbestos containing materials covered by the manifest.

5. A copy of the completed manifest shall be provided by the Abatement Contractor to the Owner’s Consultant and remain on site for inspection.

6. Abatement Contractor shall maintain a waste disposal log which indicates load number, date and time left site, container size, type of waste, quantity of waste, name of hauler, NYS DES permit number, trailer and tractor license number, and date manifest was returned to Consultant.

7. The Disposal Facility owner or operator shall return a signed copy of the Waste Manifest directly to:

Nanuet Union Free School District

103 Church Street

Nanuet, New York 10954

ATTN: Rudy Villanyi

8. Copies of the completed Waste Manifest are to be sent by the disposal facility to the Hauler and Abatement Contractor.

9. Submit signed dump tickets and manifests with final payment request.

10. Final payment request will not be honored without signed dump ticket or manifests accounting for all asbestos waste removed from the site.

E. VIOLATIONS OF SPECIFICATIONS

1. Violations of the safety, hygiene, environmental, procedures herein, any applicable federal, state of local requirement s or failure to cooperate with the Owner’s representative shall be grounds for dismissal and/or termination of this contract.

F. VIOLATIONS OF NO SMOKING POLICY

1. The Federal Pro Children Act of 1994 prohibits School District Officials from smoking in any buildings or on the grounds that is property of the School District. The District shall be considered smoke free. The School District strongly enforces its' No Smoking Policy. It is the Contractor's responsibility to inform all workers of this policy. Any worker(s) involved with this project that are found smoking or using tobacco products will be informed that they are in violation of the Federal and State Law and School Board Policy and will be removed from site.

3.17 LOCATION OF "NANUET HIGH SCHOOL" –
(Please see attached Drawings for approximate locations)

1) <u>Nanuet High School – 1st and 2nd Floors - ACM Floor Tile (Partial Removal) – Base Bid</u>

- Asbestos Abatement Contractor responsible for total and complete removal and disposal of approximately 240 SF (total) non-friable asbestos-containing 9"x9" Floor Tile both exposed and below Non-ACM 1'x1' Floor Tile on ACM Mastic AND Non-ACM 1'x1' Floor Tile on ACM Mastic to Non-ACM Cementitious Slab Floor. Removals shall include all layers of both Non-ACM Floor Tile and ACM Floor Tile to Non-ACM Cementitious Slab substrate throughout the (12) areas specified below. Prior to abatement activities and as required, the Owner and/or General Contractor to shall perform all required non-asbestos plumbing disconnects of building components potentially affected. The Owner and/or General Contractor are responsible for re-installations of non-asbestos floor coverings/mastics/etc. Areas of ACM Floor Tile and Mastic removal:
  1) 20 Classrooms/Offices under/near Unit Vents without casework – 400 SF[1]

  *Note: 1) Abatement Contractor is responsible for abatement of all Floor Tile and Mastic below existing unit ventilator and one (1) row of tiles to front and sides of the existing units to facilitate the larger units to be installed. Abatement contractor to coordinate with General Contractor for exact dimensions of removal in each room prior to work area preparation.

2) **<u>Nanuet High School – 1st and 2nd Floors - ACM Floor Tile (Partial Removal) – Add/Alternate #1</u>**

- Asbestos Abatement Contractor responsible for total and complete removal and disposal of approximately 1,025 SF (total) non-friable asbestos-containing 9"x9" Floor Tile both exposed and below Non-ACM 1'x1' Floor Tile and/or Non-ACM Carpet to Non-ACM Cementitious Slab Floor Substrate. Prior to abatement activities and as required, the Owner and/or General Contractor to shall perform all required non-asbestos plumbing disconnects of building components potentially affected. The Owner and/or General Contractor are responsible for re-installations of non-asbestos floor coverings/mastics/etc. Areas of ACM Floor Tile and Mastic removal:
  1) Assistant Superintendent Office – 185 SF
  2) Business Admininstration Office – 440 SF
  3) Office Suite Adjacent to Teacher's Lounge – 400 SF

3) <u>Nanuet High School – ACM Pipe Insulation – Base Bid</u>

- Asbestos Abatement Contractor responsible for probing non-ACM Plaster and Non-ACM Drywall Pipe Risers/Chases at radiator removal locations to confirm presence of approximately 22 LF (total) ACM Pipe Insulation in eleven locations in the First Floor. If ACM Pipe Insulation is discovered, Abatement Contractor shall remove and dispose of ACM Pipe Insulation to facilitate fin-tube radiator removals and steam line to floor penetrations. Prior to abatement activities and as required, the Owner and/or General Contractor shall perform all required non-asbestos plumbing disconnects of building components potentially affected.

Note to Contractors: ACM Pipe Insulation observed outside the scope of work. ACM Pipe Insulation may exist on concealed piping throughout the building. If suspect pipe insulation is observed, notify General Contractor and/or Owner's Representatives immediately.

END OF LOCATION OF WORK

3.18 GENERAL

A. The Abatement Contractor will be responsible for repairing all building components damaged during abatement including, but not limited to: ceiling tiles, ceiling finishes, wall finishes, floor finishes, etc.

B. The Abatement Contractor shall be responsible for all demolition required to access materials identified in scope of work and on associated drawings.

C. Concealed conditions that are exposed and may require additional work shall be brought to the attention of the Owner immediately. The Abatement Contractor shall not abate these areas without a written notice to proceed. Additional asbestos abatement performed prior to the order to proceed will not be acknowledged.

D. The Abatement Contractor shall remove asbestos-containing floor covering to the building substrate beneath; in areas indicted. Subsequent to final air clearance the substrate shall be washed with a neutralizing agent to prepare the substrate to accept new floor covering and eliminate residual odors.

E. Power tools used to drill, cut into or otherwise disturb asbestos containing material shall be equipped with HEPA filtered local exhaust ventilation.

F. The Abatement Contractor shall provide access to GFCI electrical power, required to perform the area air monitoring for this project, within and immediately adjacent to each work area.

G. Unwrapped or unbagged ACM shall be immediately placed in an impermeable waste bag or wrapped in plastic sheeting.

H. Coordinate all removal operations with the Owner.

RETURN THIS EXECUTED FORM WITH COMPLETED BID SHEET

Asbestos Employee Medical Examination Statement

Certificate of Worker Release
Asbestos Employee Training Statement
CERTIFICATE OF WORKERS'S ACKNOWLEDGEMENT

PROJECT NAME: **Nanuet High School - Phase 4**

CONTRACTOR'S NAME:_____

WORKING WITH ASBESTOS INVOLVES POTENTIAL EXPOSURE TO AIRBORNE ASBESTOS FIBERS. INHALING ASBESTOS FIBERS HAS BEEN LINKED WITH VARIOUS TYPES OF CANCER AND RESPIRATORY DISEASES. SMOKING CIGARETTES AND INHALATION OF ASBESTOS FIBERS INCREASES THE RISK THAT YOU WILL DEVELOP LUNG CANCER ABOVE THAT OF THE NON-SMOKING PUBLIC.

The Contract for this project requires the Abatement Contracting Company to: 1) supply proper respiratory protection devices, and training on their use, to their employees; 2) provide training on safe work practices, and on use of the equipment used on the project, to their employees; and, 3) provide annual medical examinations to their employees meeting the requirements of 29 CFR 1926.1101. The Abatement Contracting Company's signature on this certificate, documents that these contractual obligations are fulfilled, and that you understand the information presented to you.

**************DO NOT SIGN THIS FORM UNLESS YOU FULLY UNDERSTAND THIS INFORMATION**************

RESPIRATORY PROTECTION: I have been trained in the proper use and limitations of the type of respiratory protection devices to be used on this project. I have reviewed the written respiratory protection program manual and a copy is available for my use. Respiratory protection equipment has been proved, by the Contractor, at no cost to me.

TRAINING COURSE: I have been trained in the risks and dangers associated with handling asbestos, breathing asbestos dust, proper work procedures, personal protection and engineering controls. I have satisfactorily completed and Asbestos Safety Training Program for New York State and have been issued a New York State Department of Health Certificate of Asbestos Safety Training.

MEDICAL EXAMINATION: I have satisfactorily completed a medical examination within the last 12 months that meets the OSHA requirement for an asbestos worker and included at least 1) medical history 2) pulmonary function 3) medical examination 4) approval to wear respiratory protection devises and may have included an evaluation of a chest x-ray.

Signature:_____Date_____

Printed Name:_____SS#:_____

Witness:_____Date:_____

RETURN THIS EXECUTED FORM WITH COMPLETED BID SHEET

RETURN THIS EXECUTED FORM WITH COMPLETED BID SHEET

ESTIMATE OF ACM QUANTITIES

PROJECT NAME: **Nanuet High School - Phase 4**

****

EACH ABATEMENT CONTRACTOR SHALL READ AND ACKNOWLEDGE THE FOLLOWING NOTICE. A SIGNED AND DATED COPY OF THIS ACKNOWLEDGMENT SHALL BE SUBMITTED WITH THE ABATEMENT CONTRACTOR'S BID FOR THIS PROJECT. FAILURE TO DO SO MAY, AT THE SOLE DISCRETION OF THE OWNER, RESULT IN THE BID BEING CONSIDERED NON-RESPONSIVE AND RESULT IN DISQUALIFICATION OF THE ABATEMENT CONTRACTOR'S BID ON THIS PROJECT.

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***** NOTICE *****

The linear and square footages listed within this specification are approximates. Abatement Contractor is required to visit the work locations prior to bid submittal in order to take actual field measurements within each listed location. The Abatement Contractor shall base their bid on actual quantities determined, by them, at the site walkthrough. Estimates provided in these specifications are for informational purposes only and shall not be considered a basis for Change Orders on this project.

****

Acknowledgment: I have read and understand the above **NOTICE** regarding removal quantity estimates and understand that estimates provided in these specifications are for informational purposes only and shall not be considered a basis for Change Orders on this project. The Abatement Contractor's signatory represents to the Owner that he/she has the authority of the entity he/she represents to sign this agreement on its behalf.

Company Name: _____
Type or Print

BY: _____ _____ _____
Signature Title Date

Print Name: _____

RETURN THIS EXECUTED FORM WITH COMPLETED BID SHEET

ASSOCIATED ASBESTOS REMOVAL LOCATION DRAWINGS

- ***Nanuet Union Free School District: Nanuet High School Phase 4***
  DRAWING #ASB-01 – 1st Floor Classroom Wing Abatement
  DRAWING #ASB-02 – 1st Floor Administration Wing Abatement
  DRAWING #ASB-03 – 2nd Floor East Wing Abatement

END OF SPECIFICATION
SECTION 02080

SECTION 020800
ASBESTOS ABATEMENT PROCEDURES

AT: MILLER ELEMENTARY SCHOOL
50 BLAUVELT ROAD
NANUET, NY 10954
SED #50-01-08-03-0-001-025

OWNER: NANUET UNION FREE SCHOOL DISTRICT
103 CHURCH STREET
NANUET, NY 10954
PH. (845) 627-9880
FX. (845) 624-5338

CONSULTANT: QUALITY ENVIRONMENTAL SOLUTIONS & TECHNOLOGIES, INC. (QUES&T)
1376 ROUTE 9
WAPPINGERS FALLS, NEW YORK 12590
PH. (845) 298-6031
FX. (845) 298-6251



SPECIFICATION DATED: February 6, 2024
Design conforms to all applicable provisions of the NYS Uniform Fire Prevention and Building Code, NYS Energy Conservation Construction Code and Education Department Building Standards.

PART I – GENERAL

1.01 DESCRIPTION

A. All work under this contract shall be performed in strict accordance with the specifications and all applicable laws for asbestos removal projects. The Abatement Contractor shall furnish all labor, materials, supervision, services, insurance and equipment necessary for the complete and total removal of Asbestos-containing Materials (ACM) as described herein, in attachments to the specification, Job Specific Variance(s) and/or as directed by Nanuet Union Free School District (here-in-after the "Owner") and/or the Owners Representative(s) to support the to the following Nanuet School District projects:

- Miller Elementary School
  50 Blauvelt Road
  Nanuet, NY 10954
  SED #50-01-08-03-0-001-025

B. Abatement Contractor shall provide for personnel air monitoring to satisfy OSHA regulation 29 CFR Parts 1926.1101(f). All work performed shall be in strict accordance with applicable provisions and regulations promulgated under New York State Department of Labor, Industrial Code 56 (ICR-56).

C. The Abatement Contractor shall satisfy the requirements for asbestos projects issued by the New York State Department of Labor concerning licensing and certification; notification; equipment; removal and disposal procedures; engineering controls; work area preparation; decontamination and clean-up procedures; and personnel air monitoring.

D. The Abatement Contractor shall be responsible for submittal of asbestos project notification(s) and applicable fees to EPA and NYSDOL concerning this project. Project notification(s) shall be made for the cumulative total of ACM to be removed as required by ICR-56-3.4. Work practices for each individual work area established shall be consistent with the quantity of ACM contained within that work area as defined in ICR-56-2.

E. The scope of work under this contract shall include the following:

1. All asbestos-containing materials (ACM) shall be removed in accordance with these specifications. The Abatement Contractor is responsible for field verification of estimated quantities, locations and other site conditions that may affect work.

2. All fixed objects remaining within the work area(s) shall be protected as required by Title 12 NYCRR Section 56-7.10(b) and as described in these specifications.

3. The containerization, labeling and disposal of all asbestos waste in accordance with applicable city, state and federal regulations and these specifications.

4. The Abatement Contractor will be responsible for repairing all building components damaged during abatement including, but not limited to, ceiling tiles, ceiling finishes, wall finishes and/or floor finishes, etc.

5. The Abatement Contractor shall be responsible for any and all demolition required to access materials identified in scope of work and on associated drawings.

6. Concealed conditions that are exposed and may require additional work shall be brought to the attention of the Owner(s) immediately. The Abatement Contractor shall not abate these areas without a written notice to proceed. If the Abatement Contractor removes additional asbestos prior to the order to proceed the additional work will not be acknowledged.

7. Permissible working hours shall be Monday through Friday 7:00 A.M. to 4:00 P.M. with one (1) hour for lunch and/or as defined by the Owner. Holidays shall be considered weekends and not included for working days. Upon written approval from the Owner, the Abatement Contractor may work past these hours. The Abatement Contractor will incur any and all costs associated for work performed beyond the defined schedule including, but not limited to: abatement activities, project/air monitoring, custodial/staffing labor, overtime, mobilizations, etc.

8. Buildings will be turned over to the Abatement Contractor as is. At that time, all electrical services and HVAC systems in the proposed work areas will be shut down. Electricity and water supply will be maintained in the building for use by the Abatement Contractor. The Abatement Contractor is responsible for securing all power in the work area(s) and establishing all temporary GFCI hookups necessary to complete his work.

9. The Abatement Contractor shall remove identified asbestos-containing floor coverings to the building substrate beneath; in areas indicted. Subsequent to final air clearances, the substrate(s) shall be washed with a neutralizing agent to prepare the substrate to accept new floor covering and eliminate residual odors.

10. The Abatement Contractor must coordinate location of waste containers with the Facility and the Owner. Deliveries and storage of equipment must be coordinated with the Facility and the Owner.

11. All “Large” and “Small” asbestos abatement projects, as defined by 12 NYCRR56 shall not be performed while the building is occupied. The term “building” means a wing or major section of a building that can be completely isolated from the rest of the building with sealed non-combustible construction. The isolated portion of the building must contain exists that do not pass through the occupied portion(s) and ventilation systems must be physically separated and sealed at the isolation barriers.

1.02 PRE-CONTRACT SUBMITTALS

Within three (3) days after bids are opened, the three (3) apparent low bidders shall be required to submit the following documentation:

A. Resume: Shall include the following:

1. Provide a list of projects of similar nature performed within the past two (2) years and include the dollar value of all projects. Provide project references to include owner, consultant, and air monitoring firms' name, contact person, address, and phone number, include location of project and date of completion.

2. Abatement Contractor license issued by New York State Department of Labor for asbestos work in accordance with ICR-56-3.

3. A list of owned equipment available to be used in the performance of the project.

4. The number of years engaged in asbestos removal.

5. An outline of the worker training courses and medical surveillance program conducted by the Abatement Contractor.

6. A standard operating procedures manual describing work practices and procedures, equipment, type of decontamination facilities, respirator program, special removal techniques, etc.

7. Documentation to the satisfaction of the Owner pertaining to the Abatement Contractor's financial resources available to perform the project. Such data shall include, but not be limited to, the firm's balance sheet for the last fiscal year.

B. Citations/Violations/Legal Proceedings

1. Submit a notarized statement describing any citations, violations, criminal charges, or legal proceedings undertaken or issued by any law enforcement, regulatory agency, or consultant concerning performance on previous asbestos abatement contracts. Briefly describe the circumstances citing the project and involved persons and agencies as well as the outcome of any actions.

2. Answer the question: "Has your firm or its agents been issued a Stop Work order on any project within the last two years?" If "Yes" provide details as discussed above.

3. Answer the question: "Are you now, or have you been in the past, a party to any litigation or arbitrations arising out of your performance on Asbestos Abatement Contracts?" If "Yes" provide details as discussed in 1. above.

4. Describe any liquidated damages assessed within the last two years.

C. Preliminary Schedule

1. Provide a detailed schedule including work dates, work shift times, estimate of manpower to be utilized and the start and completion date for completion of each major work area.

1.03 DOCUMENTATION

A. The Abatement Contractor shall be required to submit the following and receive the Consultant's approval prior to commencing work on this project:

1. Provide documentation of worker training for each person assigned to the project. Documentation shall include copies of each workers valid New York State asbestos handler certificates (for those employees who may perform asbestos removal), documentation of current respirator fit test and current OSHA required training and medical examination.

2. The attached "Asbestos Employee Medical Examination Statement" and "Asbestos Employee Training Statement" forms shall be completed, signed and submitted for each worker assigned to the project. Records of all employee training and medical surveillance shall be maintained for at least forty (40) years. Copies of the records shall be submitted to the Consultant prior to commencement.

3. The Abatement Contractor shall submit proof of a current, valid license issued by the New York State Department of Labor pursuant to the authority vested in the Commissioner by section 906 of the Labor Laws, and that the employees performing asbestos related work on this project are certified by the State of New York as required in Part 56 of Title 12 of the Official Compilation of Codes, Rules and Regulations of the State of New York latest edition. Copies of all licenses shall be submitted prior to the commencement of the project.

4. The Abatement Contractor shall submit a written respiratory protection program meeting the requirements of 29 CFR 1910.134 to the Consultant.

5. The name, address, social security number and NYS DOL certificate number of the person(s) who will supervise the asbestos project.

6. The name and address of the deposit or waste disposal site or sites where the asbestos materials are to be deposited or disposed of. This site must be approved by the Owner. The manifesting procedure must also be specified.

7. The name, address and New York State Dept. of Environmental Conservation ID Number of any transporters that are to be used to transport waste.

8. A written Standard Operation Procedure (SOP) that is designed and implemented to maximize protection against human exposure to asbestos dust. The SOP shall take into consideration the workers, visitors, building employees, general public and environment. As a minimum the procedures must include the following:

   a. Security for all work areas on an around-the-clock basis against unauthorized access.

   b. Project organization chart including the phone numbers of at least two responsible persons who shall be authorized to dispatch men and equipment to the project in the event of an emergency; including weekends.

   c. Description of protective clothing and NIOSH approved respirators to be used.

   d. Description of all removal methods to be used, including HEPA air filtration and decontamination sequence with special emphasis on any procedure that may deviate from these specifications.

   e. A list of manufacturers' certificates stating that all vacuums, negative air filtration equipment, respirators and air supply equipment meet OSHA and EPA requirements.

   f. A list of all materials proposed to be furnished and used under this contract.

   g. Emergency evacuation procedures in the event of fire, smoke or accidents such as injury from falling, heat exposure, electrical shock, etc.

   h. The name, address and ELAP number of the New York State Department of Health Certified Analytical Testing Laboratory the Contractor proposes to use for the OSHA monitoring.

9. A detailed plan, in triplicate, for the phasing of the project, division of work areas and location of decontamination facilities, waste containers and temporary office.

10. Work schedule, identifying firm dates and completion for actual areas. Bar chart or critical path chart indicating phases is required.

B. The Abatement Contractor shall post their NYS DOL contractor's license and maintain a daily log documenting the dates and time of the following items within each personal decontamination unit:

1. Meetings; purpose, attendants, discussion (brief)

2. Sign-in and sign-out of all persons entering the work area including name, date, time, social security number, position or function and general description of daily activity.

3. Testing of barriers and enclosure systems using smoke tubes prior to the beginning of abatement activities and at least once a day thereafter until satisfactory clearance air monitoring results have been achieved.

4. Inspection of all plastic barriers, twice daily, by the asbestos supervisor.

5. Loss of enclosure integrity; special or unusual events, barrier breaches, equipment failures, etc.

6. Daily cleaning of enclosures.

7. Personnel air monitoring test results for OSHA Compliance. Results shall be posted at the work site within 24 hours of testing and copies supplied to the Owner within five (5) days of testing. Abnormalities shall be supplied to the Owner immediately.

C. Documentation with confirmation signature of Consultant's representative of the following shall be provided by the Abatement Contractor at the final closeout of the project.

1. Testing of barriers and enclosure systems using smoke tubes shall be performed prior to the beginning of abatement activities and at least once a day thereafter until satisfactory clearance air monitoring results have been achieved.

2. Inspection of all plastic barriers.

3. Removal of all polyethylene barriers.

4. Consultant's inspections prior to encapsulation.

5. Removal of waste materials.

6. Decontamination of equipment (list items).

7. Consultant's final inspection/final air tests.

D. The Abatement Contractor shall provide records of all project information, to include the following which shall be submitted upon completion of the project and prior to approval of the Abatement Contractor's payment application:

1. The location and description of the abatement project.

2. The name, address and social security number of the person(s) who supervised the asbestos project.

3. Certified payroll documentation Pursuant to Article 8, Section 220 of the NYS Labor Law

4. Copies of EPA/NYSDOL Asbestos Certificates for all Workers and Supervisors employed on the Project.

5. Copies of Medical Approval and Respirator Fit-testing for all Asbestos Workers and Supervisors employed on the Project.

6. Copies of Abatement Contractors Daily Sign-In Sheets & Logs for persons entering and leaving the work area. – Title 12 NYCRR Part 56-7.3.

7. Copies of Abatement Contractor's personal air sampling laboratory results.

8. The amounts and type of asbestos materials that was removed, enclosed, encapsulated, or disturbed.
9. The name and address of the deposit or waste disposal site or sites where the asbestos waste materials were deposited or disposed of and all related manifests, receipts and other documentation associated with the disposal of asbestos waste.

10. The name and address of any transporters used to transport waste and all related manifests, receipts and other documentation associated with the transport of asbestos waste.

11. All other information that may be required by state, federal or local regulations.

12. Copy of the Supervisor's Daily Project Log of events as described in 1.03 B, above.

1.04 NOTIFICATIONS AND PERMITS

A. The Abatement Contractor shall be required to prepare and submit notifications to the following agencies at least ten (10) days prior to the commencement of the project:

1. Asbestos NESHAPS Contact
   U.S. Environmental Protection Agency
   NESHAPS Coordinator, Air Facilities Branch
   26 Federal Plaza
   New York, New York 10007
   (212) 264-7307

2. State of New York Department of Labor
   Division of Safety and Health
   Asbestos Control Bureau
   State Office Building Campus, Building 12, Room 454
   Albany, New York 12240

3. Owner(s): Nanuet Union Free School District
   103 Church Street
   Nanuet, NY 10954
   ATTN: Rudy Villanyi
   Ph. (845) 620-3999
   Fx. (845) 620-3934
   E-mail: rvillanyi@nanuetsd.net

4. Owner's Representative(s): KSQ Design
   215 W 40th Street 15th Floor
   New York, Ny 10018
   ATTN: Ofe Clarke
   Ph. (646) 435-0660
   E-mail. oclarke@ksq.design

5. Environmental Consultant(s): Quality Environmental Solutions & Technologies, Inc. (QuES&T)
   1376 Route 9
   Wappingers Falls, New York 12590
   ATTN: Todd McAfee
   Ph. (845) 298-6031
   Fx. (845) 298-6251
   E-mail. tmcafee@qualityenv.com

B. The notification shall include but not be limited to the following information:

1. Name and address of Owner.

2. Name, address and asbestos handling license number of the Abatement Contractor.

3. Address and description of the building, including size, age, and prior use of the building or area; the amount, in square feet or linear feet of asbestos material to be removed; room designation numbers or other local information where asbestos material is found, including the type of asbestos material (friable or non-friable).

4. Scheduled starting and completion dates for removal.

5. Methods to be employed in abating asbestos containing materials.

6. Procedures and equipment, including ventilating/exhaust systems, that will be employed to comply with the Code of Federal Regulation (CFR) Title 40, Part 61 of the U.S. Environmental Protection Agency.

7. The name and address of the carting company and of the waste disposal site where the asbestos waste will be deposited.

NOTE: Notifications shall be submitted using standard forms as may be used by the respective agency.

For DOL (NYS) include "Asbestos Project Notification" form (DOSH-483) with proper fee, if required. For EPA include "Notification of Demolition and Renovation"; 40 CFR Part 61.

C. The Abatement Contractor shall secure any permits required by the city, town, county, or state that may be required and the cost for obtaining the permit shall be included in his base bid.

D. The Abatement Contractor shall erect warning signs around the work space at every point of potential entry into the work area in accordance with OSHA 1926.58k (2), (i). These signs shall bear the following information:

DANGER
ASBESTOS
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
AUTHORIZED PERSONNEL ONLY

In addition, where the use of respirators and protective clothing is required in the regulated area under this section, the warning signs shall include the following:

WEAR RESPIRATORS PROTECTION AND PROTECTIVE CLOTHING IN THIS AREA

E. The Abatement Contractor shall post at entrances to the work place and immediate adjacent areas, notifications to building occupants, which include the name and license number of the contractor, project location and size, amount and type of ACM, abatement procedures, dates of expected occurrence and name and address of the air monitor and laboratory in compliance with ICR 56-3.6.

F. The Abatement Contractor shall post a list of emergency telephone numbers at the job site which shall include the Owner's Representative, police, emergency squad, local hospital, Environmental Protection Agency, N.Y. State Department of Labor, Occupational Safety and Health Administration and the local Department of Health.

1.05 APPLICABLE STANDARDS

Except to the extent that more explicit or more stringent requirements are written directly into the contract documents, applicable standards of the construction industry have the same force and effects (and are made a part of contract documents by reference) as if copied directly into contract documents, or as if published copies were bound herewith. Resolution of overlapping and conflicting requirements, which result from the application of several different industry standards to the same unit of work, shall be by adherence to the most stringent requirement.

A. Applicable standards listed in these Specifications form a part of this Specification and include, but are not necessarily limited to, standards promulgated by the following agencies and organizations:

1. ANSI:
   American National Standards Institute
   1430 Broadway
   New York, New York 10018

2. ASHRAE:
   American Society for Heating, Refrigerating
   and Air Conditioning Engineers
   1791 Tullie Circle NE
   Atlanta, Georgia 30329

3. ASTM:
   American Society for Testing and Materials
   1916 Race Street
   Philadelphia, Pennsylvania 19103

4. CFR
   Code of Federal Regulations Available
   from Government Printing Office
   Washington, District of Columbia 20402

5. CGA
   Compressed Gas Association
   1235 Jefferson Davis Highway
   Arlington, Virginia 22202

6. CS
   Commercial Standard of NBS
   (US Dept. of Commerce)
   Government Printing Office

7. EPA
   Environmental Protection Agency, Region II
   26 Federal Plaza
   New York, New York 10007
   Asbestos Coordinator - Room 802
   (212) 264-9538
   Part 61, Sub-Parts A & B
   National Emission Standard for Asbestos

8. FEDERAL SPECS
   Federal Specification (General Services Administration)
   7th and D Street, SW
   Washington, District of Columbia 20406

9. NBS
   National Bureau of Standards
   (US Department of Commerce)
   Gaithersburg, Maryland 20234

10. NEC
    National Electrical Code (by NFPA)

11. NFPA
    National Fire Protection Association
    Batterymarch Park
    Quincy, Massachusetts 02269

12. NIOSH
    National Institute for Occupational Safety and Health
    26 Federal Plaza
    New York, New York 10007

13. NYSDOH
    New York State Department of Health
    Bureau of Toxic Substance Assessment
    Room 359 - 3rd Floor
    Tower Building Empire State Plaza
    Albany, New York 12237

14. NYSDEC
    New York State Department of Environmental Conservation
    Room 136
    50 Wolf Road
    Albany, New York 12233-3245

15. NYSDOL
    State of New York Department of Labor
    Division of Safety and Health
    Asbestos Control Program
    State Campus
    Building 12
    Albany, New York 12240

16. OSHA
    Occupational Safety and Health Administration
    (US Department of Labor)
    New York Regional Office - room 3445
    1515 Broadway
    New York, New York 10036

17. UL

Underwriters Laboratories
333 Pfingsten Road
Northbrook, Illinois 60062

B. Federal Regulations: Those which govern asbestos abatement work or hauling and disposal of asbestos waste materials:

1. U.S. Department of Labor, Occupational Safety and Health Administration, (OSHA):

a. Asbestos Regulations
Title 29, Part 1910, of the Code of Federal Regulations.

b. Respiratory Protection
Title 29, Part 1910, Section 134 of the Code of Federal Regulations.

c. Construction Industry
Title 29, Part 1926, of the Code of Federal Regulations.

d. Access to Employee Exposure & Medical Records
Title 29, Part 1910, Section 20 of the Code of Federal Regulations.

e. Hazard Communication
Title 29, Part 1910, Section 1200 of the Code of Federal Regulations.

f. Specifications for Accident Prevention Signs and Tags
Title 29, Part 1910, section 145 of the Code of Federal Regulations.

2. U.S. Environmental Protection Agency (EPA):

a. Asbestos Hazard Emergency Response Act (AHERA) Regulation Asbestos Containing Materials in Schools Final Rule & Notice Title 40, Part 763, Subpart E of the Code of Federal Regulations.

b. Worker Protection Rule
40 CFR Part 763, Subpart G, CPTS 62044, FLR 2843-9
Federal Register, Vol. 50, No. 134, 7/12/85, P28530-28540

c. Regulation for Asbestos
Title 40, Part 61, Subpart A of the Code of Federal Regulations

d. National Emission Standard for Asbestos
Title 40, Part 61, Subpart M (Revised Subpart B) of the Code of Federal Regulations

e. Resource Conservation and Recovery Act (RCRA) 1976, 1980
Hazardous and Solid Waste Amendments (HSWA) 1984
Subtitle D, Subtitle C

3. U.S. Department of Transportation (DOT):

a. Hazardous Substances: Final Rule Regulation 49 CFR, Part 171 and 172.

C. State Regulations: Those which govern asbestos abatement work or hauling and disposal of asbestos waste materials:

1. New York State Department of Environmental Conservation (DEC) Regulations regarding waste collection registration. Title 6, Part 364 of the New York State Official Compilation of Codes, Rules and Regulations - 6NYCRR 364.

2. New York State Right-To-Know Law

3. New York State Department of Labor Asbestos Regulations Industrial Code Rule 56.

D. Standards: Those which govern asbestos abatement work or hauling and disposal of asbestos waste materials:

1. American National Standards Institute (ANSI)

a. Fundamentals Governing the Design and Operation of Local Exhaust Systems
Publication Z9.2-79

b. Practices for Respiratory Protection
Publication Z88.2-80

E. Guidance Documents: Those that discuss asbestos abatement work or hauling and disposal of asbestos waste materials are listed below only for the Abatement Contractor's information. These documents do not describe the work and are not a part of the work of this contract.

EPA:

1. Guidance for Controlling Asbestos Containing Materials in Buildings (Purple Book) EPA560/5-85-024.

2. Asbestos Waste Management Guidance EPA 530-SW-85-007.

F. Patents and Royalties: The Abatement Contractor shall pay all royalties and/or license fees. The Abatement Contractor shall defend all suits and claims for infringement of any patent rights and save the Owner and Consultant harmless from loss including attorney fees on account thereof.

1.06 DEFINITIONS

As used in or in connection with these specifications the following are terms and definitions.

Abatement - Procedure to control release from asbestos material. This includes removal, encapsulation and enclosure.

Aggressive sampling - A method of sampling in which the person collecting the air sample creates activity by the use of mechanical equipment during the sampling period to stir up settled dust and simulate activity in that area of the building.

AIHA - The American Industrial Hygiene Association, 475 Wolf Ledges Parkway, Akron, Ohio 44311.

Airlock - A system for permitting entrance and exit while restricting air movement between a containment area and an uncontaminated area. It consists of two curtained doorways separated by a distance of at least three feet such that one passes through one doorway into the airlock, allowing the doorway sheeting to overlap and close off the opening before proceeding through the second doorway, thereby preventing flow-through contamination.

Air sampling - The process of measuring the content of a known volume of air collected during a specific period of time.

Amended water - Water to which a surfactant has been added.

Approved asbestos safety program - A program approved by the Commissioner of Health providing training in the various disciplines that may be involved in an asbestos project.

Area air sampling - Any form of air sampling or monitoring where the sampling device is placed at some stationary location.

Asbestos - Any naturally occurring hydrated mineral silicate separable into commercially usable fibers, including chrysotile (serpentine), amosite (cumingtonite-gunerite), crocidolite (riebeckite), tremolite, anthophyllite and actinolite.

Asbestos contract - An oral or written agreement contained in one or more documents for the performance of work on an asbestos project and includes all labor, goods and service.

Asbestos handler - An individual who installs, removes, applies, encapsulates, or encloses asbestos or asbestos material, or who disturbs friable asbestos. Only individuals certified by NYS Department of Labor shall be acceptable for work under this specification.

Asbestos handling certificate - A certificate issued by the Commissioner of Labor of the State of New York, to a person who has satisfactorily completed an approved asbestos safety program.

Asbestos project - Work undertaken by a contractor which involves the installation, removal, encapsulation, application or enclosure of any ACM or the disturbance of friable ACM.

Asbestos Safety Technician (AST) - Individual designated to represent the Consultant, perform third party monitoring and perform compliance monitoring at the job site during the asbestos project.

Asbestos waste material - Asbestos material or asbestos contaminated objects requiring disposal.

Authorized visitor - The building owner, his or her representative or any representative of a regulatory or other agency having jurisdiction over the project.

Background level monitoring - A method used to determine ambient airborne concentrations inside and outside of a building or structure prior to starting an abatement project.

Building owner - The person in whom legal title to the premises is vested unless the premises are held in land trust, in which instance Building Owner means the person in whom beneficial title is vested.

Clean room - An uncontaminated area or room that is a part of the personal decontamination enclosure with provisions for storage of persons' street clothes and protective equipment.

Cleanup - The utilization of HEPA vacuuming to control and eliminate accumulations of asbestos material and asbestos waste material.

Clearance air monitoring - The employment of aggressive sampling techniques with a volume of air collected to determine the airborne concentration of residual fibers upon conclusion of an asbestos abatement project.

Commissioner - Commissioner of the New York State Department of Labor.

Contractor - A company, unincorporated association, firm, partnership or corporation and any owner or operator thereof, which engages in an asbestos project or employs persons engaged in an asbestos project.

Curtained doorway - A device that consists of at least three overlapping sheets of plastic over an existing or temporarily framed doorway. One sheet shall be secured at the top and left side, the second sheet at the top and right side, and the third sheet at the top and the left side. All sheets shall have weights attached to the bottom to insure that the sheets hang straight and maintain a seal over the doorway when not in use.

Decontamination enclosure system - A series of connected rooms, separated from the work area and from each other by air locks, for the decontamination of persons, materials, equipment, and authorized visitors.

Encapsulant (sealant) or encapsulating agent - A liquid material that can be applied to asbestos material and which prevents the release of asbestos from the material by creating a membrane over the surface.

Enclosure - The construction of airtight walls, ceilings and floors between the asbestos material and the facility environment, or around surfaces coated with asbestos materials, or any other appropriate procedure that prevents the release of asbestos materials.

Equipment room - A contaminated area or room that is part of the personal decontamination enclosure system with provisions for the storage of contaminated clothing and equipment.

Fixed object - A unit of equipment, furniture or other fixture in the work area which cannot be readily removed from the work area.

Friable Asbestos Material - That condition of crumbled, pulverized, powdered, crushed or exposed asbestos capable of being released into the air by hand pressure.

Friable material containment - The encapsulation or enclosure of any friable asbestos material.

Glovebag technique - A method for removing asbestos material from heating, ventilating, and air conditioning (HVAC) ducts, piping runs, valves, joints, elbows, and other nonplanar surfaces in a noncontained work area. The glovebag assembly is a manufactured device consisting of a glovebag constructed of at least six mil transparent plastic, two inward-projecting longsleeve gloves, which may contain an inward projecting waterwand sleeve, an internal tool pouch, and an attached, labeled receptacle or portion for asbestos waste. The glovebag is constructed and installed in such a manner that it surrounds the object or area to be decontaminated and to contain all asbestos fibers released during the abatement process.

HEPA filter - A high efficiency particulate air filter capable of trapping and retaining 99.97 percent of particulate greater than 0.3 microns equivalent aerodynamic diameter.

HEPA vacuum equipment - Vacuuming equipment with a high efficiency particulate air filtration system.

Holding area - A chamber in the waste decontamination enclosure located between the washroom and an adjacent uncontaminated area.

Homogeneous work area - A site within the abatement work area that contains one type of asbestos material and where one type of abatement is used.

Large asbestos project - An asbestos project involving the installation, removal, disturbance, enclosure, or encapsulation of 160 square feet or more of asbestos or asbestos material or 260 linear feet or more of asbestos or asbestos material.

Minor asbestos project - An asbestos project involving the installation, removal, disturbance, enclosure, or encapsulation of 10 square feet or less of asbestos or asbestos material, or 25 linear feet or less of asbestos or asbestos material.

Movable object - A unit of equipment, furniture or fixture in the work area that can be readily removed from the work area.

Negative air pressure equipment - A local exhaust system equipped with HEPA filtration. The system shall be capable of creating and maintaining a negative pressure differential between the outside and the inside of the work area.

Non-asbestos material - Any material containing one percent or less asbestos by weight.

Occupied area - Any frequented portion of the work site where abatement is not taking place.

Outside air - The air outside the building or structure.

Personal air monitoring - A method used to determine an individuals exposure to airborne contaminants. The sample is collected outside the respirator in the person's breathing zone.

Plasticize - To cover floors, walls, ceilings and other surfaces with 6 mil fire retardant plastic sheeting as herein specified.

Project - Any form of work performed in connection with the abatement of asbestos or alteration, renovation, modification or demolition of a building or structure that may disturb asbestos or asbestos material.

Removal - The stripping of any asbestos material.

Repair - Corrective action using required work practices to control fiber release from damaged areas.

Respiratory protection - Respiratory protection required of licensed asbestos workers and authorized visitors in accordance with the applicable laws.

Satisfactory clearance air monitoring results - For all post- abatement samples, airborne concentrations of total fibers that are less than 0.01 fibers per cubic centimeter or background levels, whichever are greater, using phase contrast microscopy (PCM).

Shower room - A room between the clean room and the equipment room in the personal decontamination enclosure with hot and cold running water controllable at the top and arranged for complete showering during decontamination.

Small asbestos project - An asbestos project involving the installation, removal, disturbances, enclosure, or encapsulation of more than 10 and less than 160 square feet of asbestos or asbestos material of more than 25 and less than 260 linear feet of asbestos or asbestos material.

Staging area - The area near the waste transfer airlock where containerized asbestos waste has been placed prior to removal from the work area.

Surfactant - A chemical wetting agent added to water to improve its penetration.

Visible emissions - An emissions of particulate material that can be seen without the aid of instruments.

Washroom - A room between the work area and the holding area in the waste decontamination enclosure system, where equipment and waste containers are wet cleaned and/or HEPA vacuumed.

Waste decontamination enclosure system - An area, consisting of a washroom and a holding area, designated for the controlled transfer of materials and equipment.

Wet cleaning - The process of eliminating asbestos contamination from surfaces, equipment or other objects by using cloths, mops, or other cleaning tools.

Work area - Designated rooms, spaces, or areas where asbestos abatement takes place.

Work site - Premises where asbestos abatement is taking place.

Work Surface - Substrate surface from which asbestos-containing material has been removed.

1.07 UTILITIES, SERVICE AND TEMPORARY FACILITIES

A. The Owner shall make available to the Abatement Contractor all reasonable amounts of water and electrical power at no charge.

B. The Abatement Contractor shall provide, at his own expense, all electrical, water, and waste connections, extensions, and construction materials, supplies, etc. All connections must be approved in advance by the Owner and all work relative to the utilities must be in accordance with the applicable building codes.

C. The Abatement Contractor shall provide scaffolding, ladders and staging, etc. as necessary to accomplish the work of this contract. The type, erection and use of all scaffolding, ladders and staging, etc. shall comply with all applicable OSHA provisions.

D. All connections to the Owner's water system shall include reduced pressure backflow protection or double check and double gate valves. Valves shall be temperature and pressure rated for operation of the temperatures and pressures encountered. After completion of use, connections and fittings shall be removed without damage or alteration to existing water piping and equipment. Leaking or dripping valves shall be piped to the nearest drain or located over an existing sink or grade where water will not damage existing finishes or equipment.

E. The Abatement Contractor shall use only heavy duty abrasion resistant hoses with a pressure rating greater than the maximum pressure of the water distribution system to provide water to each work area and to each decontamination unit. Provide fittings as required to allow for connection to existing wall hydrants or spouts, as well as temporary water heating equipment, branch piping,

showers, shut-off nozzles and equipment. All water must be shut off at the end of each shift.

F. The Abatement Contractor shall provide service to decontamination unit electrical subpanel with minimum 60 amp, 2 pole circuit breaker or fused disconnect and ground-fault circuit interrupters (GFCI), reset button and pilot light, connected to the building's main distribution panel. Subpanel and disconnect shall be sized and equipped to accommodate all electrical equipment required for completion of the work. This electrical subpanel shall be used for hot water heater, PAPR battery recharging and air sampling pumps.

G. The Abatement Contractor shall provide UL rated 40-gallon electric hot water heater to supply hot water for the decontamination unit shower. Activate from 30 amp circuit breaker on the electrical subpanel located within the decontamination unit. Provide with relief valve compatible with water heater operation; relief valve down to drip pan on floor with type L copper. Wiring of the hot water heater shall be in compliance with NEMA, NEC, and UL standards.

H. The Abatement Contractor shall provide identification warning signs at power outlets, which are other than 110-120 volt power. Provide polarized outlets for plug-in type outlets, to prevent insertion of 110-120 plugs into higher voltage outlets. Dry transformers shall be provided where required to provide voltages necessary for work operations. All outlets or power supplies shall be protected by ground fault circuit interrupter (GFCI) at the power source.

I. The Abatement Contractor shall use only grounded extension cords; use "hard-service" cords where exposed to abrasion and traffic. Use single lengths or use waterproof connectors to connect separate lengths of electric cords, if single lengths will not reach areas of work.

J. The Abatement Contractor shall provide general service incandescent lamps of wattage indicated or required for adequate illumination; Protect lamps with guard cages or tempered glass enclosures; Provide exterior fixtures where fixtures are exposed to moisture.

K. The Abatement Contractor shall provide temporary heat or air conditioning as necessary to maintain comfortable working temperatures inside and immediately outside the work areas. Heating and A/C equipment shall have been tested and labeled by UL, FM or another recognized trade association related to the fuel being used. Fuel burning heaters shall not be used inside containment areas. The Contractor shall also provide a comfortable working environment for occupied areas that are impacted by the asbestos removal.

L. The Abatement Contractor shall comply with recommendations of the NFPA standard in regard to the use and application of fire extinguishers. Locate fire extinguishers where they are most convenient and effective for their intended purpose, but provide not less than one extinguisher in each work area, equipment room, clean room and outside the work area.

1.08 REMOVAL OF FIXTURES

A. In locations where the Abatement Contractor is directed to dispose of fixtures he shall either decontaminate the fixtures and dispose of them as non-asbestos containing materials or he shall place them in an appropriate container and dispose of them as asbestos containing material.

B. In locations where the Abatement Contractor is directed to remove and reinstall fixtures, the fixtures shall be removed, decontaminated, labeled, protected with plastic and stored by the contractor in a location as directed by the Owner.

C. Upon completion of the asbestos removal and upon receiving satisfactory clearance air monitoring results, all items to be replaced shall be restored to their original location and reinstalled by the Abatement Contractor.

PART 2 – PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. GENERAL REQUIREMENTS

1. Materials shall be stored off the ground, away from wet or damp surfaces and under protective cover to prevent damage or contamination.

2. Damaged or deteriorating materials shall not be used and shall be removed from the premises.

3. Power tools used to drill, cut into, or otherwise disturb asbestos material shall be equipped with HEPA filtered local exhaust ventilation.

4. The Abatement Contractor shall make available to authorized visitors, ladders and/or scaffolds of sufficient dimension and quantity so that all work surfaces can be easily and safely reached for inspection. Scaffold joints and ends shall be sealed with tape to prevent incursion of asbestos. Scaffolds and ladders shall comply with all applicable codes.

B. PLASTIC BARRIERS (POLYETHYLENE)

1. In sizes and shapes to minimize the number of joints.

   a. Six mil. (.006") fire-retardant for vertical protection (walls, entrances and openings).

   b. Six mil. (.006") fire-retardant for horizontal protection (fixed equipment) and heating grilles.

   c. Six mil. (.006") reinforced fire-retardant for floors of decon units.

2. Provide two (2) layers over all roof, wall and ceiling openings. Floor penetrations shall be sealed with a rigid material prior to plasticizing to prevent tripping and fall hazards. All seams within a layer shall be separated by a minimum distance of six feet and sealed airtight. All seams between layers shall be staggered.

3. Barrier Attachment - Commercially available duct tape (fabric or paper) and spray-on adhesive. Duct tape shall be capable of sealing joints of adjacent sheets of plastic, facilitating attachment of plastic sheets to finished or unfinished surfaces of dissimilar materials and adhering under both dry and wet conditions.

C. SIGNS

1. Danger signs shall be provided and shall conform to 29 CFR 1926.1101 and be 14" x 20". These signs shall bear the following information:

DANGER **ASBESTOS** **MAY CAUSE CANCER** **CAUSES DAMAGE TO LUNGS** **AUTHORIZED PERSONNEL ONLY**

In addition, where the use of respirators and protective clothing is required in the regulated area under this section, the warning signs shall include the following:

WEAR RESPIRATORS PROTECTION AND PROTECTIVE CLOTHING IN THIS AREA

D. DANGER LABELS AND TAPE

1. Labels shall be affixed to any asbestos contaminated material in accordance with the requirements of 29 CFR 1910.1200 (f) of OSHA's Hazard Communication Standard, and shall contain the following information:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID BREATHING DUST
CANCER AND LUNG DISEASE HAZARD

2. A label shall be affixed on each container of asbestos waste in accordance with the requirements of 49 CFR Parts 171 and 172, Hazardous Substances; Final Rule (U.S. Department of Transportation), and shall contain the following information:

RQ HAZARDOUS SUBSTANCE
SOLID, NOS, ORM-E, NA 9188
(ASBESTOS)

3. A label shall be affixed on each container of asbestos waste in accordance with the requirements of 40 CFR Part 61.150, NESHAP; Asbestos; Final Rule (USEPA) and shall contain the name of the waste generator and the location at which the waste was generated.

   NOTE: All containers marked as above (1, 2 and 3) shall be disposed of as asbestos waste.

4. Provide 3" red barrier tape printed with black lettered "DANGER ASBESTOS REMOVAL". Locate barrier tape across all corridors, entrances and access routes to asbestos work area.

PROTECTIVE EQUIPMENT

1. Respiratory Requirements

   a. Where fiber levels permit, and in compliance with regulatory requirements, Powered Air Purifying Respirators are the minimum allowable respiratory protection permitted to be utilized during removal operations.

   b. Where not in violation of NIOSH, OSHA, and any other regulatory requirements, the Abatement Contractor shall provide the following minimum respiratory protection to the maximum use concentrations indicated:

MSHA/NIOSH Approved Respiratory Protection	Maximum Use Concentration
Half-Mask Air Purifying with HEPA Filters	10x PEL
Full-Facepiece Air Purifying HEPA Filters and Quantitative Fit Test	10x PEL
Powered Air Purifying (PAPR), Loose fitting Helmet or Hood, HEPA Filter	25x PEL
Powered Air Purifying (PAPR), Full Facepiece, HEPA Filter	50x PEL
Supplied Air, Continuous Flow Loose fitting Helmet or Hood	25x PEL
Supplied Air, Continuous Flow Full Facepiece, HEPA Filter	50x PEL
Full Facepiece-Supplied Air Pressure Demand, HEPA Filter	100x PEL
Full Facepiece-Supplied Air Pressure Demand, with Aux. SCBA, Pressure Demand or Continuous Flow	>100x PEL

2. Disposable Clothing -"Tyvek" manufactured by Dupont or approved equal.

3. NIOSH approved safety goggles to protect eyes.

4. Polyethylene bags, 6 mil. (.006") thick (use double bags).

NOTE: Workers must wear disposable coveralls and respirator masks at all times while in the work area. Contaminated coveralls or equipment must be left in work area and not worn into other parts of the building.

TOOLS AND EQUIPMENT

1. Airless Sprayer - An airless sprayer, suitable for application of encapsulating material, shall be used.

2. Scaffolding - Scaffolding, as required to accomplish the specified work, shall meet all applicable safety regulations.

3. Transportation Equipment - Transportation equipment, as required, shall be suitable for loading, temporary storage, transport and unloading of contaminated waste without exposure to persons or property. Water tight, hard wall containers shall be provided to retain and dispose of any asbestos waste material with sharp-edged components that may tear plastic bags or sheeting. The containers shall be marked with danger labels.

4. Surfactant - Wetting Agents - "Asbestos-Wet" - Aquatrols Corp. of America or approved equal, and shall be non- carcinogenic.

5. Portable (negative air pressure) asbestos filtration system - by Micro-Trap, or approved equal.

6. Vacuum, HEPA type equal to "Nilfisk" #GA73, or "Pullman/Holt" #75 ASA.

7. Amended Water Sprayer - The water sprayer shall be an airless or other low-pressure sprayer for amended water application.

8. Other Tools and Equipment - The Abatement Contractor shall provide other suitable tools for the stripping, removal, encapsulation, and disposal activities including but not limited to: hand-held scrapers, nylon brushes, sponges, rounded edge shovels, brooms, and carts.

PART 3 – EXECUTION

3.01 PRE-ABATEMENT WORK AREA PREPARATION

A. The work area shall be vacated by the occupants prior to work area preparation and not reoccupied until satisfactory clearance air monitoring results have been achieved.

B. Caution signs shall be posted at all locations and approaches to a location where airborne concentrations of asbestos may exceed ambient background levels. Signs shall be posted that permit a person to read the sign and take the necessary protective measures to avoid exposure.

C. Shut down and lock out electric power to all work areas. The Abatement Contractor shall provide temporary power and lighting and ensure safe installation of temporary power sources and equipment used where high humidity and/or water shall be sprayed in accordance with all applicable codes. All power to work areas shall be brought in from outside the area through a ground-fault interrupter at the source.

D. Isolate the work area HVAC system.

E. The personnel decontamination enclosure system shall be installed or constructed prior to preparatory work in the work area and in particular before the disturbance of asbestos material. The waste decontamination enclosure system shall be installed or constructed prior to commencement of abatement activities.

F. Movable objects within the work area shall be pre-cleaned using HEPA filtered vacuum equipment

an/or wet cleaning and such objects shall be removed from the work area to an uncontaminated location. If disposed of as asbestos waste material, cleaning is not required.

G. Fixed objects and other items, which are to remain within the work area, shall be pre-cleaned using HEPA filtered vacuum equipment and/or wet cleaning. Such objects shall be enclosed with two layers of at least six mil plastic sheeting and sealed with tape.

H. The work area shall be pre-cleaned using HEPA filtered vacuum equipment and/or wet cleaning. Methods that raise dust, such as dry sweeping or vacuuming with equipment not equipped with HEPA filters, shall be prohibited. Asbestos material shall not be disturbed during pre-cleaning.

I. Isolation barriers that seal off all openings, including windows, corridors, doorways, ducts, and any other penetrations of the work area, shall be constructed using two layers of at least six mil fire-retardant plastic sheeting sealed with tape. Also, all seams in mechanical system components that pass through the work area shall be sealed. Doorways and corridors, which shall not be used for passage during work, shall also be sealed.

J. Removal of mounted objects. After isolation barriers are in place, objects such as light fixtures, electrical track, alarm systems, ventilation equipment and other items not previously sealed, shall be double sealed with six mil fire-retardant plastic sheeting. Localized HEPA filtered vacuum equipment shall be used during fixture removal to reduce asbestos dispersal.

K. Individual roof and floor drains shall be sealed watertight using two layers of 6-mil fire-retardant plastic sheeting and tape prior to plasticizing. Openings in floor shall be fully covered with plywood sheeting secured to the floor in such a way as to minimize a tripping hazard prior to plasticizing.

L. Emergency and fire exits from the work area shall be maintained or alternate exits shall be established according to all applicable codes.

M. Adequate toilet facilities shall be supplied by the Abatement Contractor and shall be located either in the clean area of the personnel decontamination enclosure or shall be readily accessible to the personnel decontamination enclosure.

3.02 LARGE ASBESTOS PROJECT PERSONNEL DECONTAMINATION ENCLOSURE SYSTEM (ICR 56-7.5)

A. The personnel decontamination enclosure shall be constructed prior to preparatory work in the work area and in particular before the disturbance of asbestos material.

1. Construction and use of personnel decontamination enclosure systems shall be in accordance with ICR-56 and any Applicable or Site Specific Variances utilized on this project. Such systems may consist of existing rooms outside of the work area, if the layout is appropriate, that can be enclosed is plastic sheeting and are accessible from the work area. When this situation does not exist, enclosure systems may be constructed out of metal, wood or plastic support.

2. The personnel decontamination enclosure system shall consist of a clean room, a shower room, and an equipment room, in series, separated from each other and from the work area by three airlocks.

3. There shall be one shower per six full shift abatement persons calculated on the basis of the largest shift.

4. The personnel decontamination enclosure system shall be fully framed, sheathed for safety and constructed to prevent unauthorized entry.

5. Personnel decontamination enclosure systems constructed at the work site shall utilize at least six mil fire-retardant opaque plastic sheeting. At least two layers of six mil fire-retardant reinforced plastic sheeting shall be used for the flooring of this area.

6. All prefabricated decontamination units shall be completely decontaminated and sealed prior to separation and removal from the work area. Mobile decontamination units shall remain in place until satisfactory clearance results have been attained.

7. The clean room shall be sized to accommodate all authorized persons. Benches, lockers and hooks shall be provided for street clothes. Shelves for storing respirators shall also be provided. Clean clothing, replacement filters for respirators, towels and other necessary items shall be provided. The clean room shall not be used for the storage of tools, equipment or materials. It shall not be used for office space. A lockable door shall be provided to permit access to the clean room from outside the work area or enclosure. It shall be used to secure the work area and decontamination enclosure during off-shift hours.

8. The shower room shall contain one or more showers. Each shower head shall be supplied with hot and cold water adjustable at the tap. The shower enclosure shall be constructed to ensure against leakage of any kind. Uncontaminated soap, shampoo and towels shall be available at all times. Shower water shall be drained, collected and filtered through a system with at least 5.0 micron particle size collection capability. A system containing a series of several filters with progressively smaller pore sizes shall be used to avoid rapid clogging of the filtration system by large particles. Filtered wastewater shall be discharged in accordance with applicable codes. Contaminated filters shall be disposed of as asbestos waste. The shower room shall be constructed in such way that travel through the decontamination unit shall be through the shower.

9. The equipment room shall be used for the storage of equipment and tools after decontamination using a HEPA filtered vacuum and/or wet cleaning. A one day supply of replacement filters, in sealed containers, for HEPA vacuums and negative pressure ventilation equipment, extra tools, containers of surfactant and other materials and equipment that may be required during the abatement project may also be stored here. A walk-off pan filled with water shall be located in the work area just outside the equipment room for persons to clean foot covering when leaving

the work area. A drum lined with a labeled, at least six mil plastic bag is required for collection of clothing and shall be located in this room. Contaminated footwear and work clothes shall be stored in this area.

3.03 WASTE DECONTAMINATION ENCLOSURE SYSTEM (ICR 56-7.5)

A. General Requirements

1. A waste decontamination enclosure system shall consist of the following:

   a. A washroom/cleanup room shall be constructed with an airlock doorway to the work area and another airlock doorway to the holding area.

   b. The holding area shall be constructed with an airlock doorway to the washroom/cleanup room and another lockable door to the outside.

2. Where there is only one egress from the work area, the holding area of the waste decontamination enclosure system may branch off from the equipment decontamination room, which doubles as a waste washroom, of the personnel decontamination enclosure.

3. The waste washroom shall be equipped with a drain installed to collect water and deliver it to the shower drain where it shall be filtered through a system with at least 5.0 micron particle size collection capability. A system containing a series of several filters with progressively smaller pore sizes shall be used to avoid rapid clogging of the filtration system by large particles. Filtered wastewater shall be discharged in accordance with applicable codes. Contaminated filters shall be disposed of as asbestos waste.

4. The waste washroom shall be constructed in such a way that travel through the rooms shall be through the waste washroom

3.04 WORK AREA ENTRY AND EXIT PROCEDURES

A. The following procedures shall be followed throughout the asbestos abatement project until satisfactory clearance air monitoring results have been achieved:

1. All persons shall enter and exit the work area through the personnel decontamination enclosure system.

2. All persons who enter the work area or an enclosure shall sign the entry/exit log, located in the clean room, upon every entry and exit.

3. All persons, before entering the work area, or an enclosure shall read and be familiar with all posted regulations, personal protection requirements, including work area entry and exit procedures, and emergency procedures. The entry/exit log headings shall indicate, and the signatures shall be used to acknowledge, that these have been reviewed and understood by all persons prior to entry.

4. All persons shall proceed first to the clean room, remove all street clothing, store these items in clean sealable plastic bags or lockers and don coveralls, head covering, foot covering and gloves. All persons shall also don NIOSH approved respiratory protection. Clean respirators and protective clothing shall be utilized, by each person, for each separate entry into the work area. Respirators shall be inspected prior to each use and tested for proper seal using quantitative or qualitative fit checks.

5. Persons wearing designated personal protective equipment shall proceed from the clean room through the shower room to the equipment room, where necessary tools are collected and any additional clothing shall be donned, before entry into the work area.

6. Before leaving the work area, all persons shall remove gross contamination from the outside of respirators and protective clothing by brushing, wet cleaning, and/or HEPA vacuuming.

7. Persons shall proceed to the equipment room where all coveralls, head covering, foot covering and gloves shall be removed. Disposable clothing shall be deposited into labeled containers for disposal. Reusable contaminated clothing, footwear, head gear and gloves shall be stored in the equipment room when not being used in the work area.

8. Still wearing respirators, persons shall proceed to the shower area, clean the outside of the respirator and the exposed face area under running water prior to removal of the respirator, and then fully and vigorously shower and shampoo to remove residual asbestos contamination. Respirators shall be washed thoroughly with soap and water. Some types of respirators will require slight modification of these procedures. An airline respirator with HEPA filtered disconnect protection shall be disconnected in the equipment room and worn into the shower. A powered air-purifying respirator facepiece shall be disconnected from the filter/power pack assembly prior to entering the shower.

9. After showering and drying, all persons shall proceed to the clean room and don clean personal protective equipment if returning to the work area or street clothing if exiting the enclosure.

3.05 EQUIPMENT AND WASTE CONTAINER DECONTAMINATION & REMOVAL PROCEDURES

A. The following procedures shall be followed throughout the asbestos abatement project until satisfactory clearance air monitoring results have been achieved.

1. External surfaces of contaminated containers and equipment shall be cleaned by wet cleaning and/or HEPA vacuuming in the work area before moving such items into the waste decontamination enclosure system airlock by persons assigned to this duty. These work area persons shall not enter the airlock.

2. These contaminated items shall be removed from the airlock by persons stationed in the washroom during waste removal operations. These washroom persons shall remove gross contamination from the exterior of their respirators and protective clothing by brushing, HEPA vacuuming and/or wet cleaning.

3. Once in the waste decontamination enclosure system, external surfaces of contaminated containers and equipment shall be cleaned a second time by wet cleaning.

4. The cleaned containers of asbestos material and equipment are to be dried of any excessive pooled or beaded liquid, placed in uncontaminated plastic bags or sheeting and sealed airtight.

5. The clean recontainerized items shall be moved into the airlock that leads to the holding area. The washroom persons shall not enter this airlock or the work area until waste removal is finished for that period.

6. Containers and equipment shall be moved from the airlock and into the holding area by persons dressed in clean personal protective equipment, who have entered from uncontaminated areas.

7. The cleaned containers of asbestos material and equipment shall be placed in water tight carts with doors or tops that shall be closed and secured. These carts shall be held in the holding area pending removal. The carts shall be wet cleaned and/or HEPA vacuumed at least once each day.

8. The exit from the decontamination enclosure system shall be secured to prevent unauthorized entry.

9. Where the waste removal enclosure is part of the personnel decontamination enclosure, waste removal shall not occur during shift changes or when otherwise occupied. Precautions shall be taken to prevent short circuiting and cycling of air outward through the shower and clean room.

10. Containers labeled with Asbestos hazard warnings shall not be used to dispose of non asbestos waste.

3.06 ENGINEERING CONTROLS

A. Ventilation.

1. The Abatement Contractor shall employ HEPA equipped vacuums or negative air pressure equipment for ventilation as required.

2. All negative air pressure equipment ventilation units shall be equipped with HEPA filtration. The Contractor shall provide a manufacturer's test certificate for each unit documenting the capability of trapping and retaining 99.97 percent of asbestos fibers greater than 0.3 microns equivalent aerodynamic diameter.

3. A power supply shall be available to satisfy the requirements of the total of all ventilating units.

4. On electric power failure, abatement shall stop immediately and shall not resume until power is restored and exhaust units are operating fully. On extended power failure, longer than one hour, the decontamination facilities, after the evacuation of all persons from the work area, shall be sealed airtight.

5. If extending the exhaust of the ventilation units 50 feet from the building would result in an exhaust location either in the road, blocking driveway access to the facility or within 50 feet of other buildings, a second unit will be run in series with the primary unit.

3.07 MAINTENANCE OF DECONTAMINATION ENCLOSURE SYSTEMS AND WORK AREA BARRIERS

A. GENERAL REQUIREMENTS

1. The Consultant must review and approve installation before commencement of work. Upon completion of the construction of all plastic barriers and decontamination system enclosures and prior to beginning actual abatement activities.

2. All plastic barriers inside the work area, in the personnel decontamination enclosure system, in the waste decontamination enclosure system and at partitions constructed to isolate the work area from occupied areas, shall be inspected by the asbestos supervisor at least twice daily. The barriers shall be inspected before the start of and following the completion of the day's abatement activities. Inspections and observations shall be documented in the project log.

3. Damage and defects in the barriers and/or enclosure systems shall be repaired immediately upon discovery and prior to resumption of abatement activities.

4. At any time during the abatement activities, if visible emissions are observed outside of the work area of if damage occurs to the barriers, work shall be stopped, repairs made and visible residue immediately cleaned up using HEPA vacuuming methods prior to the resumption of abatement activities.

5. The Abatement Contractor shall HEPA vacuum and/or wet clean the waste decontamination enclosure system and the personnel decontamination enclosure system at the end of each day of abatement activities.

3.08 HANDLING AND REMOVAL PROCEDURES

The Abatement Contractor may utilize existing provisions of ICR-56, Applicable Variances or a Site Specific Variance, approved by the Owner's Consultant, to permit the conduct of this work.

3.09 ABATEMENT PROCEDURES

A. AIR SAMPLING - By Owner

1. Air sampling and analysis shall be conducted according to the requirements of Subpart 56-4 before the start, during and after the completion of the asbestos removal project.

2. In addition to the requirements of Subpart 56-4, air monitoring shall be conducted in accordance with any approved job specific variance(s) or applicable variance utilized.

3. Clearance samples may be analyzed using PCM to maintain compliance with ICR-56.

4. If applicable, clearance samples will be analyzed using TEM to maintain compliance with ICR-56 and 40 CFR 763.90[i].

B. The provisions of the Applicable Variances or a Job Specific Variance shall apply only in those areas where approval has been granted by the NYS DOL and the Contractor has obtained concurrence from the Owner's Consultant. All other applicable provisions of Industrial Code Rule 56-1 through 56-12 shall be complied.

C. A copy of the NYS DOL Job Specific or Applicable Variance, if applicable, shall be conspicuously posted at the work area(s).

D. The Abatement Contractor shall construct a decontamination unit at the work site. The Abatement Contractor shall, as a minimum, comply with the requirements of 29 CFR 1926.1101(j); Hygiene facilities and practices for employees.

3.10 ENCAPSULATION PROCEDURES

The following procedures shall be followed to seal in non-visible residue, after obtaining satisfactory clearance air monitoring results, while conducting lockdown encapsulation on any surfaces which were the subject of removal or other remediation activities:

A. Only encapsulants rated as acceptable or marginally acceptable on the basis of Battelle Columbus Laboratory test procedures and rating requirements developed under the 1978 USEPA contract shall be used for lockdown encapsulation.

B. Sealants considered for use in encapsulation shall first be tested to ensure that the sealant is adequate for its intended use. A section of the work surface shall be evaluated following this initial test application of the sealant to quantitatively determine the sealant's effectiveness in terms of penetrating and locking down the asbestos fibers. The American Society of Testing and Materials (ASTM) Committee E06.21.06E on Encapsulation of Building Materials has developed a guidance document to assist in the selection of an encapsulant.

C. The encapsulant solvent or vehicle shall not contain a volatile hydrocarbon.

D. Encapsulants shall be applied using airless spray equipment.

1. Spraying is to occur at the lowest pressure range possible to minimize fiber release from encapsulant impact at the surface. It shall be applied with a consistent horizontal or vertical motion.

E. Encapsulation shall be utilized as a surface sealant once all asbestos containing materials have been removed in a work area. In no event shall encapsulant be applied to any surface that was the subject of removal or other remediation activities prior to obtaining satisfactory clearance air monitoring.

3.11 CLEANUP PROCEDURES

A. The following cleanup procedures shall be required.

1. Cleanup of accumulations of loose asbestos material shall be performed whenever enough loose asbestos materials have been removed to fill a single leak tight container of the type commensurate with the material properties. In no case shall cleanup be performed less than once prior to the close of each working day. Asbestos material shall be kept wet until cleaned up.

2. Accumulations of dust shall be cleaned off all surfaces on a daily basis using HEPA vacuum cleaning methods.

3. Decontamination enclosures shall be HEPA vacuumed at the end of each shift.

4. Accumulations of asbestos waste material shall be containerized utilizing HEPA vacuums or rubber or plastic dust pans, squeegees or shovels. Metal shovels shall not be used to pick up or move waste.

5. Excessive water accumulation or flooding in the area shall require work to stop until the water is collected and disposed of properly.

B. The following cleanup procedures shall be required after completion of all removal activities.

1. All accumulations of asbestos waste material shall be containerized utilizing HEPA vacuums or rubber or plastic dust pan, squeegees or shovels. Metal shovels shall not be used to pick up or move waste. HEPA vacuums shall be used to clean all surfaces after gross cleanup.

2. Cleaning. All surfaces in the work area shall be HEPA vacuumed. To pick up excess liquid and wet debris, a wet purpose shop vacuum may be used and shall be decontaminated prior to removal from the work area.

3. Windows, doors, HVAC system vents and all other openings shall remain sealed. Decontamination enclosure systems shall remain in place and be utilized.

4. All containerized waste shall be removed from the work area and the holding area.

5. All tools and equipment shall be decontaminated and removed from the work area.

6. A final visual inspection and clearance air monitoring, as per the schedule for air sampling and analysis, shall be conducted.

7. The isolation barriers and decontamination unit shall be removed only after satisfactory

8. clearance air monitoring results have been achieved.

3.12 SAFETY MONITORING – CONSULTANT:

The Consultant will designate an Asbestos Safety Technician (AST) to represent the Owner during the removal program. The AST must be on the job site at all times during abatement work. Absolutely no abatement or preparation work will occur without the presence of the AST.

The AST will conduct four (4) milestone inspections.

1. Pre-commencement inspection shall be conducted as follows:

   a. Notification in writing to the Consultant shall be made by the Abatement Contractor to request a pre-commencement inspection at least 48 hours in advance of the desired date of inspection. This inspection shall be requested prior to beginning preparatory work in another work area.

   b. The AST shall ensure that:

      i. The job site is properly prepared and that all containment measures are in place;

      ii. The designated supervisor shall present to the inspector a valid supervisor's license issued by the New York Department of Labor;

      iii. All workers shall present to the inspector a valid handler's license issued by the New York Department of Labor;

      iv. Measures for the disposal of removed asbestos material are in place and shall conform to the adopted standards;

      v. The Abatement Contractor has a list of emergency telephone numbers at the job site which shall include the monitoring firm employed by the Owner and telephone numbers for fire, police, emergency squad, local hospital and health officer.

   c. If all is in order, the AST shall issue a written notice to proceed in the field. If the job site is not in order, then any needed corrective action must be taken before any work is to commence. Conditional approvals shall not be granted.

Progress inspection shall be conducted as follows:

   a. Primary responsibility for ensuring that the abatement work progresses in accordance with these technical specifications and regulatory requirements rests with the Abatement Contractor. The AST shall continuously be present to observe the progress of work and perform required tests.

   b. If the AST observes irregularities at any time, he shall direct such corrective action as may be necessary. If the Abatement Contractor fails to take the corrective action required, or if the Abatement Contractor or any of their employees habitually and/or excessively violate the requirements of any regulation, then the AST shall inform the Owner who shall issue a Stop Work Order to the Abatement Contractor and have the work site secured until all violations are abated.

Clean-up inspections shall be conducted as follows:

   a. Notice for clean-up inspection shall be requested by the Abatement Contractor at least 24 hours in advance of the desired date of inspection;

   b. The clean-up inspection shall be conducted prior to the removal of any isolation or critical

barriers and before final air clearance monitoring;

c. The AST shall ensure that:

i. The work site has been properly cleaned and is free of visible asbestos containing material and debris.

ii. All removed asbestos has been properly placed in a locked secure container outside of the work area.

d. If all is in order, the AST shall issue a written notice of authorization to remove surface barriers from the work area. All isolation barriers shall remain in place until satisfactory clearance air sampling has been completed.

4. Clearance Visual Inspection shall be conducted after the removal of non-critical plastic sheeting. The AST shall insure that:

a. The work area is free of all visible asbestos or suspect asbestos debris and residue.

b. All waste has been properly bagged and removed from the work area.

c. Should clearance visual inspection identify residual debris, as determined by the AST, the Abatement Contractor is responsible for recleaning the area at his own cost and shall bear all costs of reinspection until acceptable levels are achieved.

B. The Abatement Contractor shall be required to receive written approval before proceeding after each milestone inspection.

3.13 PERSONNEL AIR MONITORING – CONTRACTOR (29 CFR 1926.1101)

A. Personnel air monitoring shall be provided to determine both short-term (STEL) and full shift during when abatement activities occur. Personnel sampling shall be performed in each work area in order to accurately determine the concentrations of airborne asbestos to which workers may be exposed.

B. The Abatement Contractor shall have a qualified "Competent Person" (as specified in 29 CFR 1926 OSHA) to conduct personnel air monitoring.

C. The laboratory performing the air sample analysis shall be certified by NYS DOH ELAP and approved by the consultant.

D. Personnel air monitoring test results for OSHA Compliance. Results shall be posted at the work site within 24 hours of testing and copies supplied to the Owner within five (5) days of testing. Abnormalities shall be supplied to the Owner immediately.

3.14 CLEARANCE AIR MONITORING

A. Air samples will be collected in and around the work areas at the completion of abatement activities.

B. Clearance samples may be analyzed using PCM to maintain compliance with ICR-56.

C. If applicable, clearance samples will be analyzed using TEM to maintain compliance with ICR-56 and 40 CFR part 763 “Asbestos-Containing Materials in Schools; Final Rule and Notice” section 763.90.

D. ***RETESTING***
Should clearance air monitoring yield fiber concentrations above the “Clearance” criteria of either 0.01 fibers per CC and/or background levels (PCM) –OR- seventy (70) structures per square millimeter (TEM/AHERA), the Abatement Contractor is responsible for re-cleaning the area at his own cost and shall bear all costs associated with the retesting of the work area(s) including monitoring labor, sampling, analysis, etc. until such levels are achieved.

3.15 RESPIRATORY PROTECTION REQUIREMENT

A. Respiratory protection shall be worn by all individuals inside the work area from the initiation of the asbestos project until all areas have successfully passed clearance air monitoring in accordance with these specifications. The Abatement Contractor shall keep available at all times two PAPR's with new filters and charged batteries for use by authorized visitors.

B. All respiratory protection shall be MSHA/NIOSH approved in accordance with the provisions of 30 CFR Part II. All respiratory protection shall be provided by the Abatement Contractor, and used by workers in conjunction with the written respiratory protection program.

C. The Abatement Contractor shall provide respirators that meet the requirements of 29 CFR Parts 1910 and 1926.

1. Full facepiece Type C supplied-air respirators operated in pressure demand mode equipped with an auxiliary self- contained breathing apparatus, operated in pressure demand or continuous flow, shall be worn during gross removal, demolition, renovation and/or other disturbance of ACM whenever airborne fiber concentrations inside the work area are greater than 10.0 f/cc.

2. Full facepiece Type C supplied-air respirators operated in pressure demand mode with HEPA filter disconnect protection shall be work during gross removal, demolition, renovation and/or other disturbance of ACM with an amphibole content and/or whenever airborne fiber concentrations inside the work area are equal to or greater than 0.5 f/cc and less than or equal to 10.0 f/cc.

3. Full facepiece powered air-purifying respirators (PAPR) equipped with HEPA filters shall be worn during the removal, encapsulation, enclosure, repair and/or other disturbance of friable ACM if airborne fiber concentrations inside the work area are less than 0.5 f/cc. A supply of charged replacement batteries, HEPA filters and flow test meter shall be available in the clean room for use with powered air-purifying respirators. HEPA filters shall be changed daily or as flow testing indicates change is necessary. Any Type C supplied-air respirator operated in continuous flow, with HEPA filter disconnect protection, may be substituted for a powered air-purifying respirator.

4. Loose fitting helmets or hoods with powered air-purifying respirators (PAPR) equipped with HEPA filters may be worn during the removal, encapsulation, enclosure, repair and/or other disturbance of friable ACM if airborne fiber concentrations inside the work area are less than 0.25 f/cc. A supply of charged replacement batteries, HEPA filters and flow test meter shall be available in the clean room for use with powered air-purifying respirators. HEPA filters shall be changed daily or as flow testing indicates change is necessary. Any Type C supplied-air respirator operated in continuous flow may be substituted for a powered air- purifying respirator.

5. Half-mask or full-face air-purifying respirators with HEPA filters shall be worn only during the preparation of the work area and final clean up procedures provided airborne fiber concentrations inside the work area are less than 0.1 f/cc.

6. Use of single use dust respirators is prohibited for the above respiratory protection.

D. Workers shall be provided with personally issued and individually marked respirators. Respirators shall not be marked with any equipment that will alter the fit of the respirator in any way. Only waterproof identification markers shall be used.

E. The Abatement Contractor shall ensure that the workers are qualitatively or quantitatively fit tested by an Industrial Hygienist initially and every six months thereafter with the type of respirator he/she will be using.

F. Whenever the respirator design permits, workers shall perform the positive and negative air pressure fit test each time a respirator is worn. Powered air-purifying respirators shall be tested for adequate flow as specified by the manufacturer.

G. No facial hair, which interferes with the face-to-mask sealing surface, shall be permitted to be worn when wearing respiratory protection that requires a mask-to-face seal.

H. Contact lenses shall not be worn in conjunction with respiratory protection.

I. If a worker wears glasses, a spectacle kit to fit their respirator shall be provided by the Abatement Contractor at the Abatement Contractor's expense.

J. Respiratory protection maintenance and decontamination procedures shall meet the following requirement:

1. Respiratory protection shall be inspected and decontaminated on a daily basis in accordance with OSHA 29 CFR 1910.134(b); and

2. HEPA filters for negative pressure respirators shall be changed after each shower; and

3. Respiratory protection shall be the last piece of worker protection equipment to be removed. Workers must wear respirators in the shower when going through decontamination procedures; and

4. Airline respirators with HEPA filtered disconnect shall be disconnected in the equipment room and worn into the shower. Powered air-purifying respirator facepieces shall be worn into the shower. Filtered/power pack assemblies shall be decontaminated in accordance with manufacturers' recommendations; and

5. Respirators shall be stored in a dry place and in such a manner that the facepiece and exhalation valves are not distorted; and

6. Organic solvents shall not be used for washing of respirators.

K. No visitors shall be allowed to enter the contaminated area if they do not have their medical certification and training certificate. Authorized visitors shall be provided with suitable PAPR respirators and instructions on the proper use of respirators whenever entering the work area.

3.16 DISPOSAL OF WASTE

A. APPLICABLE REGULATIONS

1. All asbestos waste shall be stored, transported and disposed of as per, but not limited to, the following Regulations:

   a. NYS Code Rule 56

   b. U.S. Department of Transportation (DOT)
   Hazardous Substances
   Title 29, Part 171 and 172 of the code of Federal Regulations
   regarding waste collector registration

   c. Regulations regarding waste collector registration Title 6, part 364 of the New York State Official Compilation of Codes, Rules and Regulations – 6 NYCRR 364

   d. USEPA NESHAPS 40 CRF 61

   e. USEPA ASBESTOS WASTE MANAGEMENT GUIDANCE EPA/530-SW-85-007

B. TRANSPORTER OR HAULER - The Abatement Contractor shall bear full responsibility for proper characterization, transportation and disposal of all solid or liquid waste, generated during the project, in a legal manner. The Owner shall approve all transportation and disposal methods.

1. The Abatement Contractor's Transporter (hauler) and disposal site shall be approved by the Owner. The Abatement Contractor shall remove within 48 hours all asbestos waste from the site after completing the clean up.

2. The Transporter must possess and present to the Owner's representative a valid New York State Department of Environmental Conservation Part 364 asbestos hauler's permit to verify license plate and permit numbers. The Owner's representative will verify the authenticity of the hauler's permit with the proper authority.

3. The Abatement Contractor shall give 24 hour notification prior to removing any waste from the site. All waste shall be removed from site only during normal working hours. No waste may be taken from the site without authorization from the Owner's representative.

4. The Abatement Contractor shall have the Transporter give the date and time of arrival at the disposal site.

5. The Transporter with the Abatement Contractor and Owner's consultant shall inspect all material in the transport container prior to taking possession and signing the Waste Manifest. The Transporter shall not have any off site transfers or be combined with any other off-site asbestos material.

6. The Transporter must travel directly to the disposal site with no unauthorized stops.

C. WASTE STORAGE CONTAINER

1. During loading and on site storage, the asbestos waste container shall be labeled with EPA Danger signage:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

2. The NYS DEC Hauler's Permit number shall be on both sides and back of the container.

3. The Container will not be permitted to leave the site without the proper signage.

4. A copy of the completed waste manifest shall be forwarded directly to the Owner's Consultant by the disposal facility.

5. Packaging of Non-friable Asbestos. Use of an open top container shall require written request, by the Contractor, and written approval by the Owners Representative, and be performed in compliance with all applicable regulations.

   a) A chute, if used, shall be air/dust tight along its lateral perimeter and at the terminal connection to the dumpster at ground level (solid wall and top container). The upper end of the chute shall be furnished with a hinged lid, to be closed when the chute is not being used.

   b) The container shall be lined with a minimum of two (2) layers of 6 mil. Fire-retardant polyethylene draped loosely over the sides so as to facilitate being wrapped over the top of the load and sealed prior to transport from the site.

   c) Prior to transport from the work site the Dumpster will be disconnected from the chute and sealed air/dust tight utilizing six mil plastic and tape. The waste material will be transported as an asbestos containing material by appropriate legal methods.

6. Packaging Friable Asbestos.

   a) The container shall be a solid wall, hard top and lockable container.

   b) The container shall be locked upon arrival at the site to restrict access. Security shall be provided at the entrance to the container during the loading process and immediately locked upon completion.

   c) The interior walls, floor and ceiling shall be lined with two (2) layers of 6 mil. Fire-retardant polyethylene.

   d) The waste shall be loaded in such a manner as to protect the integrity of the individual waste packages.

   e) Prior to transport from the work site the interior of the Dumpster will sealed air/dust tight utilizing six mil plastic and tape. The waste material will be transported as an asbestos containing material by appropriate legal methods.

D. WASTE DISPOSAL MANIFEST

1. The Asbestos Waste Manifest shall be equivalent to the “Waste Shipment Record” included in 40 CFR 61. A copy of the Contractor’s manifest shall be reviewed by the Owner’s Consultant and shall be the only manifest used.

2. The Manifest shall be verified by the Owner’s Consultant indicating that all the information and amounts are accurate and the proper signatures are in place.

3. The Manifest shall have the signatures of the Abatement Contractor and the Transporter prior to any waste being removed from the site.

4. The Manifest shall be signed by the Disposal Facility owner or operator to certify receipt of asbestos containing materials covered by the manifest.

5. A copy of the completed manifest shall be provided by the Abatement Contractor to the Owner’s Consultant and remain on site for inspection.

6. Abatement Contractor shall maintain a waste disposal log which indicates load number, date and time left site, container size, type of waste, quantity of waste, name of hauler, NYS DES permit number, trailer and tractor license number, and date manifest was returned to Consultant.

7. The Disposal Facility owner or operator shall return a signed copy of the Waste Manifest directly to:

Nanuet Union Free School District

103 Church Street

Nanuet, New York 10954

ATTN: Rudy Villanyi

8. Copies of the completed Waste Manifest are to be sent by the disposal facility to the Hauler and Abatement Contractor.

9. Submit signed dump tickets and manifests with final payment request.

10. Final payment request will not be honored without signed dump ticket or manifests accounting for all asbestos waste removed from the site.

E. VIOLATIONS OF SPECIFICATIONS

1. Violations of the safety, hygiene, environmental, procedures herein, any applicable federal, state of local requirement s or failure to cooperate with the Owner’s representative shall be grounds for dismissal and/or termination of this contract.

F. VIOLATIONS OF NO SMOKING POLICY

1. The Federal Pro Children Act of 1994 prohibits School District Officials from smoking in any buildings or on the grounds that is property of the School District. The District shall be considered smoke free. The School District strongly enforces its' No Smoking Policy. It is the Contractor's responsibility to inform all workers of this policy. Any worker(s) involved with this project that are found smoking or using tobacco products will be informed that they are in violation of the Federal and State Law and School Board Policy and will be removed from site.

3.17 LOCATION OF "MILLER ELEMENTARY SCHOOL – PHASE 4" WORK – *(Please see attached Drawings for approximate locations)*

1) <u>Miller Elementary School – Security Vestibule – Concealed ACM Pipe Insulation – Base Bid</u>

- Asbestos Abatement Contractor responsible for probing non-ACM plaster, ceramic and masonry walls at radiator pipe riser, for concealed Asbestos-containing Pipe Insulation and/or Asbestos-containing Mudded Joint Packing on metal piping. If ACM Pipe Insulation and/or ACM Mudded Joint Packing is discovered, Abatement Contractor shall remove and dispose of ACM Pipe Insulation and/or ACM Mudded Joint Packing to facilitate upcoming renovations. Prior to abatement activities and as required, the Owner and/or General Contractor to shall perform all required non-asbestos plumbing disconnects of building components potentially affected. Areas of concealed ACM Piping Probes/abatement:
  1) Security Vestibule outside Administration Assistant Room C120

  *Note: Abatement contractor to coordinate with General Contractor for exact locations of probes prior to work area preparation.

END OF LOCATION OF WORK

3.18 GENERAL

A. The Abatement Contractor will be responsible for repairing all building components damaged during abatement including, but not limited to: ceiling tiles, ceiling finishes, wall finishes, floor finishes, etc.

B. The Abatement Contractor shall be responsible for all demolition required to access materials identified in scope of work and on associated drawings.

C. Concealed conditions that are exposed and may require additional work shall be brought to the attention of the Owner immediately. The Abatement Contractor shall not abate these areas without a written notice to proceed. Additional asbestos abatement performed prior to the order to proceed will not be acknowledged.

D. The Abatement Contractor shall remove asbestos-containing floor covering to the building substrate beneath; in areas indicted. Subsequent to final air clearance the substrate shall be washed with a neutralizing agent to prepare the substrate to accept new floor covering and eliminate residual odors.

E. Power tools used to drill, cut into or otherwise disturb asbestos containing material shall be equipped with HEPA filtered local exhaust ventilation.

F. The Abatement Contractor shall provide access to GFCI electrical power, required to perform the area air monitoring for this project, within and immediately adjacent to each work area.

G. Unwrapped or unbagged ACM shall be immediately placed in an impermeable waste bag or wrapped in plastic sheeting.

H. Coordinate all removal operations with the Owner.

RETURN THIS EXECUTED FORM WITH COMPLETED BID SHEET

Asbestos Employee Medical Examination Statement

Certificate of Worker Release
Asbestos Employee Training Statement
CERTIFICATE OF WORKERS'S ACKNOWLEDGEMENT

PROJECT NAME: **Miller Elementary School – Phase 4**

CONTRACTOR'S NAME:_____

WORKING WITH ASBESTOS INVOLVES POTENTIAL EXPOSURE TO AIRBORNE ASBESTOS FIBERS. INHALING ASBESTOS FIBERS HAS BEEN LINKED WITH VARIOUS TYPES OF CANCER AND RESPIRATORY DISEASES. SMOKING CIGARETTES AND INHALATION OF ASBESTOS FIBERS INCREASES THE RISK THAT YOU WILL DEVELOP LUNG CANCER ABOVE THAT OF THE NON-SMOKING PUBLIC.

The Contract for this project requires the Abatement Contracting Company to: 1) supply proper respiratory protection devices, and training on their use, to their employees; 2) provide training on safe work practices, and on use of the equipment used on the project, to their employees; and, 3) provide annual medical examinations to their employees meeting the requirements of 29 CFR 1926.1101. The Abatement Contracting Company's signature on this certificate, documents that these contractual obligations are fulfilled, and that you understand the information presented to you.

**************DO NOT SIGN THIS FORM UNLESS YOU FULLY UNDERSTAND THIS INFORMATION**************

RESPIRATORY PROTECTION: I have been trained in the proper use and limitations of the type of respiratory protection devices to be used on this project. I have reviewed the written respiratory protection program manual and a copy is available for my use. Respiratory protection equipment has been proved, by the Contractor, at no cost to me.

TRAINING COURSE: I have been trained in the risks and dangers associated with handling asbestos, breathing asbestos dust, proper work procedures, personal protection and engineering controls. I have satisfactorily completed and Asbestos Safety Training Program for New York State and have been issued a New York State Department of Health Certificate of Asbestos Safety Training.

MEDICAL EXAMINATION: I have satisfactorily completed a medical examination within the last 12 months that meets the OSHA requirement for an asbestos worker and included at least 1) medical history 2) pulmonary function 3) medical examination 4) approval to wear respiratory protection devises and may have included an evaluation of a chest x-ray.

Signature:_____Date_____

Printed Name:_____SS#:_____

Witness:_____Date:_____

RETURN THIS EXECUTED FORM WITH COMPLETED BID SHEET

RETURN THIS EXECUTED FORM WITH COMPLETED BID SHEET

ESTIMATE OF ACM QUANTITIES

PROJECT NAME: **Miller Elementary School – Phase 4**

****

EACH ABATEMENT CONTRACTOR SHALL READ AND ACKNOWLEDGE THE FOLLOWING NOTICE. A SIGNED AND DATED COPY OF THIS ACKNOWLEDGMENT SHALL BE SUBMITTED WITH THE ABATEMENT CONTRACTOR'S BID FOR THIS PROJECT. FAILURE TO DO SO MAY, AT THE SOLE DISCRETION OF THE OWNER, RESULT IN THE BID BEING CONSIDERED NON-RESPONSIVE AND RESULT IN DISQUALIFICATION OF THE ABATEMENT CONTRACTOR'S BID ON THIS PROJECT.

****

***** NOTICE *****

The linear and square footages listed within this specification are approximates. Abatement Contractor is required to visit the work locations prior to bid submittal in order to take actual field measurements within each listed location. The Abatement Contractor shall base their bid on actual quantities determined, by them, at the site walkthrough. Estimates provided in these specifications are for informational purposes only and shall not be considered a basis for Change Orders on this project.

****

Acknowledgment: I have read and understand the above **NOTICE** regarding removal quantity estimates and understand that estimates provided in these specifications are for informational purposes only and shall not be considered a basis for Change Orders on this project. The Abatement Contractor's signatory represents to the Owner that he/she has the authority of the entity he/she represents to sign this agreement on its behalf.

Company Name: _____
Type or Print

BY: _____ _____ _____
Signature Title Date

Print Name: _____

RETURN THIS EXECUTED FORM WITH COMPLETED BID SHEET

ASSOCIATED ASBESTOS REMOVAL LOCATION DRAWINGS

- ***Nanuet Union Free School District: Miller Elementary School***
  DRAWING #ASB-01 – 1st Floor Abatement

END OF SPECIFICATION
SECTION 02080

QuES&T
Quality Environmental Solutions & Technologies, Inc.

PRE-CONSTRUCTION SURVEY REPORT
FOR
ASBESTOS-CONTAINING MATERIALS (ACM)
LEAD-BASED PAINTS (LBP)
POLYCHLORINATD BIPHENYL (PCB)

Prepared for:

NANUET UFSD
103 Church Street
Nanuet, NY 10954

at

NANUET HIGH SCHOOL,
BARR MIDDLE SCHOOL,
GEORGE MILLER ELEMENTARY SCHOOL

March 4, 2024

QuES&T Project #22-4988

QuES&T

Quality Environmental Solutions & Technologies, Inc.

March 4, 2024

NANUET UFSD
103 Church Street
Nanuet, NY 10954

ATTN: Rudy Villanyi

Via E-mail: rvillanyi@nanuetsd.org

Re: Nanuet High School, Barr Middle School, Miller Elementary School
Pre-Construction Asbestos, Lead, PCB
QuES&T Project #22-4988

Dear Mr. Villanyi,

Attached is the Pre-Construction Inspection Report for Asbestos-containing Materials (ACM), Lead-Based Paints (LBP), Polychlorinated Biphenyls (PCB identified throughout areas included within the above-referenced location(s) by **Qu**ality **E**nvironmental **S**olutions **& T**echnologies, Inc. **(QuES&T)**. The inspection included visual assessment of the location in question, and representative sampling, as required, in compliance with the requirements of all applicable federal, state, and local regulations.

The attached report summarizes the inspection protocol and inspection results for your review. **QuES&T** believes this report accurately reflects the material condition existing in the functional spaces at the time of our inspection.

Should you wish to discuss this matter further or require additional information concerning this submittal, please contact us at (845) 298-6031. **QuES&T** appreciates the opportunity to assist Nanuet UFSD in the environmental services area.

Sincerely,

Todd McAfee
Project Manager
NYS/AHERA Inspector/Project Designer
Cert. #AH 12-10881
NYCDEP Asbestos Investigator
EPA Lead Risk Assessor / Inspector

QuES&T

Quality Environmental Solutions & Technologies, Inc.

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EXECUTIVE SUMMARY

Quality **E**nvironmental **S**olutions & **T**echnologies, Inc. (**QuES&T**) was retained by Nanuet UFSD to conduct a Pre-Construction Survey for the presence of Asbestos-containing Materials (ACM), Lead-based Paints (LBP), Polychlorinated Biphenyls (PCB) in support of the Phase 3 and 4 Districtwide Renovation Projects located at Nanuet High School, Nanuet Middle School and Miller ES.

The survey included a visual inspection/assessment for suspect hazardous material(s), as detailed above, which are likely to be affected by planned demolition/renovations/construction activities. Inspection and sampling were limited to areas/materials slated for demolition/renovation/construction, as detailed in drawings, initially dated September 30, 2022, by KSQ Design, along with more recent drawings up to the final set release August 29, 2023, also by KSQ Design.

The survey was conducted by **QuES&T** personnel on October 12th, 13th & November 10th, 2022. Additional sampling and/or viasual assessments were conducted on June 5, 2023, October 13, 2023, January 22, 2024, and February 23, 2024. Asbestos, Lead & PCB inspections and/or sampling was conducted by NYSDOL Asbestos Inspector(s) Nicholas Salerno (AH# 16-10991), Todd McAfee (#AH 12-10881), and Jonathan Mages (Cert. #AH 18-53364). The lead survey was conducted Niton-Certified XRF Technician(s) Nicholas Salerno & Todd McAfee utilizing X-Ray Fluorescence Technology (XRF).

ASBESTOS

Laboratory analysis and/or existing sampling data indicated the following materials as Asbestos-containing Materials (greater than 1% asbestos) **(Refer to Table I & Appendix A for details and locations)**

Nanuet High School

- Classroom 214 – Floor Tile & Mastic
- Classroom 214 – Anti-Sweat Tar
- Classroom 216 – Floor Tile & Mastic
- Classroom 216 – Anti-Sweat Tar
- Tech Lab Work Room 217 – Bottom Layer Floor Tile & Mastic
- Classroom 218 – Floor Tile & Mastic
- Tech Lab 219 – Bottom Layer Floor Tile & Mastic
- Classroom 220 – Floor Tile & Mastic
- Classroom 221 – Bottom Layer Floor Tile & Mastic
- Classroom 222 – Floor Tile & Mastic
- Classroom 223 – Floor Tile & Mastic
- Classroom 224 – Floor Tile & Mastic
- Classroom 225 – Floor Tile & Mastic
- Exterior, Overhang Roofs, Field to Perimeter – Caulk
- Exterior, Overhang Roofs, Termination Bar – Caulk

Nanuet Middle School

- Various First & Second Floor Rooms, Floor – Floor Tile Mastic
- Various First & Second Floor Rooms, Bottom Layer, Floor – 9”x9” Floor Tile & Mastic

LEAD

Based on review of the data generated by the Niton XLp-300A XRF Spectrum Analyzer, the following surfaces within the scope of work were identified as lead-based as defined by HUD/EPA (equal to or in excess of 1.0 milligram per square centimeter) (**Refer to Table II & Appendix B for details**):

Nanuet High School

- Throughout Scope of Work, on Wall – Tack Board, Cork, White

Nanuet Middle School

- None Detected

It should be noted that several components tested did in fact contain minimal lead-levels below the EPA threshold level of 1.0 mg/sq. cm for classification as Lead-Based Paint (LBP) and are considered lead-containing coatings by the OSHA Regulation, "Lead Exposure in Construction" (29 CFR 1926.62). OSHA does not recognize a minimum limit for lead concentrations in paint for the purposes of disturbance. Monitoring of workers performing demolition/cleaning/disturbance of painted surfaces shall be completed to document personnel occupational exposure. Items containing any amount of lead concentration are considered lead-containing coatings per 29 CFR 1926.62, OSHA Lead Exposure in Construction.

PCB

- Materials are considered to be hazardous if they contain greater than fifty (50) parts per million (ppm) of PCBs based on a sum of all Arocolors. Laboratory analysis indicates that the following materials are hazardous based on PCB concentrations of greater than 50 ppm.

None Detected

1.0 INTRODUCTION:

Quality **E**nvironmental **S**olutions **&** **T**echnologies, Inc. **(QuES&T)** performed a Pre-Construction Survey for the presence of Asbestos-containing Materials (ACM), Lead-based Paint (LBP) and Polychlorinated Biphenyls (PCB) in conformance with the requirements of all applicable federal, state, and local regulations. The survey included a visual inspection/assessment, and representative sampling of suspect hazardous materials, as required, throughout accessible interior and exterior locations to be affected by future renovations of Nanuet High School & Nanuet Middle School.

Certified **QuES&T** personnel, Nicholas Salerno, Todd McAfee & Jonathan Mages conducted field inspection(s) on October 12th, 13th & November 10th, 2022. The inspection scope was established based on review of work scope drawings provided by KSQ Design. Results and findings from previous surveys conducted by **QuES&T** were not utilized in this inspection.

QuES&T established functional spaces based either on physical barriers (i.e. walls, doors, etc.) or homogeneity of material. Within each functional space identified, a visual inspection was performed using reasonable care and judgment, to identify and assess location, quantity, friability, and/or condition, as applicable, of all accessible installed building materials observed at the affected portion of the building/structure.

Limited localized demolition of building surfaces was performed, as part of this survey, to access concealed surfaces. No disassembly of installed equipment was conducted as part of this inspection. ACM, LBP and/or PCB's, concealed within structural components and equipment interiors or that is accessible only through extensive mechanical or structural demolition may not have been identified as part of this survey.

Homogenous material types were established based on appearance, color and texture. The findings presented in this report are based upon reasonably available information and observed site conditions at the time the assessment was performed. The findings and conclusions of this report are not meant to be indicative of future conditions at the site and does not warrant against conditions that were not evident from visual observations or historical information obtained from others.

2.0 ASBESTOS SURVEY:

2.1 INSPECTION SUMMARY

QuES&T performed a Pre-Construction Survey, in conformance with Title 12 NYCRR Part 56-5.1, for Nanuet UFSD in support of the Renovation Projects at Nanuet High School & Nanuet Middle School. The survey included a visual inspection / assessment for Presumed Asbestos-containing Materials (PACM) and suspect miscellaneous Asbestos-containing Materials (ACM) throughout accessible interior and exterior locations to be affected by future renovations, as detailed above. Results and findings from previous inspections conducted by **QuES&T** were not utilized in this inspection.

Limited localized demolition of building surfaces was performed, as part of this survey, to access concealed surfaces. No disassembly of installed equipment was conducted as part of this inspection. ACM concealed within structural components and equipment interiors or that is accessible only through extensive mechanical or structural demolition may not have been identified as part of this survey. When any construction activity, such as demolition, remodeling, renovation or repair work, reveals PACM or suspect miscellaneous ACM that has not been identified, as part of this survey, all construction activities shall cease in the affected area.

The survey included both visual inspection of accessible spaces and representative sampling of suspect building materials for ACM. Samples collected were analyzed by a laboratory approved under the New York State Department of Health Environmental Laboratory Approval Program (NYSDOH ELAP). Samples were analyzed in the laboratory by Polarized Light Microscopy (PLM), Polarized Light Microscopy-NOB (PLM-NOB) and/or Quantitative Transmission Electron Microscopy (QTEM), as required. Sample collection and laboratory analysis were conducted in compliance with the requirements of Title 12 NYCRR Part 56-5.1, 29 CFR 1926.1101 and standard EPA & OSHA accepted methods. Samples consisting of multiple layers were separated and analyzed independently in the laboratory.

2.2 SAMPLE COLLECTION & ANALYTIAL PROCEDURES

Representative bulk sampling was performed on suspect building materials for laboratory analysis using PLM, PLM-NOB, and/or QTEM. The following is a summary of installed building materials sampled:

- Wall Materials – Glue Dab, Plaster, Concrete Block, Mortar, Cove Base Molding (Various), Adhesive, Sheetrock, Joint Compound.
- Ceiling Materials – Ceiling Tile, Plaster, Concrete.
- Flooring Materials – Floor Tile (Various), Floor Tile Mastic (Various), Leveler, Carpet Mastic, Adhesive, Concrete Slab.
- Thermal System Insulation Materials (TSI) – Pipe Wrap.
- Roofing Materials – Built-Up Roofing, Perlite, Isofoam, Tar Paper Vapor Barrier, Tar, Gypsum Deck, Asphalt Rolled Roof.
- Miscellaneous Materials – Caulk, Anti-Sweat Tar.

Certified **QuES&T** personnel (Appendix C), Mr. Nicholas Salerno (Cert. #AH 16-10991), Mr. Todd McAfee (Cert. #AH 12-10881) and Mr. Jonathan Mages (Cert. #AH 18-53364) performed visual assessments throughout interior and exterior construction areas. A total of one-hundred seventy-four **(174)** samples/layers of installed and accessible suspect building materials were analyzed by a laboratory approved under the NYSDOH ELAP. Forty **(40)** samples/layers were analyzed using Polarized Light Microscopy (PLM) for friable materials; seventy-four **(74)** samples/layers were analyzed using Polarized Light Microscopy (PLM-NOB) for non-friable organically bound materials; forty-four **(44)** samples/layers were analyzed by Confirmatory-QTEM following negative-determinations using PLM-NOB protocols; and sixteen **(16)** samples/layers were analyzed using SM-V Vermiculite analysis following detection of vermiculite from PLM analysis.

2.3 IDENTIFIED ASBESTOS-CONTAINING MATERIALS (ACM)

TABLE I: IDENTIFIED ACM
NANUET HIGH SCHOOL
&
NANUET MIDDLE SCHOOL
(Refer to Appendix A for details)

KEY: **ACM** = Materials containing greater than 1% of asbestos;
LF = Linear Feet; **SF** = Square Feet; **PACM** = Presumed Asbestos-containing Materials;
Friable = ACM capable of being released into air, and which can be crumbled, pulverized, powdered, crushed or exposed by hand-pressure.

Location	Material	Approximate Quantity	Friable?	Condition
NANUET HIGH SCHOOL				
First Floor, Assistant Superintendent Office, Floor, Under Carpet	Floor Tile & Mastic	300 SF	No	Good
First Floor, Business Office, Floor, Under Carpet	Floor Tile & Mastic	600 SF	No	Good
First Floor, Office Suite, Floor, Under Carpet	Floor Tile & Mastic	600 SF	No	Good
First Floor, P.E. Office 8, Floor, Below Carpet	Floor Tile & Mastic	900 SF	No	Good
Tech Classroom 6, Floor	Floor Tile & Mastic	900 SF	No	Good
Classroom 9, Floor	Floor Tile & Mastic	900 SF	No	Good
Classroom 11, Floor	Floor Tile & Mastic	900 SF	No	Good
Classroom 12, Floor	Floor Tile & Mastic	900 SF	No	Good
Classrooms 200-207, Floor, under Unit Ventilators	Residual Floor Tile and Mastic	80 SF (10 SF/room)	No	Good
Classroom 208, Floor	Floor Tile & Mastic	900 SF	No	Good
Classroom 214, Floor	Floor Tile & Mastic	900 SF	No	Good
Classroom 214, on Metal Sink Basin	Anti-Sweat Tar	1 Unit	No	Good
Classroom 216, Floor	Floor Tile & Mastic	900 SF	No	Good
Classroom 216, on Metal Sink Basin	Anti-Sweat Tar	1 Unit	No	Good
Tech Lab Work Room 217, Below Carpet	Floor Tile & Mastic	280 SF	No	Good
Classroom 218, Floor	Floor Tile & Mastic	900 SF	No	Good

Tech Lab 219, Below Carpet	Floor Tile & Mastic	1,200 SF	No	Good
Classroom 220, Floor	Floor Tile & Mastic	900 SF	No	Good
Classroom 221, Floor, Below 12x12 Floor Tile	Floor Tile & Mastic	900 SF	No	Good
Classroom 222, Floor	Floor Tile & Mastic	900 SF	No	Good
Classroom 223, Floor	Floor Tile & Mastic	900 SF	No	Good
Classroom 224, Floor	Floor Tile & Mastic	900 SF	No	Good
Classroom 225, Floor	Floor Tile & Mastic	900 SF	No	Good
Exterior, Overhang Roofs, Termination Bar, Metal to Brick	Caulk	20 LF	No	Good
Exterior, Overhang Roofs, Field to Perimeter, Metal to Metal	Caulk	30 LF	No	Good
NANUET MIDDLE SCHOOL				
First Floor, Multiple Classrooms Below 12"x12" Floor Tiles, on Concrete Slab	Floor Tile Mastic[3]	6,500 SF	No	Good
First Floor, Multiple Classrooms & Elevator, Floor, Bottom Layer, on Concrete Slab, 9"x9"	Floor Tile & Mastic[3]	3,800 SF	No	Good
Second Floor, Multiple Classrooms, Floor, Bottom Layer, on Concrete Slab, 9"x9"	Floor Tile & Mastic[3]	13,600 SF	No	Good
First Floor, Multiple Classrooms Below 12"x12" Floor Tiles, on Concrete Slab	Floor Tile Mastic[3]	8,500 SF	No	Good
PRESUMED ASBESTOS-CONTAINING MATERIALS (PACM)				
Nanuet Middle School, Throughout	PACM Electrical Components[2]	Indeterminate	Indeterminate	Good
Nanuet Middle School, Throughout, Air Handling Units	PACM Vibration Dampener[2]	Indeterminate	Indeterminate	Good
Nanuet High School, Principal's Office, Floor	PACM Floor Tile & Mastic[4]	300 SF	No	Good
Nanuet High School, Throughout, Within Concealed Cavities/Wet Walls	PACM Thermal Systems Insulation	Indeterminate	Indeterminate	Good

NOTES

1. The Nanuet Middle School roof was not sampled by QuES&T personnel at the time of inspection. Therefore, all roofing materials are considered Asbestos-Containing until sampling can take place.
2. Because the electric & HVAC systems in Nanuet Middle School was active at the time of inspection, Electrical Components & Materials associated with active Air Handling Units that are to be affected by in this renovation project were not sampled and are considered Asbestos-Containing until the electric/HVAC systems can be shut down and sampling of the components can safely take place.
3. Accurate Room names were not provided on scope of work drawings. Because QuES&T personnel don't have names for all rooms with ACM, quantities of these materials are listed as totals throughout each floor of the building within the scope of work. Specifications of ACM present within each room can be seen on drawings ASB-03 & ASB-04 (Appendix A).
4. QuES&T could not gain access to the principal's office at the time of inspection. Therefore, flooring within the space is presumed to be asbestos containing until it can be made accessible for sampling.
5. QuES&T personnel did not conduct destructive sampling during this survey. Therefore, there is a possibility that concealed thermal systems insulation is present within wall cavities/wet walls.

3.0 LEAD SURVEY:

3.1 INSPECTION SUMMARY

QuES&T conducted a Limited Pre-Construction Lead Survey, utilizing X-Ray Fluorescence Technology (XRF), throughout specific interior and exterior areas of Nanuet High School & Nanuet Middle School in support of the Nanuet UFSD Renovation Project. The survey was limited to specific accessible, representative building components & immovable objects, potentially affected by scheduled renovation/construction activities.

Niton-certified XRF Technician(s) Nicholas Salerno of **QuES&T**, collected a total of sixty-eight **(68)** samples (including calibrations) from October 12th to October 13th, 2022. Niton-certified XRF Technician(s) Todd McAfee of **QuES&T**, collected a total of thirteen **(13)** samples (including calibrations) on November 10th, 2022.

3.2 IDENTIFIED LEAD-BASED PAINT(S) (LBP)

Based on review of the data generated by the Niton XLp-300A XRF Spectrum Analyzer, the following surfaces tested were identified as lead-based as defined by HUD/EPA (equal to or in excess of 1.0 milligram per square centimeter):

TABLE II: IDENTIFIED LEAD-BASED PAINT
NANUET HIGH SCHOOL
&
NANUET MIDDLE SCHOOL
(CONSTRUCTION AREAS)

Location	LBP Component	Substrate	Color	LBP Condition	Approximate Quantity
NANUET HIGH SCHOOL					
Throughout Scope of Work	Tack Board	Cork	White	Fair	900 SF
NANUET MIDDLE SCHOOL					
***** NO LEAD-BASED PAINTS (LBP) DETECTED WITHIN SCOPE OF WORK *****					
NOTE: Locations and quantities of identified LBP is limited to areas potentially affected by future renovation activities. Surfaces/components with LBP's may exist in other spaces not included in this scope of work.					

It should be noted that several components tested did in fact contain minimal lead-levels below the EPA threshold level of 1.0 mg/sq. cm for classification as Lead-Based Paint (LBP) and are considered lead-containing coatings by the OSHA Regulation, "Lead Exposure in Construction" (29 CFR 1926.62). OSHA does not recognize a minimum limit for lead concentrations in paint for the purposes of disturbance. Monitoring of workers performing demolition/cleaning/disturbance of painted surfaces shall be completed to document personnel occupational exposure. Items containing any amount of lead concentration are considered lead-containing coatings per 29 CFR 1926.62, OSHA Lead Exposure in Construction.

4.0 POLYCHLORINATED BIPHENYL (PCB) SURVEY:

4.1 INSPECTION SUMMARY

QuES&T conducted a Limited Pre-Construction Survey for the presence of PCBs in support of the Nanuet UFSD Renovation Project located at Nanuet High School & Nanuet Middle School. Sampling was limited to representative, homogenous, exterior caulks potentially affected by renovations as detailed in work scope drawings.

Mr. Jonathan Mages, Mr. Todd McAfee & Mr. Nicholas Salerno of **QuES&T**, collected a total of zero **(0)** bulk samples on October 12th, October 13th & November 10th, 2022, consisting of zero **(0)** interior caulk samples. Bulk samples were properly packaged and forwarded to York Analytical Laboratories, Inc., in Stratford, CT for analysis using method SW846-8082A. Copies of the analytical results are contained within attached appendices for review.

4.2 IDENTIFIED PCBS

A summation of samples collected, and associated results are as follows:

TABLE III: SUMMATION OF COLLECTED PCB CAULK SAMPLES
NANUET HIGH SCHOOL
&
NANUET MIDDLE SCHOOL
(CONSTRUCTION AREAS)

Sample #	Location/Description	Material Matrix	Color	Substrate	Applicable Regulatory Standards (Most Stringent)	Classification Result Upon Lab analysis
***** No Samples Taken *****						

5.0 RECOMMENDATIONS:

5.1 ASBESTOS

All construction personnel as well as individuals who have access to locations where asbestos containing materials (ACM) exists should be informed of its presence and the proper work practices in these areas. Conspicuous labeling of all ACM is suggested to ensure personnel is adequately informed. Personnel should be informed not to rest, lean or store material or equipment on or near these surfaces and not to cut, saw, drill, sand or disturb ACM. All removal, disturbance, and repair of ACM should be performed in compliance with Title 12 NYCRR Part 56 by persons properly trained to handle ACM. Facility custodial and maintenance personnel should receive training commensurate with their work activities; as defined in 29 CFR 1910.1001.

As specified in Title 12 NYCRR Part 56-5.1 (h) and (i), "If the building/structure asbestos survey finds that the portion of the building/structure to be demolished, renovated, remodeled, or have repair work contains ACM, PACM, suspect miscellaneous ACM assumed to be ACM, or asbestos material, which is

impacted by the work, the owner or the owner's agent shall conduct, or cause to have conducted, asbestos removal performed by a licensed asbestos abatement contractor in conformance with all standards set forth in this Part. All ACM, PACM, suspect miscellaneous ACM assumed to be ACM, or asbestos material impacted by the demolition, renovation, remodeling or repair project shall be removed as per this Part, prior to access or disturbance by other uncertified trades or personnel. No demolition, renovation, remodeling or repair work shall be commenced by any owner or the owner's agent prior to the completion of the asbestos abatement in accordance with the notification requirements of this Part…All building/structure owners and asbestos abatement contractors on a demolition, renovation, remodeling, or repair project, which includes work covered by this part, shall inform all trades on the work site about PACM, ACM, asbestos material and suspect miscellaneous ACM…Bids may be advertised and contracts awarded for demolition, remodeling, renovation, or repair work, but no work on the current intermediate portion of the project shall commence on the demolition, renovation, remodeling or repair work by any owner or agent prior to completion of all necessary asbestos abatement work for the current intermediate portion of the entire project, in conformance with all standards set forth in this Part."

Prior to conducting demolition or construction work at the building, all ACM affected/impacted by such activities shall be removed utilizing a licensed asbestos abatement contractor and NYSDOL/EPA/NYC certified personnel prior to construction/demolition activities. All work conducted should be in accordance with all legal requirements, including but not limited to U.S. Environmental Protection Agency (EPA) National Emissions Standards for Hazardous Air Pollutants (NESHAP) [40 CFR Part 61], New York State Industrial Code Rule 56 Asbestos Regulations (ICR 56) and Chapter 1 of Title 15 of the Rules of the City of New York Regulations, as applicable. Advance notification of the asbestos project to the USEPA, NYSDOL, and NYCDEP may be required.

All suspect building materials not sampled during this survey should be considered ACM until these materials are sampled and analyzed for ACM in the laboratory. Concealed ACM: In addition to the ACMs identified at the site, there is a possibility that concealed ACM may exist at the subject facility. As such, if any concealed suspect ACM is encountered during future construction related activities, the work should immediately stop. Prior to resuming the work, the suspect ACM should either be 1) Sampled by an appropriately certified asbestos professional and submitted to an Approved NYSDOH ELAP laboratory for asbestos analysis or 2) Presumed to be ACM (PACM) and removed by a licensed asbestos abatement contractor for disposal in accordance with all applicable regulations.

5.2 LEAD

In addition to any identified Lead-based Paints (LBP), several components tested did in fact contain minimal lead-levels below the EPA threshold level of 1.0 mg/sq. cm for classification as LBP and are considered lead-containing coatings by the OSHA Regulation, "Lead Exposure in Construction" (29 CFR 1926.62). OSHA does not recognize a minimum limit for lead concentrations in paint for the purposes of disturbance. Monitoring of workers performing demolition/cleaning/disturbance of painted surfaces shall be completed to document personnel occupational exposure. Items containing any amount of lead concentration are considered lead-containing coatings per 29 CFR 1926.62, OSHA Lead Exposure in Construction.

Activities involving the disturbance of LBP in homes, child-occupied facilities, and/or pre-schools built before 1978 must follow the requirements outlined by EPA regulations (40 CFR 745).

In areas where demolition and/or renovations are to occur and lead is present, the demolition debris waste stream should be further analyzed during segregation for compliance with EPA regulations to ensure proper disposal. TCLP testing can be performed prior to waste segregation, but results may not be indicative of the actual waste streams produced during demolition.

5.3 PCB CAULK

Materials are considered to be hazardous if they contain greater than fifty (50) parts per million (ppm) PCBs based on the sum of all Aroclors. All materials containing greater than 50 ppm PCBs potentially impacted by proposed renovations should be abated in accordance with any applicable federal, state, and/or local codes, rules, and regulations.

6.0 DISCLAIMERS

The findings presented in this report are based upon reasonably available information and observed site conditions at the time the assessment was performed. Conditions may have changed since that time and the findings and conclusions of this report are not meant to be indicative of future conditions at the Site. This report does not warrant against conditions that were not evident from visual observations or historical information obtained, or conditions that could only be determined by physical sampling or other intrusive investigation techniques that are outside the proposed scope of work.

It should be noted that the information contained within this report is based solely upon site observations and the results of laboratory analysis for samples collected by **QuES&T.** These observations and results are time dependent, subject to changing site conditions and revisions to Federal, State and Local regulations. **QuES&T** warrants that these findings have been promulgated after being prepared in general accordance with generally accepted practices in the abatement industries. **QuES&T** also recognizes that inspection laboratory data is not usually sufficient to make all abatement and management decisions.

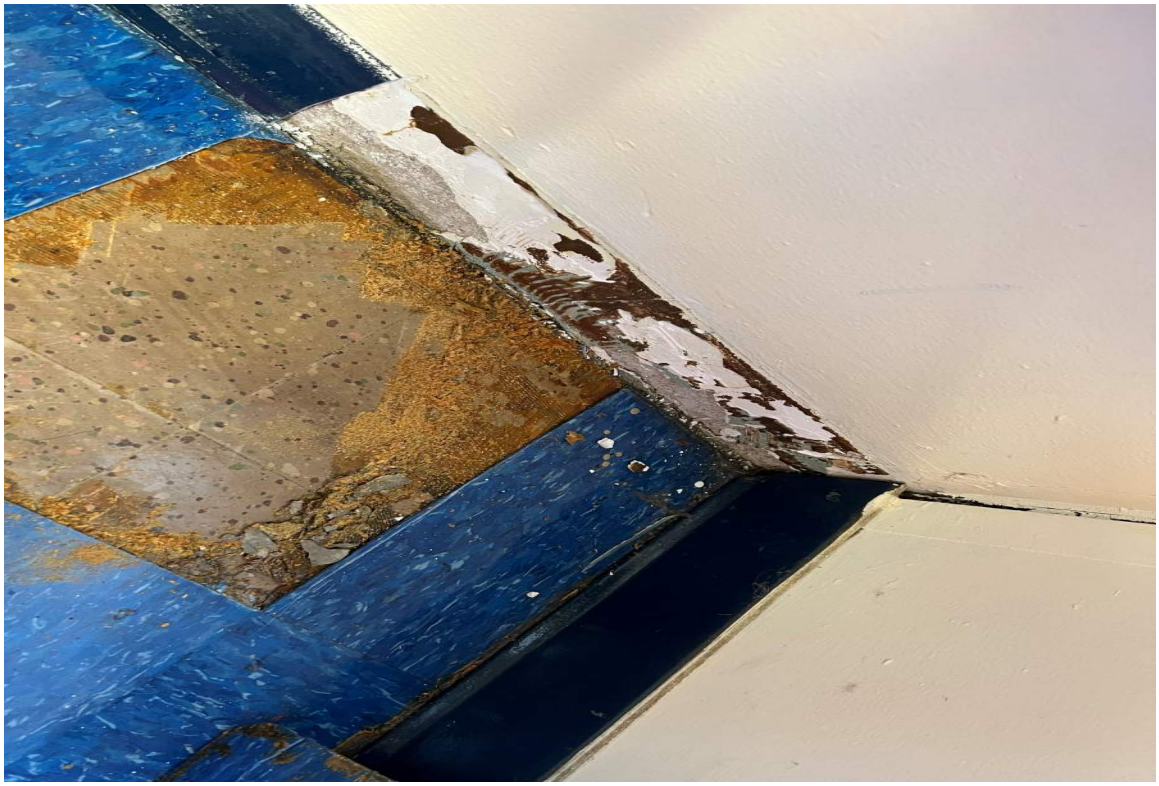
Due to the potential for concealed Asbestos-containing Materials (ACM) or other regulated materials, this report should not be construed to represent all ACM or regulated materials within the site(s). All quantities of ACM or other regulated materials identified, and all dimensions listed within this report are approximate and should be verified On-site.

This inspection report is not intended to be used as the sole basis for soliciting pricing for regulated materials abatement. An abatement plan, specification, drawing and/or Variances should be developed to identify scope, timing, phasing and remediation means & methods for any asbestos project. The Linear and/or Square Footages (LF / SF) listed within this Report are only approximates. Abatement Contractor(s) are required to visit the building(s) in order to take actual field measurements within each listed location.

Appendix A:
ACM LOCATION DRAWINGS & PICTURES



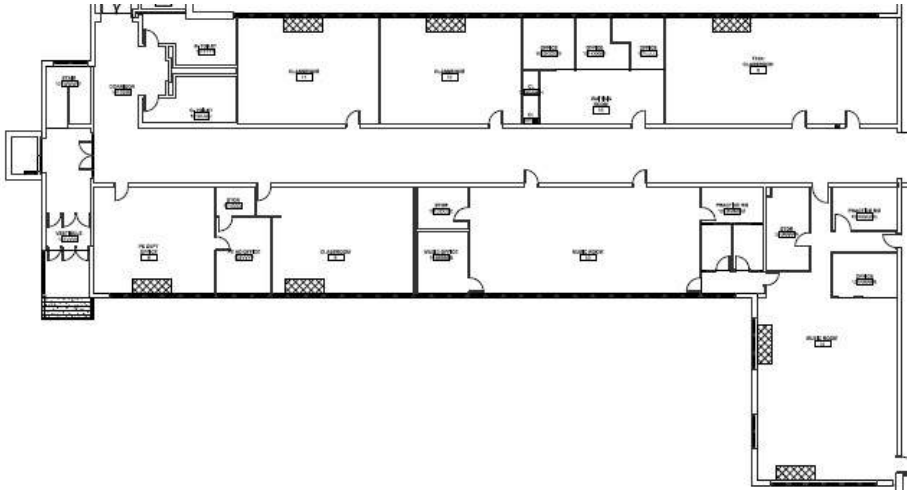
ABOVE: NANUET HIGH SCHOOL – TYPICAL ACM FLOOR TILE & MASTIC SYSTEM
BELOW: NANUET HIGH SCHOOL – ACM BOTTOM LAYER FLOOR TILE & MASTIC

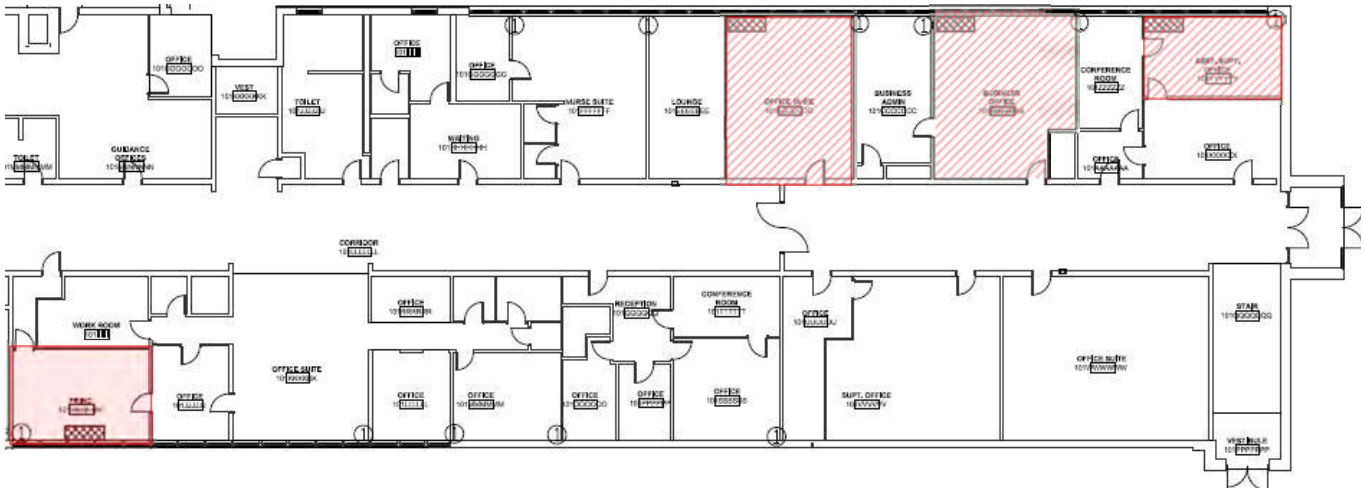




ABOVE: Nanuet Middle School – ACM Floor Tile Mastic – Below 12”x12” Floor Tile
BELOW: Nanuet Middle School – PACM Vibration Dampener







ACM LOCATION KEY (Refer to Report for Details)
ACM BOTTOM LAYER FLOOR TILE & MASTIC
PACM FLOOR TILE & MASTIC NO ACCESS TO SPACE AT TIME OF INSPECTION

N

Drawing Not to Scale

This Drawing is not intended to be used as the sole basis for soliciting pricing for asbestos abatement. An abatement plan, specification, drawing and/or variances should be developed to identify scope, timing, phasing and remediation means & methods for any asbestos project.

Date: 10/21/2022	**Version #** 1
Issued For: Asbestos Survey	
QuES&T Project #: 22-4988	
Project Manager: TM	**Prepared By:** NDS

QuES&T

Quality Environmental Solutions & Technologies, Inc.
1376 Route 9
Wappingers Falls, NY 12590
Phone: (845) 298- 6031
Fax: (845) 298-6251

CLIENT

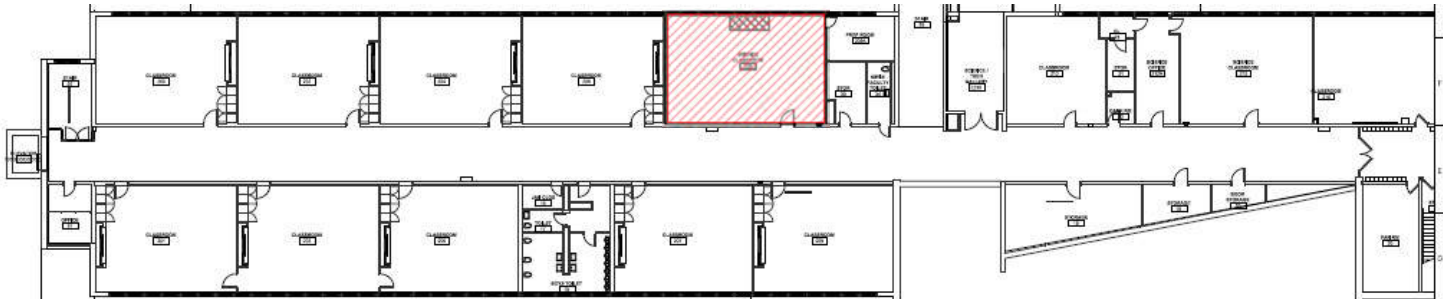
NANUET UFSD
101 Church Street
Nanuet, NY 10954

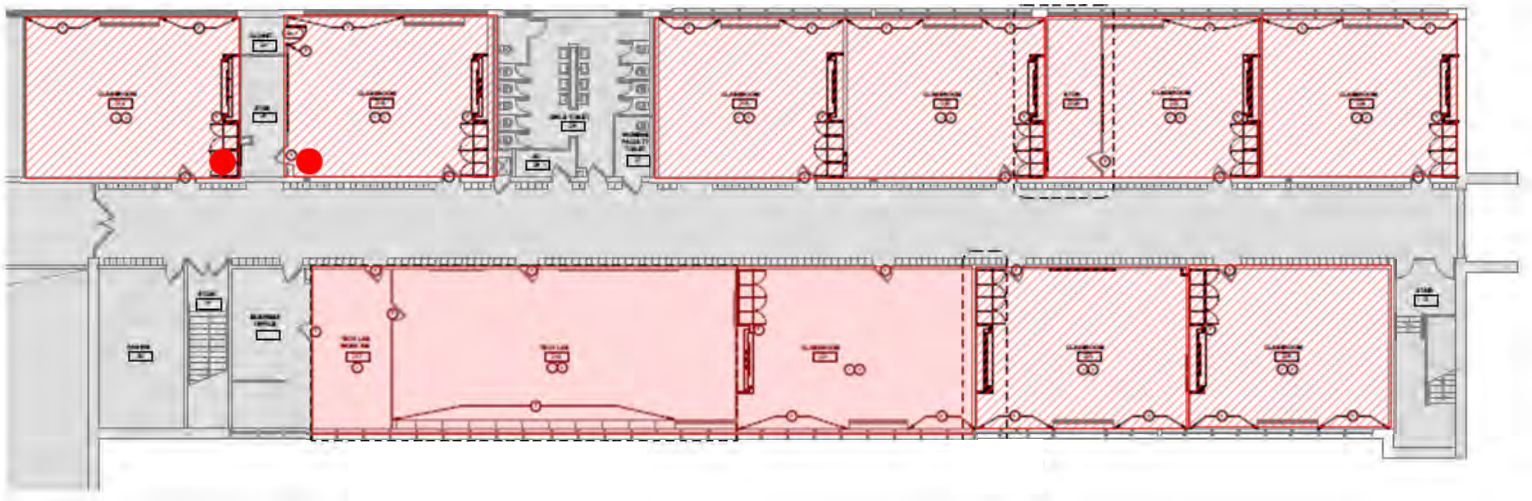
PROJECT LOCATION

NANUET HIGH SCHOOL
103 Church Street
Nanuet, NY 10954

PARTIAL FIRST FLOOR SAMPLE LOCATIONS

SL-01





ACM LOCATION KEY (Refer to Report for Details)
ACM FLOOR TILE & MASTIC
ACM BOTTOM LAYER FLOOR TILE & MASTIC
ACM SINK ANTI-SWEAT TAR

N

Drawing Not to Scale

This Drawing is not intended to be used as the sole basis for soliciting pricing for asbestos abatement. An abatement plan, specification, drawing and/or variances should be developed to identify scope, timing, phasing and remediation means & methods for any asbestos project.

Date: 10/28/2022	**Version #** 1
Issued For: Asbestos Survey	
QuES&T Project #: 22-4988	
Project Manager: TM	**Prepared By:** NDS

QuES&T

Quality Environmental Solutions & Technologies, Inc.
1376 Route 9
Wappingers Falls, NY 12590
Phone: (845) 298- 6031
Fax: (845) 298-6251

CLIENT

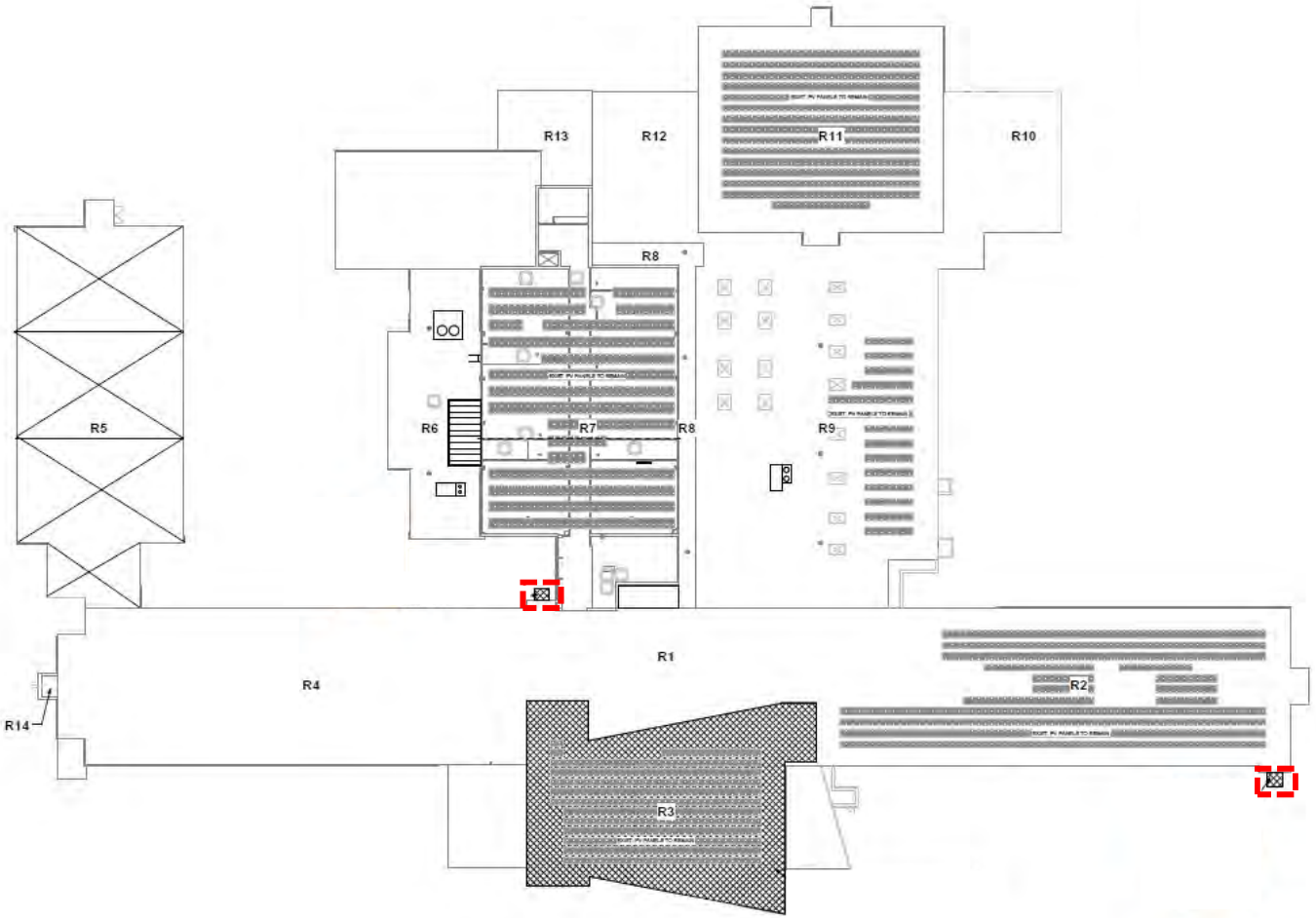
NANUET UFSD
101 Church Street
Nanuet, NY 10954

PROJECT LOCATION

NANUET HIGH SCHOOL
103 Church Street
Nanuet, NY 10954

PARTIAL SECOND FLOOR ASBESTOS LOCATIONS

ASB-02



ACM LOCATION KEY (Refer to Report for Details)

ACM CAULK
FIELD TO PERIMETER
&
TERMINATION BAR

N

Drawing Not to Scale
This Drawing is not intended to be used as the sole basis for soliciting pricing for asbestos abatement. An abatement plan, specification, drawing and/or variances should be developed to identify scope, timing, phasing and remediation means & methods for any asbestos project.

Date: 10/28/2022	**Version #** 1
Issued For: Asbestos Survey	
QuES&T Project #: 22-4988	
Project Manager: TM	**Prepared By:** NDS

QuES&T

Quality Environmental
Solutions & Technologies, Inc.
1376 Route 9
Wappingers Falls, NY 12590
Phone: (845) 298- 6031
Fax: (845) 298-6251

CLIENT

NANUET UFSD
101 Church Street
Nanuet, NY 10954

PROJECT LOCATION

NANUET HIGH SCHOOL
103 Church Street
Nanuet, NY 10954

ROOF
ASBESTOS LOCATIONS

ASB-03



ACM LOCATION KEY (Refer to Report for Details)	
	ACM 9" x 9" Floor Tile Bottom Layer
	ACM Floor Tile Mastic Below 12" x 12" Floor Tile
NOTE	PACM Electrical Components Throughout Scope of Work
NOTE	PACM Vibration Dampener Between AHU Seams

N

Drawing Not to Scale

This Drawing is not intended to be used as the sole basis for soliciting pricing for asbestos abatement. An abatement plan, specification, drawing and/or variances should be developed to identify scope, timing, phasing and remediation means & methods for any asbestos project.

Date: 10/21/2022	Version # 1
Issued For: Asbestos Survey	
QuES&T Project #: 22-4988	
Project Manager: TM	**Prepared By:** NDS

QuES&T

Quality Environmental
Solutions & Technologies, Inc.
1376 Route 9
Wappingers Falls, NY 12590
Phone: (845) 298- 6031
Fax: (845) 298-6251

CLIENT

NANUET UFSD
101 Church Street
Nanuet, NY 10954

PROJECT LOCATION

NANUET MIDDLE SCHOOL
143 Church Street
Nanuet, NY 10954

FIRST FLOOR ASBESTOS LOCATIONS

ASB-04



ACM LOCATION KEY (Refer to Report for Details)	
	ACM 9" x 9" Floor Tile Bottom Layer
	ACM Floor Tile Mastic Below 12" x 12" Floor Tile
NOTE	PACM Electrical Components

N

Drawing Not to Scale

This Drawing is not intended to be used as the sole basis for soliciting pricing for asbestos abatement. An abatement plan, specification, drawing and/or variances should be developed to identify scope, timing, phasing and remediation means & methods for any asbestos project.

Date: 10/26/2022	**Version #** 1
Issued For: Asbestos Survey	
QuES&T Project #: 22-4988	
Project Manager: TM	**Prepared By:** NDS

QuES&T

Quality Environmental Solutions & Technologies, Inc.
1376 Route 9
Wappingers Falls, NY 12590
Phone: (845) 298- 6031
Fax: (845) 298-6251

CLIENT

NANUET UFSD
101 Church Street
Nanuet, NY 10954

PROJECT LOCATION

NANUET MIDDLE SCHOOL
143 Church Street
Nanuet, NY 10954

SECOND FLOOR ASBESTOS LOCATIONS

ASB-05



No Asbestos-containing Materials (ACM) identified uponPLM & QTEM/PLM analysis

N

Drawing Not to Scale
This Drawing is not intended to be used as the sole basis for soliciting pricing for asbestos abatement. An abatement plan, specification, drawing and/or variances should be developed to identify scope, timing, phasing and remediation means & methods for any asbestos project.

Date: 10/21/2022	**Version #** 1
Issued For: Asbestos Survey	
QuES&T Project #: 22-4988	
Project Manager: TM	**Prepared By:** NDS

QuES&T

Quality Environmental
Solutions & Technologies, Inc.
1376 Route 9
Wappingers Falls, NY 12590
Phone: (845) 298- 6031
Fax: (845) 298-6251

CLIENT

NANUET UFSD
101 Church Street
Nanuet, NY 10954

PROJECT LOCATION

NANUET MIDDLE SCHOOL
143 Church Street
Nanuet, NY 10954

ROOF
ASBESTOS LOCATIONS

ASB-06

QuES&T
Quality Environmental Solutions & Technologies, Inc.

Appendix B:
ASBESTOS SAMPLE RESULTS & SAMPLE LOCATIONS

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/24/2022
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.1
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client: QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-HS-03	4988-HS-04	4988-HS-17	4988-HS-18
Layer Number					
Lab ID Number		2870471	2870472	2870473	2870474
Sample Location		2nd Floor, Classroom 224, Floor, Under Floor Tile, On Concrete	2nd Floor, Classroom 222, Floor, Under Floor Tile, On Concrete	2nd Floor, Classroom 221, Floor, On 9 x 9 FT, Blue	2nd Floor, Classroom 221, Floor, On 9 x 9 FT, Blue
Sample Description		Leveler	Leveler	12 x 12 FT, Mastic and Leveler (Leveler Layer)	12 x 12 FT, Mastic and Leveler (Leveler Layer)
Method of Quantification		Scanning Option	Scanning Option	Scanning Option	Scanning Option
Appearance	Layered	Yes	Yes	Yes	Yes
	Homogenous	No	No	No	No
	Fibrous	No	No	No	No
	Color	Brown/Black	Brown/Black	Gray/Brown	Gray/Brown
Sample Treatment		Homogenized	Homogenized	Homogenized	Homogenized
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND	ND	ND	ND
Other Fibrous Materials Present	% Fibrous Glass	ND	ND	ND	ND
	% Cellulose	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Unidentified	ND	ND	ND	ND
Non-Fibrous Materials Present	% Silicates	15.0	20.0	20.0	20.0
	% Carbonates	30.0	25.0	25.0	30.0
	% Other	ND	ND	ND	ND
	% Unidentified	55.0	55.0	55.0	50.0

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory. ND = Not Detected. Reporting Limit is <1%.
Liability Limited To Cost Of Analysis. This Report Must Not be Used by the Client to Claim Product Endorsement by NVLAP or Any Agency of the US Government.
These Results Can Not Be Used To Claim That NOB Items Tested Are Non-Asbestos Containing. Overall Lab Accuracy ± 17%. Samples received in acceptable condition unless otherwise noted.
AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/24/2022
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.1
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client: QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-HS-21	4988-HS-21	4988-HS-22	4988-HS-22
Layer Number		1	2	1	2
Lab ID Number		2870475	2870475	2870476	2870476
Sample Location		2nd Floor, Technology Lab 219, Ceiling, On Metal Lath, Textured	2nd Floor, Technology Lab 219, Ceiling, On Metal Lath, Textured	2nd Floor, Technology Lab 219, Ceiling, On Metal Lath, Textured	2nd Floor, Technology Lab 219, Ceiling, On Metal Lath, Textured
Sample Description		Plaster (Plaster Layer)	Plaster (Scratch Layer) * Vermiculite Observed, Analysis Terminated	Plaster (Plaster Layer)	Plaster (Scratch Layer) * Vermiculite Observed, Analysis Terminated
Method of Quantification		Scanning Option	Scanning Option	Scanning Option	Scanning Option
Appearance	Layered	No	No	No	No
	Homogenous	No	No	No	No
	Fibrous	Yes	No	Yes	No
	Color	White	Gray/Brown	White	Gray/Brown
Sample Treatment		Homogenized	Homogenized	Homogenized	Homogenized
Asbestos Content	% Amosite	ND	NA	ND	NA
	% Chrysotile	ND	NA	ND	NA
	% Other	ND	NA	ND	NA
	% Total Asbestos	ND	NA	ND	NA
Other Fibrous Materials Present	% Fibrous Glass	35.0	NA	30.0	NA
	% Cellulose	ND	NA	ND	NA
	% Other	ND	NA	ND	NA
	% Unidentified	ND	NA	ND	NA
Non-Fibrous Materials Present	% Silicates	10.0	NA	10.0	NA
	% Carbonates	20.0	NA	20.0	NA
	% Other	ND	NA Vermiculite	ND	NA Vermiculite
	% Unidentified	35.0	NA	40.0	NA

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory. ND = Not Detected. Reporting Limit is <1%.
Liability Limited To Cost Of Analysis. This Report Must Not be Used by the Client to Claim Product Endorsement by NVLAP or Any Agency of the US Government.
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AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/24/2022
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.1
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client: QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-HS-23	4988-HS-23	4988-HS-24	4988-HS-24
Layer Number		1	2	1	2
Lab ID Number		2870477	2870477	2870478	2870478
Sample Location		2nd Floor, Technology Lab 219, Ceiling, On Metal Lath, Textured	2nd Floor, Technology Lab 219, Ceiling, On Metal Lath, Textured	2nd Floor, Technology Lab Work Room 217, Ceiling, On Metal Lath, Textured	2nd Floor, Technology Lab Work Room 217, Ceiling, On Metal Lath, Textured
Sample Description		Plaster (Plaster Layer)	Plaster (Scratch Layer) * Vermiculite Observed, Analysis Terminated	Plaster (Plaster Layer)	Plaster (Scratch Layer) * Vermiculite Observed, Analysis Terminated
Method of Quantification		Scanning Option	Scanning Option	Scanning Option	Scanning Option
Appearance	Layered	No	No	No	No
	Homogenous	No	No	No	No
	Fibrous	Yes	No	Yes	No
	Color	White	Gray/Brown	White	Gray/Brown
Sample Treatment		Homogenized	Homogenized	Homogenized	Homogenized
Asbestos Content	% Amosite	ND	NA	ND	NA
	% Chrysotile	ND	NA	ND	NA
	% Other	ND	NA	ND	NA
	% Total Asbestos	ND	NA	ND	NA
Other Fibrous Materials Present	% Fibrous Glass	30.0	NA	30.0	NA
	% Cellulose	ND	NA	ND	NA
	% Other	ND	NA	ND	NA
	% Unidentified	ND	NA	ND	NA
Non-Fibrous Materials Present	% Silicates	10.0	NA	10.0	NA
	% Carbonates	25.0	NA	20.0	NA
	% Other	ND	NA Vermiculite	ND	NA Vermiculite
	% Unidentified	35.0	NA	40.0	NA

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory. ND = Not Detected. Reporting Limit is <1%.
Liability Limited To Cost Of Analysis. This Report Must Not be Used by the Client to Claim Product Endorsement by NVLAP or Any Agency of the US Government.
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AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/24/2022
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.1
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client: QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-HS-25	4988-HS-25	4988-HS-26	4988-HS-26
Layer Number		1	2	1	2
Lab ID Number		2870479	2870479	2870480	2870480
Sample Location		2nd Floor, Technology Lab Work Room 217, Ceiling, On Metal Lath, Textured	2nd Floor, Technology Lab Work Room 217, Ceiling, On Metal Lath, Textured	2nd Floor, Classroom 221, Ceiling, On Metal Lath, Textured	2nd Floor, Classroom 221, Ceiling, On Metal Lath, Textured
Sample Description		Plaster (Plaster Layer)	Plaster (Scratch Layer) * Vermiculite Observed, Analysis Terminated	Plaster (Plaster Layer)	Plaster (Scratch Layer) * Vermiculite Observed, Analysis Terminated
Method of Quantification		Scanning Option	Scanning Option	Scanning Option	Scanning Option
Appearance	Layered	No	No	No	No
	Homogenous	No	No	No	No
	Fibrous	Yes	No	Yes	No
	Color	Gray/Brown	Gray/Brown	White	Gray/Brown
Sample Treatment		Homogenized	Homogenized	Homogenized	Homogenized
Asbestos Content	% Amosite	ND	NA	ND	NA
	% Chrysotile	ND	NA	ND	NA
	% Other	ND	NA	ND	NA
	% Total Asbestos	ND	NA	ND	NA
Other Fibrous Materials Present	% Fibrous Glass	30.0	NA	30.0	NA
	% Cellulose	ND	NA	ND	NA
	% Other	ND	NA	ND	NA
	% Unidentified	ND	NA	ND	NA
Non-Fibrous Materials Present	% Silicates	10.0	NA	10.0	NA
	% Carbonates	15.0	NA	20.0	NA
	% Other	ND	NA Vermiculite	ND	NA Vermiculite
	% Unidentified	45.0	NA	40.0	NA

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory. ND = Not Detected. Reporting Limit is <1%.
Liability Limited To Cost Of Analysis. This Report Must Not be Used by the Client to Claim Product Endorsement by NVLAP or Any Agency of the US Government.
These Results Can Not Be Used To Claim That NOB Items Tested Are Non-Asbestos Containing. Overall Lab Accuracy ± 17%. Samples received in acceptable condition unless otherwise noted.
AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/24/2022
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.1
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client: QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-HS-27	4988-HS-27	4988-HS-30	4988-HS-30
Layer Number		1	2	1	2
Lab ID Number		2870481	2870481	2870482	2870482
Sample Location		2nd Floor, Classroom 223, Ceiling, On Metal Lath, Textured	2nd Floor, Classroom 223, Ceiling, On Metal Lath, Textured	2nd Floor, Classroom 221, Wall, Behind Cove Base	2nd Floor, Classroom 221, Wall, Behind Cove Base
Sample Description		Plaster (Plaster Layer)	Plaster (Scratch Layer) * Vermiculite Observed, Analysis Terminated	Plaster (Plaster Layer)	Plaster (Scratch Layer) * Vermiculite Observed, Analysis Terminated
Method of Quantification		Scanning Option	Scanning Option	Scanning Option	Scanning Option
Appearance	Layered	No	No	Yes	No
	Homogenous	No	No	No	No
	Fibrous	Yes	No	No	No
	Color	White	Gray/Brown	White/Brown	Gray/Brown
Sample Treatment		Homogenized	Homogenized	Homogenized	Homogenized
Asbestos Content	% Amosite	ND	NA	ND	NA
	% Chrysotile	ND	NA	ND	NA
	% Other	ND	NA	ND	NA
	% Total Asbestos	ND	NA	ND	NA
Other Fibrous Materials Present	% Fibrous Glass	30.0	NA	ND	NA
	% Cellulose	ND	NA	ND	NA
	% Other	ND	NA	ND	NA
	% Unidentified	ND	NA	ND	NA
Non-Fibrous Materials Present	% Silicates	10.0	NA	10.0	NA
	% Carbonates	15.0	NA	45.0	NA
	% Other	ND	NA Vermiculite	ND	NA Vermiculite
	% Unidentified	45.0	NA	45.0	NA

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AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/24/2022
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.1
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client: QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-HS-31	4988-HS-31	4988-HS-32	4988-HS-32
Layer Number		1	2	1	2
Lab ID Number		2870483	2870483	2870484	2870484
Sample Location		2nd Floor, Classroom 221, Wall, Behind Cove Base	2nd Floor, Classroom 221, Wall, Behind Cove Base	2nd Floor, Classroom 220, Wall, Above Suspended Ceiling	2nd Floor, Classroom 220, Wall, Above Suspended Ceiling
Sample Description		Plaster (Plaster Layer)	Plaster (Scratch Layer) * Vermiculite Observed, Analysis Terminated	Plaster (Plaster Layer)	Plaster (Scratch Layer) * Vermiculite Observed, Analysis Terminated
Method of Quantification		Scanning Option	Scanning Option	Scanning Option	Scanning Option
Appearance	Layered	No	No	No	No
	Homogenous	Yes	No	Yes	No
	Fibrous	No	No	No	No
	Color	White	Gray/Brown	White	Purple
Sample Treatment		None	Homogenized	None	Homogenized
Asbestos Content	% Amosite	ND	NA	ND	NA
	% Chrysotile	ND	NA	ND	NA
	% Other	ND	NA	ND	NA
	% Total Asbestos	ND	NA	ND	NA
Other Fibrous Materials Present	% Fibrous Glass	ND	NA	ND	NA
	% Cellulose	ND	NA	ND	NA
	% Other	ND	NA	ND	NA
	% Unidentified	ND	NA	ND	NA
Non-Fibrous Materials Present	% Silicates	10.0	NA	10.0	NA
	% Carbonates	50.0	NA	45.0	NA
	% Other	ND	NA Vermiculite	ND	NA Vermiculite
	% Unidentified	40.0	NA	45.0	NA

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Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/24/2022
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.1
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client: QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-HS-33	4988-HS-33	4988-HS-34	4988-HS-34
Layer Number		1	2	1	2
Lab ID Number		2870485	2870485	2870486	2870486
Sample Location		2nd Floor, Classroom 214, Wall	2nd Floor, Classroom 214, Wall	2nd Floor, Classroom 216, Wall	2nd Floor, Classroom 216, Wall
Sample Description		Plaster (Plaster Layer)	Plaster (Scratch Layer) * Vermiculite Observed, Analysis Terminated	Plaster (Plaster Layer)	Plaster (Scratch Layer) * Vermiculite Observed, Analysis Terminated
Method of Quantification		Scanning Option	Scanning Option	Scanning Option	Scanning Option
Appearance	Layered	Yes	No	Yes	No
	Homogenous	No	No	No	No
	Fibrous	No	No	No	No
	Color	White/Gray	Gray/Brown	White/Gray	Gray/Brown
Sample Treatment		Homogenized	Homogenized	Homogenized	Homogenized
Asbestos Content	% Amosite	ND	NA	ND	NA
	% Chrysotile	ND	NA	ND	NA
	% Other	ND	NA	ND	NA
	% Total Asbestos	ND	NA	ND	NA
Other Fibrous Materials Present	% Fibrous Glass	ND	NA	ND	NA
	% Cellulose	ND	NA	ND	NA
	% Other	ND	NA	ND	NA
	% Unidentified	ND	NA	ND	NA
Non-Fibrous Materials Present	% Silicates	15.0	NA	10.0	NA
	% Carbonates	40.0	NA	45.0	NA
	% Other	ND	NA Vermiculite	ND	NA Vermiculite
	% Unidentified	45.0	NA	45.0	NA

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AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/24/2022
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.1
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client: QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-HS-35	4988-HS-35	4988-HS-36	4988-HS-36
Layer Number		1	2	1	2
Lab ID Number		2870487	2870487	2870488	2870488
Sample Location		2nd Floor, Classroom 218, Wall	2nd Floor, Classroom 218, Wall	2nd Floor, Classroom 214, Wall	2nd Floor, Classroom 214, Wall
Sample Description		Plaster (Plaster Layer)	Plaster (Scratch Layer) * Vermiculite Observed, Analysis Terminated	Plaster (Plaster Layer)	Plaster (Scratch Layer) * Vermiculite Observed, Analysis Terminated
Method of Quantification		Scanning Option	Scanning Option	Scanning Option	Scanning Option
Appearance	Layered	Yes	No	Yes	No
	Homogenous	No	No	No	No
	Fibrous	No	No	No	No
	Color	White/Gray	Gray/Brown	White/Gray	Gray/Brown
Sample Treatment		Homogenized	Homogenized	Homogenized	Homogenized
Asbestos Content	% Amosite	ND	NA	ND	NA
	% Chrysotile	ND	NA	ND	NA
	% Other	ND	NA	ND	NA
	% Total Asbestos	ND	NA	ND	NA
Other Fibrous Materials Present	% Fibrous Glass	ND	NA	ND	NA
	% Cellulose	ND	NA	ND	NA
	% Other	ND	NA	ND	NA
	% Unidentified	ND	NA	ND	NA
Non-Fibrous Materials Present	% Silicates	10.0	NA	15.0	NA
	% Carbonates	45.0	NA	40.0	NA
	% Other	ND	NA Vermiculite	ND	NA Vermiculite
	% Unidentified	45.0	NA	45.0	NA

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AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
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Date Analyzed : 10/24/2022
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.1
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client: QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-HS-41	4988-HS-42	4988-HS-47	4988-HS-48
Layer Number					
Lab ID Number		2870489	2870490	2870491	2870492
Sample Location		Roof, Field Cut, Second Layer, On Isofoam	Roof, Perimeter Cut, Fourth Layer	Roof, Field Cut, Fifth Layer	Roof, Perimeter Cut
Sample Description		Perlite	Perlite	Gysum Deck * Vermiculite Observed, Analysis Terminated	Gysum Deck * Vermiculite Observed, Analysis Terminated
Method of Quantification		Scanning Option	Scanning Option	Scanning Option	Scanning Option
Appearance	Layered	Yes	Yes	No	No
	Homogenous	No	No	No	No
	Fibrous	Yes	Yes	No	No
	Color	Brown/Black	Brown/Black	Gray/Brown	Gray/Brown
Sample Treatment		Homogenized	Homogenized	Homogenized	Homogenized
Asbestos Content	% Amosite	ND	ND	NA	NA
	% Chrysotile	ND	ND	NA	NA
	% Other	ND	ND	NA	NA
	% Total Asbestos	ND	ND	NA	NA
Other Fibrous Materials Present	% Fibrous Glass	ND	ND	NA	NA
	% Cellulose	30.0	35.0	NA	NA
	% Other	ND	ND	NA	NA
	% Unidentified	ND	ND	NA	NA
Non-Fibrous Materials Present	% Silicates	5.0	5.0	NA	NA
	% Carbonates	ND	ND	NA	NA
	% Other	20.0 Perlite	15.0 Perlite	NA Vermiculite	NA Vermiculite
	% Unidentified	45.0	45.0	NA	NA

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Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/24/2022
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.1
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client: QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-HS-59	4988-HS-60
Layer Number			
Lab ID Number		2870493	2870494
Sample Location		Roof, Overhang Roof, Bottom	Roof, Overhang Roof, Bottom
Sample Description		Concrete	Concrete
Method of Quantification		Scanning Option	Scanning Option
Appearance	Layered	No	No
	Homogenous	No	No
	Fibrous	No	No
	Color	Gray/Brown	Gray/Brown
Sample Treatment		Homogenized	Homogenized
Asbestos Content	% Amosite	ND	ND
	% Chrysotile	ND	ND
	% Other	ND	ND
	% Total Asbestos	ND	ND
Other Fibrous Materials Present	% Fibrous Glass	ND	ND
	% Cellulose	ND	ND
	% Other	ND	ND
	% Unidentified	ND	ND
Non-Fibrous Materials Present	% Silicates	25.0	20.0
	% Carbonates	35.0	35.0
	% Other	ND	ND
	% Unidentified	40.0	45.0

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Eastern Analytical Services, Inc.
Chain of Custody Form

EAS Client:	QuES&T, Inc. 1376 Route 9 Wappingers Falls, NY 12590	EAS Batch No.	2208540
		Turn-Around:	5 Day
		Shipped Via:	NY DB004
Analyte:	% Asb	State of Origin:	NY
No. of Samples Received:	24	Sample Disposition:	Standard x Return
No. of Samples Analyzed:	22		
Client Project Number/Name:	RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY		

Lab ID Numbers: 2870471-2870472;2870473-2870474;2870475-2870481;2870482-2870488;2870489-2870490;2870491-2870492;2870493-2870494

Collected By:	N. Salerno/J. Mages		Date: 10/12-13/2022	
Received By:	Damien Warner		Date: 10/14/2022	Time: 1857
Logged In By:	Marita Prado		Date: 10/21/2022	
Prepped By:	Marita Prado		Date: 10/24/2022	
Analyzed By :	George Htay		Date: 10/24/2022	Time: 1420
Re-Analyzed By:			Date:	
Checked By:	Damien Warner		Date: 10/27/2022	
E-Transmitted By:	Damien Warner		Date: 10/27/2022	Time: 1537
Logged Out By:			Date:	

Phone 914-592-8380 e-mail Lab@EASInc.com Fax 914-592-8956

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/25/2022
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-HS-01	4988-HS-01	4988-HS-02	4988-HS-02
Layer Number		1	2	1	2
Lab ID Number		2870392	2870392	2870393	2870393
Sample Location		2nd Floor, Classrm 224, Floor, On Concrete and Leveler, 9" x 9", Light Brown	2nd Floor, Classrm 224, Floor, On Concrete and Leveler, 9" x 9", Light Brown	2nd Floor, Classrm 224, Floor, On Concrete and Leveler, 9" x 9", Light Brown	2nd Floor, Classrm 224, Floor, On Concrete and Leveler, 9" x 9", Light Brown
Sample Description		Floor Tile and Mastic (Tile Layer)	Floor Tile and Mastic (Mastic Layer)	Floor Tile and Mastic (Tile Layer)	Floor Tile and Mastic (Mastic Layer)
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	No	No	No	No
	Homogenous	Yes	Yes	Yes	Yes
	Fibrous	No	No	No	No
	Color	Gray	Black	Gray	Black
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	3.6	ND	3.4	< 0.3
	% Other	ND	ND	ND	ND
	% Total Asbestos	3.6	ND Inconclusive	3.4	< 0.3 Inconclusive
Other Materials Present	% Organic	25.1	59.5	25.7	62.3
	% Carbonates	30.4	10.6	27.5	11.3
	% Other Inorganic	40.9	29.9	43.4	26.4

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This method does not remove vermiculite and may underestimate the level of asbestos present in a sample containing greater than 10% vermiculite.
AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/25/2022
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-HS-05	4988-HS-06	4988-HS-06	4988-HS-07
Layer Number			1	2	1
Lab ID Number		2870394	2870395	2870395	2870396
Sample Location		2nd Floor, Classrm 224, Ceiling, 2' x 4', Suspended, Dot Canyon	2nd Floor, Classrm 222, Floor, On Concrete and Leveler, 9" x 9", Dark Brown	2nd Floor, Classrm 222, Floor, On Concrete and Leveler, 9" x 9", Dark Brown	2nd Floor, Classrm 222, Floor, On Concrete and Leveler, 9" x 9", Dark Brown
Sample Description		Ceiling Tile	Floor Tile and Mastic (Tile Layer)	Floor Tile and Mastic (Mastic Layer)	Floor Tile and Mastic (Tile Layer)
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	Yes	No	No	No
	Homogenous	No	Yes	Yes	Yes
	Fibrous	Yes	No	No	No
	Color	Gray/Brown/White	Gray	Black	Gray
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	3.0	< 0.2	3.5
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND Inconclusive	3.0	< 0.2 Inconclusive	3.5
Other Materials Present	% Organic	26.8	27.7	74.9	28.8
	% Carbonates	55.9	30.6	10.0	32.4
	% Other Inorganic	17.3	38.7	15.1	35.3

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AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/25/2022
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-HS-07	4988-HS-08	4988-HS-08	4988-HS-09
Layer Number		2	1	2	1
Lab ID Number		2870396	2870397	2870397	2870398
Sample Location		2nd Floor, Classrm 222, Floor, On Concrete and Leveler, 9" x 9", Dark Brown	2nd Floor, Classrm 225, Floor, On Concrete and Leveler, 9" x 9", Tan/Green	2nd Floor, Classrm 225, Floor, On Concrete and Leveler, 9" x 9", Tan/Green	2nd Floor, Classrm 225, Floor, On Concrete and Leveler, 9" x 9", Tan/Green
Sample Description		Floor Tile and Mastic (Mastic Layer)	Floor Tile and Mastic (Tile Layer)	Floor Tile and Mastic (Mastic Layer)	Floor Tile and Mastic (Tile Layer)
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	No	No	No	No
	Homogenous	Yes	Yes	Yes	Yes
	Fibrous	No	No	No	No
	Color	Black	Tan/Green	Black	Green
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	2.6	ND	1.8
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND Inconclusive	2.6	ND Inconclusive	1.8
Other Materials Present	% Organic	64.9	25.3	49.4	29.2
	% Carbonates	11.9	36.3	16.5	32.4
	% Other Inorganic	23.2	35.8	34.1	36.6

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AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/25/2022
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-HS-09	4988-HS-10	4988-HS-10	4988-HS-11
Layer Number		2	1	2	1
Lab ID Number		2870398	2870399	2870399	2870400
Sample Location		2nd Floor, Classrm 225, Floor, On Concrete and Leveler, 9" x 9", Tan/Green	2nd Floor, Classrm 223, Floor, On Concrete and Leveler, 9" x 9", Red	2nd Floor, Classrm 223, Floor, On Concrete and Leveler, 9" x 9", Red	2nd Floor, Classrm 223, Floor, On Concrete and Leveler, 9" x 9", Red
Sample Description		Floor Tile and Mastic (Mastic Layer)	Floor Tile and Mastic (Tile Layer)	Floor Tile and Mastic (Mastic Layer)	Floor Tile and Mastic (Tile Layer)
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	No	No	No	No
	Homogenous	Yes	Yes	Yes	Yes
	Fibrous	No	No	No	No
	Color	Black	Red	Black	Red
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	< 0.2	3.0	< 0.1	1.5
	% Other	ND	ND	ND	ND
	% Total Asbestos	< 0.2 Inconclusive	3.0	< 0.1 Inconclusive	1.5
Other Materials Present	% Organic	61.9	31.0	77.4	29.3
	% Carbonates	13.6	35.5	10.8	37.9
	% Other Inorganic	24.5	30.5	11.8	31.3

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AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/25/2022
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-HS-11	4988-HS-12	4988-HS-13	4988-HS-14
Layer Number		2			
Lab ID Number		2870400	2870401	2870402	2870403
Sample Location		2nd Floor, Classrm 223, Floor, On Concrete and Leveler, 9" x 9", Red	2nd Floor, Classrm 214, Suspended Ceiling, 2' x 4', Dot Canyon Ceiling Tile	2nd Floor, Classrm 214, Wall, On Plaster, Exposed, Black	2nd Floor, Classrm 214, Wall, On Plaster, Exposed, Black
Sample Description		Floor Tile and Mastic (Mastic Layer)	Ceiling Tile	Glue Dab	Glue Dab
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	No	Yes	No	No
	Homogenous	Yes	No	Yes	Yes
	Fibrous	No	Yes	No	No
	Color	Black	Gray/White	Black	Black
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	0.2	ND	< 0.4	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	0.2 Inconclusive	ND Inconclusive	< 0.4 Inconclusive	ND Inconclusive
Other Materials Present	% Organic	77.8	28.2	49.4	49.4
	% Carbonates	10.7	52.7	9.1	6.1
	% Other Inorganic	11.3	19.1	41.5	44.5

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Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY

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Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-HS-15	4988-HS-16	4988-HS-17	4988-HS-17
Layer Number				1	2
Lab ID Number		2870404	2870405	2870406	2870406
Sample Location		2nd Floor, Classrm 216, On Metal Sink Basin, Black	2nd Floor, Classrm 214, On Metal Sink Basin, Black	2nd Floor, Classrm 221, Floor, On 9 x 9 FT, Blue	2nd Floor, Classrm 221, Floor, On 9 x 9 FT, Blue
Sample Description		Anti-Sweat Tar	Anti-Sweat Tar	12 x 12 FT, Mastic and Leveler (Tile Layer)	12 x 12 FT, Mastic and Leveler (Mastic Layer)
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	No	No	No	No
	Homogenous	Yes	Yes	Yes	Yes
	Fibrous	No	No	No	No
	Color	Black	Black	Blue	Tan
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	0.2	0.4	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	0.2 Inconclusive	0.4 Inconclusive	ND Inconclusive	ND Inconclusive
Other Materials Present	% Organic	20.9	21.1	22.0	78.1
	% Carbonates	71.1	64.0	67.7	9.1
	% Other Inorganic	7.8	14.5	10.3	12.8

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Eastern Analytical Services, Inc.

Bulk Sample Results

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Collected By : N. Salerno/J. Mages
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Date Analyzed : 10/25/2022
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-HS-18	4988-HS-18	4988-HS-19	4988-HS-19
Layer Number		1	2	1	2
Lab ID Number		2870407	2870407	2870408	2870408
Sample Location		2nd Floor, Classrm 221, Floor, On 9 x 9 FT, Blue	2nd Floor, Classrm 221, Floor, On 9 x 9 FT, Blue	2nd Floor, Classrm 221, Wall, On Plaster, Blue, 4"	2nd Floor, Classrm 221, Wall, On Plaster, Blue, 4"
Sample Description		12 x 12 FT, Mastic and Leveler (Tile Layer)	12 x 12 FT, Mastic and Leveler (Mastic Layer)	Cove Base and Adhesive (Molding Layer)	Cove Base and Adhesive (Adhesive Layer)
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	No	No	No	Yes
	Homogenous	Yes	Yes	Yes	No
	Fibrous	No	No	No	No
	Color	Blue	Tan	Blue	Beige/Brown
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND Inconclusive	ND Inconclusive	ND Inconclusive	ND Inconclusive
Other Materials Present	% Organic	20.5	80.2	57.8	48.9
	% Carbonates	57.6	9.9	40.3	4.3
	% Other Inorganic	21.9	9.9	1.9	46.8

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Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
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Date Analyzed : 10/25/2022
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-HS-20	4988-HS-20	4988-HS-28	4988-HS-29
Layer Number		1	2		
Lab ID Number		2870409	2870409	2870410	2870411
Sample Location		2nd Floor, Classrm 221, Wall, On Plaster, Blue, 4"	2nd Floor, Classrm 221, Wall, On Plaster, Blue, 4"	2nd Floor, Technology Lab 219, Floor, On 9" x 9" Tile, Below Carpet, Yellow	2nd Floor, Technology Lab 219, Floor, On 9" x 9" Tile, Below Carpet, Yellow
Sample Description		Cove Base and Adhesive (Molding Layer)	Cove Base and Adhesive (Adhesive Layer)	Carpet Mastic	Carpet Mastic
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	No	Yes	No	No
	Homogenous	Yes	No	Yes	Yes
	Fibrous	No	No	No	No
	Color	Blue	Beige/Brown	Tan	Tan
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND Inconclusive	ND Inconclusive	ND Inconclusive	ND Inconclusive
Other Materials Present	% Organic	59.3	51.1	63.7	62.1
	% Carbonates	38.7	16.1	5.0	10.2
	% Other Inorganic	2.0	32.8	31.3	27.7

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AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/25/2022
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-HS-37	4988-HS-37	4988-HS-38	4988-HS-38
Layer Number		1	2	1	2
Lab ID Number		2870412	2870412	2870413	2870413
Sample Location		2nd Floor, Classroom 214, Wall, On Plaster, 4", Black	2nd Floor, Classroom 214, Wall, On Plaster, 4", Black	2nd Floor, Classroom 220, Wall, On Plaster, 4", Black	2nd Floor, Classroom 220, Wall, On Plaster, 4", Black
Sample Description		Cove Base Molding and Adhesive (Molding Layer)	Cove Base Molding and Adhesive (Adhesive Layer)	Cove Base Molding and Adhesive (Molding Layer)	Cove Base Molding and Adhesive (Adhesive Layer)
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	No	No	No	Yes
	Homogenous	Yes	Yes	Yes	No
	Fibrous	No	No	No	No
	Color	Black	Brown	Black	Beige/Brown
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	< 0.4	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND Inconclusive	< 0.4 Inconclusive	ND Inconclusive	ND Inconclusive
Other Materials Present	% Organic	57.0	52.6	48.5	33.2
	% Carbonates	9.1	8.0	22.1	22.3
	% Other Inorganic	33.9	39.4	29.4	44.5

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Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
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Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-HS-39	4988-HS-40	4988-HS-43	4988-HS-44
Layer Number					
Lab ID Number		2870414	2870415	2870416	2870417
Sample Location		Roof, Field Cut, Top, On Perlite	Roof, Perimeter Cut, Second Layer	Roof, Field Cut, Third Layer, On Tar Paper Vapor Barrier	Roof, Perimeter, Fifth Layer
Sample Description		Built Up Roofing	Built Up Roofing	Isofoam	Isofoam
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	Yes	Yes	No	No
	Homogenous	No	No	Yes	Yes
	Fibrous	Yes	Yes	No	No
	Color	Black	Black	Yellow	Yellow
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND	ND Inconclusive	ND	ND
Other Materials Present	% Organic	88.3	92.2	99.9	99.3
	% Carbonates	11.2	6.3	ND	0.5
	% Other Inorganic	0.5	1.5	0.1	0.2

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Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY

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Collected By : N. Salerno/J. Mages
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Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-HS-45	4988-HS-46	4988-HS-49	4988-HS-50
Layer Number					
Lab ID Number		2870418	2870419	2870420	2870421
Sample Location		Roof, Field Cut, Fourth Layer, On Gypsum Deck	Roof, Perimeter Cut, Third Layer	Roof, Perimeter Cut, Top	Roof, Perimeter Cut, Top
Sample Description		Tar Paper Vapor Barrier	Tar Paper Vapor Barrier	Asphalt Rolled Roof	Asphalt Rolled Roof
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	No	No	Yes	Yes
	Homogenous	Yes	Yes	No	No
	Fibrous	Yes	Yes	Yes	Yes
	Color	Black	Black	Black/Gray	Black/Gray
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	< 0.1	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND Inconclusive	< 0.1 Inconclusive	ND Inconclusive	ND Inconclusive
Other Materials Present	% Organic	60.6	84.4	65.4	46.6
	% Carbonates	9.2	8.7	25.7	32.6
	% Other Inorganic	30.2	6.9	8.9	20.8

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Collected By : N. Salerno/J. Mages
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Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-HS-51	4988-HS-52	4988-HS-53	4988-HS-54
Layer Number					
Lab ID Number		2870422	2870423	2870424	2870425
Sample Location		Roof, Perimeter Cut, Bottom, On Gypsum Deck	Roof, Perimeter Cut, Bottom, On Gypsum Deck	Roof, Pitch Pocket	Roof, Pitch Pocket
Sample Description		Tar	Tar	Tar	Tar
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	Yes	No	No	No
	Homogenous	No	No	Yes	Yes
	Fibrous	Yes	Yes	No	No
	Color	Black	Black	Black	Black
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND Inconclusive	ND Inconclusive	ND	ND
Other Materials Present	% Organic	88.0	84.1	99.2	99.1
	% Carbonates	3.9	9.3	0.7	0.8
	% Other Inorganic	8.1	6.6	0.1	0.1

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Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
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Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-HS-55	4988-HS-56	4988-HS-57	4988-HS-58
Layer Number					
Lab ID Number		2870426	2870427	2870428	2870429
Sample Location		Roof, Overhang Roof, Field to Perimeter, Metal to Metal	Roof, Overhang Roof, Field to Perimeter, Metal to Metal	Roof, Overhang Roof, Termination Bar, Metal to Brick, Gray	Roof, Overhang Roof, Termination Bar, Metal to Brick, Gray
Sample Description		Caulk	Caulk	Caulk	Caulk
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	Yes	Yes	No	No
	Homogenous	No	No	Yes	Yes
	Fibrous	No	No	No	No
	Color	Gray/White	Gray/White	Gray	Gray
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	1.4	1.1	1.3	1.1
	% Other	ND	ND	ND	ND
	% Total Asbestos	1.4	1.1	1.3	1.1
Other Materials Present	% Organic	28.9	11.6	22.0	26.3
	% Carbonates	53.1	66.6	58.1	52.5
	% Other Inorganic	16.6	20.7	18.6	20.1

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Eastern Analytical Services, Inc.
Chain of Custody Form

EAS Client:	QuES&T, Inc. 1376 Route 9 Wappingers Falls, NY 12590	EAS Batch No.	2208541
		Turn-Around:	5 Day
		Shipped Via:	NY DB004
Analyte:	Grav Plm	State of Origin:	NY
No. of Samples Received:	38	Sample Disposition:	Standard x Return
No. of Samples Analyzed:	38		
Client Project Number/Name:	RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY		

Lab ID Numbers: 2870392-2870393;2870394-2870409;2870410-2870411;2870412-2870415;2870416-2870419;2870420-2870429

Collected By:	N. Salerno/J. Mages		Date: 10/12-13/2022	
Received By:	Damien Warner		Date: 10/14/2022	Time: 1857
Logged In By:	Meghan A. Warner		Date: 10/20/2022	
Prepped By:	Marita Prado		Date: 10/25/2022	
Analyzed By :	George Htay		Date: 10/25/2022	Time: 1125
Re-Analyzed By:			Date:	
Checked By:	Damien Warner		Date: 10/27/2022	
E-Transmitted By:	Damien Warner		Date: 10/27/2022	Time: 1537
Logged Out By:			Date:	

Phone 914-592-8380 e-mail Lab@EASInc.com Fax 914-592-8956

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/27/2022
Analyzed By : Ernest Sanchez
Signature :
Analytical Method : NYS-DOH 198.4
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-HS-01	4988-HS-02	4988-HS-05	4988-HS-06
Layer Number		2	2		2
Lab ID Number		2870392	2870393	2870394	2870395
Sample Location		2nd Floor, Classrm 224, Floor, On Concrete and Leveler, 9" x 9", Light Brown	2nd Floor, Classrm 224, Floor, On Concrete and Leveler, 9" x 9", Light Brown	2nd Floor, Classrm 224, Ceiling, 2' x 4', Suspended, Dot Canyon	2nd Floor, Classrm 222, Floor, On Concrete and Leveler, 9" x 9", Dark Brown
Sample Description		Floor Tile and Mastic (Mastic Layer)	Floor Tile and Mastic (Mastic Layer)	Ceiling Tile	Floor Tile and Mastic (Mastic Layer)
Analytical Method		NOB Tem	NOB Tem	NOB Tem	NOB Tem
Appearance	Layered	No	No	Yes	No
	Homogenous	Yes	Yes	No	Yes
	Fibrous	No	No	Yes	No
	Color	Black	Black	Gray/Brown/White	Black
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	7.5	6.6	ND	1.5
	% Other	ND	ND	ND	ND
	% Total Asbestos	7.5	6.6	ND	1.5
Other Materials Present	% Organic	59.5	62.3	26.8	74.9
	% Carbonates	10.6	11.3	55.9	10.0
	% Other Inorganic	22.4	19.8	17.3	13.6

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AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/27/2022
Analyzed By : Ernest Sanchez
Signature :
Analytical Method : NYS-DOH 198.4
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-HS-07	4988-HS-08	4988-HS-09	4988-HS-10
Layer Number		2	2	2	2
Lab ID Number		2870396	2870397	2870398	2870399
Sample Location		2nd Floor, Classrm 222, Floor, On Concrete and Leveler, 9" x 9", Dark Brown	2nd Floor, Classrm 225, Floor, On Concrete and Leveler, 9" x 9", Tan/Green	2nd Floor, Classrm 225, Floor, On Concrete and Leveler, 9" x 9", Tan/Green	2nd Floor, Classrm 223, Floor, On Concrete and Leveler, 9" x 9", Red
Sample Description		Floor Tile and Mastic (Mastic Layer)	Floor Tile and Mastic (Mastic Layer)	Floor Tile and Mastic (Mastic Layer)	Floor Tile and Mastic (Mastic Layer)
Analytical Method		NOB Tem	NOB Tem	NOB Tem	NOB Tem
Appearance	Layered	No	No	No	No
	Homogenous	Yes	Yes	Yes	Yes
	Fibrous	No	No	No	No
	Color	Black	Black	Black	Black
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	3.5	2.4	2.4	2.4
	% Other	ND	ND	ND	ND
	% Total Asbestos	3.5	2.4	2.4	2.4
Other Materials Present	% Organic	64.9	49.4	61.9	77.4
	% Carbonates	11.9	16.5	13.6	10.8
	% Other Inorganic	19.7	31.7	22.1	9.4

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Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY

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Collected By : N. Salerno/J. Mages
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Analyzed By : Ernest Sanchez
Signature :
Analytical Method : NYS-DOH 198.4
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-HS-11	4988-HS-12	4988-HS-13	4988-HS-14
Layer Number		2			
Lab ID Number		2870400	2870401	2870402	2870403
Sample Location		2nd Floor, Classrm 223, Floor, On Concrete and Leveler, 9" x 9", Red	2nd Floor, Classrm 214, Suspended Ceiling, 2' x 4', Dot Canyon Ceiling Tile	2nd Floor, Classrm 214, Wall, On Plaster, Exposed, Black	2nd Floor, Classrm 214, Wall, On Plaster, Exposed, Black
Sample Description		Floor Tile and Mastic (Mastic Layer)	Ceiling Tile	Glue Dab	Glue Dab
Analytical Method		NOB Tem	NOB Tem	NOB Tem	NOB Tem
Appearance	Layered	No	Yes	No	No
	Homogenous	Yes	No	Yes	Yes
	Fibrous	No	Yes	No	No
	Color	Black	Gray/White	Black	Black
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	1.7	ND	< 0.4	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	1.7	ND	< 0.4	ND
Other Materials Present	% Organic	77.8	28.2	49.4	49.4
	% Carbonates	10.7	52.7	9.1	6.1
	% Other Inorganic	9.8	19.1	41.5	44.5

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Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
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Analyzed By : Ernest Sanchez
Signature :
Analytical Method : NYS-DOH 198.4
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-HS-15	4988-HS-16	4988-HS-17	4988-HS-17
Layer Number				1	2
Lab ID Number		2870404	2870405	2870406	2870406
Sample Location		2nd Floor, Classrm 216, On Metal Sink Basin, Black	2nd Floor, Classrm 214, On Metal Sink Basin, Black	2nd Floor, Classrm 221, Floor, On 9 x 9 FT, Blue	2nd Floor, Classrm 221, Floor, On 9 x 9 FT, Blue
Sample Description		Anti-Sweat Tar	Anti-Sweat Tar	12 x 12 FT, Mastic and Leveler (Tile Layer)	12 x 12 FT, Mastic and Leveler (Mastic Layer)
Analytical Method		NOB Tem	NOB Tem	NOB Tem	NOB Tem
Appearance	Layered	No	No	No	No
	Homogenous	Yes	Yes	Yes	Yes
	Fibrous	No	No	No	No
	Color	Black	Black	Blue	Tan
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	1.6	3.0	ND	1.9
	% Other	ND	ND	ND	ND
	% Total Asbestos	1.6	3.0	ND	1.9
Other Materials Present	% Organic	20.9	21.1	22.0	78.1
	% Carbonates	71.1	64.0	67.7	9.1
	% Other Inorganic	6.4	11.9	10.3	10.9

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Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
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Analyzed By : Ernest Sanchez
Signature : 
Analytical Method : NYS-DOH 198.4
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-HS-18	4988-HS-18	4988-HS-19	4988-HS-19
Layer Number		1	2	1	2
Lab ID Number		2870407	2870407	2870408	2870408
Sample Location		2nd Floor, Classrm 221, Floor, On 9 x 9 FT, Blue	2nd Floor, Classrm 221, Floor, On 9 x 9 FT, Blue	2nd Floor, Classrm 221, Wall, On Plaster, Blue, 4"	2nd Floor, Classrm 221, Wall, On Plaster, Blue, 4"
Sample Description		12 x 12 FT, Mastic and Leveler (Tile Layer)	12 x 12 FT, Mastic and Leveler (Mastic Layer)	Cove Base and Adhesive (Molding Layer)	Cove Base and Adhesive (Adhesive Layer)
Analytical Method		NOB Tem	NOB Tem	NOB Tem	NOB Tem
Appearance	Layered	No	No	No	Yes
	Homogenous	Yes	Yes	Yes	No
	Fibrous	No	No	No	No
	Color	Blue	Tan	Blue	Beige/Brown
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	1.5	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND	1.5	ND	ND
Other Materials Present	% Organic	20.5	80.2	57.8	48.9
	% Carbonates	57.6	9.9	40.3	4.3
	% Other Inorganic	21.9	8.4	1.9	46.8

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Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
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Date Analyzed : 10/27/2022
Analyzed By : Ernest Sanchez
Signature :
Analytical Method : NYS-DOH 198.4
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-HS-20	4988-HS-20	4988-HS-28	4988-HS-29
Layer Number		1	2		
Lab ID Number		2870409	2870409	2870410	2870411
Sample Location		2nd Floor, Classrm 221, Wall, On Plaster, Blue, 4"	2nd Floor, Classrm 221, Wall, On Plaster, Blue, 4"	2nd Floor, Technology Lab 219, Floor, On 9" x 9" Tile, Below Carpet, Yellow	2nd Floor, Technology Lab 219, Floor, On 9" x 9" Tile, Below Carpet, Yellow
Sample Description		Cove Base and Adhesive (Molding Layer)	Cove Base and Adhesive (Adhesive Layer)	Carpet Mastic	Carpet Mastic
Analytical Method		NOB Tem	NOB Tem	NOB Tem	NOB Tem
Appearance	Layered	No	Yes	No	No
	Homogenous	Yes	No	Yes	Yes
	Fibrous	No	No	No	No
	Color	Blue	Beige/Brown	Tan	Tan
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	< 0.3	< 0.3
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND	ND	< 0.3	< 0.3
Other Materials Present	% Organic	59.3	51.1	63.7	62.1
	% Carbonates	38.7	16.1	5.0	10.2
	% Other Inorganic	2.0	32.8	31.3	27.7

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Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
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Date Analyzed : 10/27/2022
Analyzed By : Ernest Sanchez
Signature :
Analytical Method : NYS-DOH 198.4
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-HS-37	4988-HS-37	4988-HS-38	4988-HS-38
Layer Number		1	2	1	2
Lab ID Number		2870412	2870412	2870413	2870413
Sample Location		2nd Floor, Classroom 214, Wall, On Plaster, 4", Black	2nd Floor, Classroom 214, Wall, On Plaster, 4", Black	2nd Floor, Classroom 220, Wall, On Plaster, 4", Black	2nd Floor, Classroom 220, Wall, On Plaster, 4", Black
Sample Description		Cove Base Molding and Adhesive (Molding Layer)	Cove Base Molding and Adhesive (Adhesive Layer)	Cove Base Molding and Adhesive (Molding Layer)	Cove Base Molding and Adhesive (Adhesive Layer)
Analytical Method		NOB Tem	NOB Tem	NOB Tem	NOB Tem
Appearance	Layered	No	No	No	Yes
	Homogenous	Yes	Yes	Yes	No
	Fibrous	No	No	No	No
	Color	Black	Brown	Black	Beige/Brown
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	0.8	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND	0.8	ND	ND
Other Materials Present	% Organic	57.0	52.6	48.5	33.2
	% Carbonates	9.1	8.0	22.1	22.3
	% Other Inorganic	33.9	38.6	29.4	44.5

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Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/27/2022
Analyzed By : Ernest Sanchez
Signature :
Analytical Method : NYS-DOH 198.4
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-HS-40	4988-HS-45	4988-HS-46	4988-HS-49
Layer Number					
Lab ID Number		2870415	2870418	2870419	2870420
Sample Location		Roof, Perimeter Cut, Second Layer	Roof, Field Cut, Fourth Layer, On Gypsum Deck	Roof, Perimeter Cut, Third Layer	Roof, Perimeter Cut, Top
Sample Description		Built Up Roofing	Tar Paper Vapor Barrier	Tar Paper Vapor Barrier	Asphalt Rolled Roof
Analytical Method		NOB Tem	NOB Tem	NOB Tem	NOB Tem
Appearance	Layered	Yes	No	No	Yes
	Homogenous	No	Yes	Yes	No
	Fibrous	Yes	Yes	Yes	Yes
	Color	Black	Black	Black	Black/Gray
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	< 0.1	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND	ND	< 0.1	ND
Other Materials Present	% Organic	92.2	60.6	84.4	65.4
	% Carbonates	6.3	9.2	8.7	25.7
	% Other Inorganic	1.5	30.2	6.9	8.9

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Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY

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Analyzed By : Ernest Sanchez
Signature :
Analytical Method : NYS-DOH 198.4
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-HS-50	4988-HS-51	4988-HS-52
Layer Number				
Lab ID Number		2870421	2870422	2870423
Sample Location		Roof, Perimeter Cut, Top	Roof, Perimeter Cut, Bottom, On Gypsum Deck	Roof, Perimeter Cut, Bottom, On Gypsum Deck
Sample Description		Asphalt Rolled Roof	Tar	Tar
Analytical Method		NOB Tem	NOB Tem	NOB Tem
Appearance	Layered	Yes	Yes	No
	Homogenous	No	No	No
	Fibrous	Yes	Yes	Yes
	Color	Black/Gray	Black	Black
Asbestos Content	% Amosite	ND	ND	ND
	% Chrysotile	ND	ND	ND
	% Other	ND	ND	ND
	% Total Asbestos	ND	ND	ND
Other Materials Present	% Organic	46.6	88.0	84.1
	% Carbonates	32.6	3.9	9.3
	% Other Inorganic	20.8	8.1	6.6

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Eastern Analytical Services, Inc.
Chain of Custody Form

EAS Client:	QuES&T, Inc. 1376 Route 9 Wappingers Falls, NY 12590	EAS Batch No.	2208542
		Turn-Around:	Five Day
		Shipped Via:	NY DB004
Analyte:	Grav Tem	State of Origin:	NY
No. of Samples Received:	38	Sample Disposition:	Standard x Return
No. of Samples Analyzed:	21		
Client Project Number/Name:	RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY		

Lab ID Numbers: 2870392-2870393;2870394-2870409;2870410-2870411;2870412-2870415;2870416-2870419;2870420-2870429

Collected By:	N. Salerno/J. Mages		Date: 10/12-13/2022	
Received By:	Damien Warner		Date: 10/14/2022	Time: 1857
Logged In By:	Meghan A. Warner		Date: 10/20/2022	
Prepped By:	Damien Warner		Date: 10/26/2022	
Analyzed By :	Ernest Sanchez		Date: 10/27/2022	Time: 1335
Re-Analyzed By:			Date:	
Checked By:	Damien Warner		Date: 10/27/2022	
E-Transmitted By:	Damien Warner		Date: 10/27/2022	Time: 1537
Logged Out By:			Date:	

Phone 914-592-8380 e-mail Lab@EASInc.com Fax 914-592-8956

RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY

Date Collected: 10/12-13/2022
Collected By: N. Salerno/J. Mages
Date Received: 10/14/2022
Date Analyzed: 11/29/2022
Analyzed By: Damien Warner
Signature:
Method: NYS Item 198.8
NYS Lab Number: 10851
NVLAP Lab No.: 101646-0

Client: QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-HS-21	4988-HS-22	4988-HS-23	4988-HS-24
Layer Number		2	2	2	2
Lab ID Number		2870475	2870476	2870477	2870478
Sample Location		2nd Floor, Technology Lab 219, Ceiling, On Metal Lath, Textured	2nd Floor, Technology Lab 219, Ceiling, On Metal Lath, Textured	2nd Floor, Technology Lab 219, Ceiling, On Metal Lath, Textured	2nd Floor, Technology Lab Work Room 217, Ceiling, On Metal Lath, Textured
Sample Description		Plaster (Scratch Layer)	Plaster (Scratch Layer)	Plaster (Scratch Layer)	Plaster (Scratch Layer)
Method of Quantification		Point Count	Point Count	Point Count	Point Count
Appearance	Layered	No	No	No	No
	Homogenous	No	No	No	No
	Fibrous	No	No	No	No
	Color	Gray/Brown	Gray/Brown	Gray/Brown	Gray/Brown
Sample Treatment		Homogenized	Homogenized	Homogenized	Homogenized
Level 1 Results (% Weight - Chrysotile)		0.0	0.0	0.0	0.0
Level 2 Results (% Weight - Amphibole)		0.0	0.0	0.0	0.0
Total Asbestos (% Weight)		0.0	0.0	0.0	0.0
Other Fibrous Materials Present		Fibrous Glass	Fibrous Glass	Fibrous Glass	Fibrous Glass

Results Applicable to Those Items Tested
Reported Results Comply with NYSDOH ELAP Regulations and Standards
Liability Limited to Cost of Analysis

RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY

Date Collected: 10/12-13/2022
Collected By: N. Salerno/J. Mages
Date Received: 10/14/2022
Date Analyzed: 11/29/2022
Analyzed By: Damien Warner
Signature:
Method: NYS Item 198.8
NYS Lab Number: 10851
NVLAP Lab No.: 101646-0

Client: QuES&T, Inc.
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Wappingers Falls, NY 12590

Sample ID Number		4988-HS-25	4988-HS-26	4988-HS-27	4988-HS-30
Layer Number		2	2	2	2
Lab ID Number		2870479	2870480	2870481	2870482
Sample Location		2nd Floor, Technology Lab Work Room 217, Ceiling, On Metal Lath, Textured	2nd Floor, Classroom 221, Ceiling, On Metal Lath, Textured	2nd Floor, Classroom 223, Ceiling, On Metal Lath, Textured	2nd Floor, Classroom 221, Wall, Behind Cove Base
Sample Description		Plaster (Scratch Layer)	Plaster (Scratch Layer)	Plaster (Scratch Layer)	Plaster (Scratch Layer)
Method of Quantification		Point Count	Point Count	Point Count	Point Count
Appearance	Layered	No	No	No	No
	Homogenous	No	No	No	No
	Fibrous	No	No	No	No
	Color	Gray/Brown	Gray/Brown	Gray/Brown	Gray/Brown
Sample Treatment		Homogenized	Homogenized	Homogenized	Homogenized
Level 1 Results (% Weight - Chrysotile)		0.0	0.0	0.0	0.0
Level 2 Results (% Weight - Amphibole)		0.0	0.0	0.0	0.0
Total Asbestos (% Weight)		0.0	0.0	0.0	0.0
Other Fibrous Materials Present		Fibrous Glass	Fibrous Glass	Fibrous Glass	None

Results Applicable to Those Items Tested
Reported Results Comply with NYSDOH ELAP Regulations and Standards
Liability Limited to Cost of Analysis

RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY

Date Collected: 10/12-13/2022
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Analyzed By: Damien Warner
Signature:
Method: NYS Item 198.8
NYS Lab Number: 10851
NVLAP Lab No.: 101646-0

Client: QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-HS-31	4988-HS-32	4988-HS-33	4988-HS-34
Layer Number		2	2	2	2
Lab ID Number		2870483	2870484	2870485	2870486
Sample Location		2nd Floor, Classroom 221, Wall, Behind Cove Base	2nd Floor, Classroom 220, Wall, Above Suspended Clg	2nd Floor, Classroom 214, Wall	2nd Floor, Classroom 216, Wall
Sample Description		Plaster (Scratch Layer)	Plaster (Scratch Layer)	Plaster (Scratch Layer)	Plaster (Scratch Layer)
Method of Quantification		Point Count	Point Count	Point Count	Point Count
Appearance	Layered	No	No	No	No
	Homogenous	No	No	No	No
	Fibrous	No	No	No	No
	Color	Brown/Gray	Brown/Gray	Brown/White	Brown/White
Sample Treatment		Homogenized	Homogenized	Homogenized	Homogenized
Level 1 Results (% Weight - Chrysotile)		0.0	0.0	0.0	0.0
Level 2 Results (% Weight - Amphibole)		0.0	0.0	0.0	0.0
Total Asbestos (% Weight)		0.0	0.0	0.0	0.0
Other Fibrous Materials Present		None	None	None	None

Results Applicable to Those Items Tested
Reported Results Comply with NYSDOH ELAP Regulations and Standards
Liability Limited to Cost of Analysis

RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY

Date Collected:	10/12-13/2022	Client:	QuES&T, Inc.
Collected By:	N. Salerno/J. Mages		1376 Route 9
Date Received:	10/14/2022		Wappingers Falls, NY 12590
Date Analyzed:	11/29/2022		
Analyzed By:	Damien Warner		
Signature:			
Method:	NYS Item 198.8		
NYS Lab Number:	10851		
NVLAP Lab No.:	101646-0		

Sample ID Number		4988-HS-35	4988-HS-36
Layer Number		2	2
Lab ID Number		2870487	2870488
Sample Location		2nd Floor, Classroom 218, Wall	2nd Floor, Classroom 214, Wall
Sample Description		Plaster (Scratch Layer)	Plaster (Scratch Layer)
Method of Quantification		Point Count	Point Count
Appearance	Layered	No	No
	Homogenous	No	No
	Fibrous	No	No
	Color	Brown/Gray	Brown/Gray
Sample Treatment		Homogenized	Homogenized
Level 1 Results (% Weight - Chrysotile)		0.0	0.0
Level 2 Results (% Weight - Amphibole)		0.0	0.0
Total Asbestos (% Weight)		0.0	0.0
Other Fibrous Materials Present		None	None

Results Applicable to Those Items Tested
Reported Results Comply with NYSDOH ELAP Regulations and Standards
Liability Limited to Cost of Analysis

Quality Environmental Solutions and Technologies, Inc.
Bulk Sample Chain of Custody

CLIENT: Nanuet UFSD

SAMPLED BY: N. Salerno & J. Mages

ADDRESS: 101 Church Street
Nanuet, NY 10954

DATE SAMPLED: 10/12/22 & 10/13/22

CONTACT: Rudy Villanyi

ANALYSIS METHOD: PLM/ PLM-NOB/QTEM

PROJECT ID: Nanuet High School
103 Church Street, Nanuet, NY 10954

TURN-AROUND TIME: Standard

PROJECT # : 22-4988

Sample	HM#	Floor	Space Name/ID #	Location	Material
2870392 4988-HS-01	63,33	SECOND	CLASSROOM 224	FLOOR, ON CONCRETE AND LEVELER 9"X9", LIGHT BROWN	FLOOR TILE AND MASTIC
2870393 4988-HS-02	63,33	SECOND	CLASSROOM 224	FLOOR, ON CONCRETE AND LEVELER 9"X9", LIGHT BROWN	FLOOR TILE AND MASTIC
4988-HS-03	83	SECOND	CLASSROOM 224	FLOOR, UNDER FLOOR TILE, ON CONCRETE	LEVELER
4988-HS-04	83	SECOND	CLASSROOM 222	FLOOR, UNDER FLOOR TILE, ON CONCRETE	LEVELER
2870394 4988-HS-05	9	SECOND	CLASSROOM 224	CEILING, 2'X4', SUSPENDED, DOT CANYON	CEILING TILE
2870395 4988-HS-06	63,33	SECOND	CLASSROOM 222	FLOOR, ON CONCRETE AND LEVELER 9"X9", DARK BROWN	FLOOR TILE AND MASTIC
2870396 4988-HS-07	63,33	SECOND	CLASSROOM 222	FLOOR, ON CONCRETE AND LEVELER, 9"X9", DARK BROWN	FLOOR TILE AND MASTIC
2870397 4988-HS-08	63,33	SECOND	CLASSROOM 225	FLOOR, ON CONCRETE AND LEVELER, 9"X9", TAN/GREEN	FLOOR TILE AND MASTIC
2870398 4988-HS-09	63,33	SECOND	CLASSROOM 225	FLOOR, ON CONCRETE AND LEVELER, 9"X9", TAN/GREEN	FLOOR TILE AND MASTIC
2870399 4988-HS-10	63,33	SECOND	CLASSROOM 223	FLOOR, ON CONCRETE AND LEVELER, 9"X9", RED	FLOOR TILE AND MASTIC
2870400 4988-HS-11	63,33	SECOND	CLASSROOM 223	FLOOR, ON CONCRETE AND LEVELER, 9"X9", RED	FLOOR TILE AND MASTIC
2870401 4988-HS-12	9	SECOND	CLASSROOM 214	SUSPENDED CEILING, 2X4, DOT CANYON CEILING TILE	CEILING TILE
2870402 4988-HS-13	84	SECOND	CLASSROOM 214	WALL, ON PLASTER, EXPOSED, BLACK	GLUE DAB
2870403 4988-HS-14	84	SECOND	CLASSROOM 214	WALL, ON PLASTER, EXPOSED, BLACK	GLUE DAB
2870404 4988-HS-15	81	SECOND	CLASSROOM 216	ON METAL SINK BASIN, BLACK	ANTI-SWEAT TAR

Comments:

SUBMITTED BY: N. Salerno

DATE: 10/14/2022
OCT 14 '22 13:57

RECEIVED BY: D. Warner

DATE:

Quality Environmental Solutions and Technologies, Inc.
Bulk Sample Chain of Custody

CLIENT: Nanuet UFSD

SAMPLED BY: N. Salerno & J. Mages

ADDRESS: 101 Church Street
Nanuet, NY 10954

DATE SAMPLED: 10/12/22 & 10/13/22

CONTACT: Rudy Villianyi

ANALYSIS METHOD: PLM/ PLM-NOB/QTEM

PROJECT ID: Nanuet High School
103 Church Street, Nanuet, NY 10954

TURN-AROUND TIME: Standard

PROJECT # : 22-4988

	Sample	HM#	Floor	Space Name/ID #	Location	Material
2870405	4988-HS-16	81	SECOND	CLASSROOM 214	ON METAL SINK BASIN, BLACK	ANTI-SWEAT TAR
2870406	4988-HS-17	63, 83	SECOND	CLASSROOM 221	FLOOR, ON 9X9 FT, BLUE	12X12 FT, MASTIC AND LEVELER
2870407	4988-HS-18	63, 83	SECOND	CLASSROOM 221	FLOOR, ON 9X9 FT, BLUE	12X12 FT, MASTIC AND LEVELER
2870408	4988-HS-19	74	SECOND	CLASSROOM 221	WALL, ON PLASTER, BLUE, 4"	COVE BASE AND ADHESIVE
2870409	4988-HS-20	74	SECOND	CLASSROOM 221	WALL, ON PLASTER, BLUE, 4"	COVE BASE AND ADHESIVE
	4988-HS-21	69	SECOND	TECHNOLOGY LAB 219	CEILING, ON METAL LATHE, TEXTURED	PLASTER (SEPARATE LAYERS)
	4988-HS-22	69	SECOND	TECHNOLOGY LAB 219	CEILING, ON METAL LATHE, TEXTURED	PLASTER (SEPARATE LAYERS)
	4988-HS-23	69	SECOND	TECHNOLOGY LAB 219	CEILING, ON METAL LATHE, TEXTURED	PLASTER (SEPARATE LAYERS)
	4988-HS-24	69	SECOND	TECHNOLOGY LAB WORK ROOM 217	CEILING, ON METAL LATHE, TEXTURED	PLASTER (SEPARATE LAYERS)
	4988-HS-25	69	SECOND	TECHNOLOGY LAB WORK ROOM 217	CEILING, ON METAL LATHE, TEXTURED	PLASTER (SEPARATE LAYERS)
	4988-HS-26	69	SECOND	CLASSROOM 221	CEILING, ON METAL LATHE, TEXTURED	PLASTER (SEPARATE LAYERS)
	4988-HS-27	69	SECOND	CLASSROOM 223	CEILING, ON METAL LATHE, TEXTURED	PLASTER (SEPARATE LAYERS)
2870410	4988-HS-28	79	SECOND	TECHNOLOGY LAB 219	FLOOR, ON 9"X9" TILE, BELOW CARPET, YELLOW	CARPET MASTIC
2870411	4988-HS-29	79	SECOND	TECHNOLOGY LAB 219	FLOOR, ON 9"X9" TILE, BELOW CARPET, YELLOW	CARPET MASTIC
	4988-HS-30	69	SECOND	CLASSROOM 221	WALL, BEHIND COVE BASE	PLASTER (SEPARATE LAYERS)

Comments:

SUBMITTED BY: Nicholas Salerno

DATE: 10/14/2022

RECEIVED BY:

OCT 14'22 18:57

DATE:

Quality Environmental Solutions and Technologies, Inc.
Bulk Sample Chain of Custody

CLIENT: Nanuet UFSD

SAMPLED BY: N. Salerno & J. Mages

ADDRESS: 101 Church Street
Nanuet, NY 10954

DATE SAMPLED: 10/12/22 & 10/13/22

CONTACT: Rudy Villianyi

ANALYSIS METHOD: PLM/ PLM-NOB/QTEM

PROJECT ID: Nanuet High School
103 Church Street, Nanuet, NY 10954

TURN-AROUND TIME: Standard

PROJECT # : 22-4988

	Sample	HM#	Floor	Space Name/ID #	Location	Material
	4988-HS-31	69	SECOND	CLASSROOM 221	WALL, BEHIND COVE BASE	PLASTER (SEPARATE LAYERS)
	4988-HS-32	69	SECOND	CLASSROOM 220	WALL, ABOVE SUSPENDED CEILING	PLASTER (SEPARATE LAYERS)
	4988-HS-33	69	SECOND	CLASSROOM 214	WALL	PLASTER (SEPARATE LAYERS)
	4988-HS-34	69	SECOND	CLASSROOM 216	WALL	PLASTER (SEPARATE LAYERS)
	4988-HS-35	69	SECOND	CLASSROOM 218	WALL	PLASTER (SEPARATE LAYERS)
	4988-HS-36	69	SECOND	CLASSROOM 214	WALL	PLASTER (SEPARATE LAYERS)
2870412	4988-HS-37	74	SECOND	CLASSROOM 214	WALL, ON PLASTER, 4", BLACK	COVE BASE MOLDING AND ADHESIVE
2870413	4988-HS-38	74	SECOND	CLASSROOM 220	WALL, ON PLASTER, 4", BLACK	COVE BASE MOLDING AND ADHESIVE
2870414	4988-HS-39	91	ROOF	ROOF	FIELD CUT, TOP, ON PERLITE	BUILT UP ROOFING
2870415	4988-HS-40	91	ROOF	ROOF	PERIMETER CUT, SECOND LAYER	BUILT UP ROOFING
	4988-HS-41	90	ROOF	ROOF	FIELD CUT, SECOND LAYER, ON ISOFOAM	PERLITE
	4988-HS-42	90	ROOF	ROOF	PERIMETER CUT, FOURTH LAYER	PERLITE
2870416	4988-HS-43	89	ROOF	ROOF	FIELD CUT, THIRD LAYER, ON TAR PAPER VAPOR BARRIER	ISOFOAM
2870417	4988-HS-44	89	ROOF	ROOF	PERIMETER, FIFTH LAYER	ISOFOAM
2870418	4988-HS-45	88	ROOF	ROOF	FIELD CUT, FOURTH LAYER, ON GYPSUM DECK	TAR PAPER VAPOR BARRIER

Comments:

SUBMITTED BY: [signature]

DATE: 10/14/2022

RECEIVED BY: [signature]

DATE:

PAGE 3 OF 4

Quality Environmental Solutions and Technologies, Inc.
Bulk Sample Chain of Custody

CLIENT: Nanuet UFSD

SAMPLED BY: N. Salerno & J. Mages

ADDRESS: 101 Church Street
Nanuet, NY 10954

DATE SAMPLED: 10/12/22 & 10/13/22

CONTACT: Rudy Villianyi

ANALYSIS METHOD: PLM/ PLM-NOB/QTEM

PROJECT ID: Nanuet High School
103 Church Street, Nanuet, NY 10954

TURN-AROUND TIME: Standard

PROJECT # : 22-4988

	Sample	HM#	Floor	Space Name/ID #	Location	Material
2870419	4988-HS-46	88	ROOF	ROOF	PERIMETER CUT, THIRD LAYER	TAR PAPER VAPOR BARRIER
	4988-HS-47	52	ROOF	ROOF	FIELD CUT, FIFTH LAYER	GYPSUM DECK
	4988-HS-48	52	ROOF	ROOF	PERIMETER CUT	GYPSUM DECK
2870420	4988-HS-49	40	ROOF	ROOF	PERIMETER CUT, TOP	ASPHALT ROLLED ROOF
2870421	4988-HS-50	40	ROOF	ROOF	PERIMETER CUT, TOP	ASPHALT ROLLED ROOF
2870422	4988-HS-51	54	ROOF	ROOF	PERIMETER CUT, BOTTOM, ON GYPSUM DECK	TAR
2870423	4988-HS-52	54	ROOF	ROOF	PERIMETER CUT, BOTTOM, ON GYPSUM DECK	TAR
2870424	4988-HS-53	54	ROOF	ROOF	PITCH POCKET	TAR
2870425	4988-HS-54	54	ROOF	ROOF	PITCH POCKET	TAR
2870426	4988-HS-55	8	ROOF	OVERHANG ROOF	FIELD TO PERIMETER, METAL TO METAL	CAULK
2870427	4988-HS-56	8	ROOF	OVERHANG ROOF	FIELD TO PERIMETER, METAL TO METAL	CAULK
2870428	4988-HS-57	8	ROOF	OVERHANG ROOF	TERMINATION BAR, METAL TO BRICK, GREY	CAULK
2870429	4988-HS-58	8	ROOF	OVERHANG ROOF	TERMINATION BAR, METAL TO BRICK, GREY	CAULK
	4988-HS-59	86	ROOF	OVERHANG ROOF	BOTTOM	CONCRETE
	4988-HS-60	86	ROOF	OVERHANG ROOF	BOTTOM	CONCRETE

Comments:

SUBMITTED BY: N. Salerno

DATE: 10/14/2022

RECEIVED BY: D. Simmons

DATE: OCT 14 '22 12:57

EAS Batch No. 2209206

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY

Date Collected : 11/11/2022
Collected By : N. Salerno/T. McAfee
Date Received : 11/11/2022
Date Analyzed : 11/21/2022
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-HS-A-01	4988-HS-A-01	4988-HS-A-02	4988-HS-A-02
Layer Number		1	2	1	2
Lab ID Number		2877979	2877979	2877980	2877980
Sample Location		First Floor, Band Room, Floor, On Concrete, 1' x 1', Gray	First Floor, Band Room, Floor, On Concrete, 1' x 1', Gray	First Floor, Band Room, Floor, On Concrete, 1' x 1', Gray	First Floor, Band Room, Floor, On Concrete, 1' x 1', Gray
Sample Description		Floor Tile and Mastic (Tile Layer)	Floor Tile and Mastic (Mastic Layer)	Floor Tile and Mastic (Tile Layer)	Floor Tile and Mastic (Mastic Layer)
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	No	Yes	No	Yes
	Homogenous	Yes	No	Yes	No
	Fibrous	No	No	No	No
	Color	Gray	Black/Brown	Gray	Black/Brown
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND Inconclusive	ND Inconclusive	ND Inconclusive	ND Inconclusive
Other Materials Present	% Organic	17.3	32.6	16.9	33.1
	% Carbonates	78.2	22.6	79.1	22.5
	% Other Inorganic	4.5	44.8	4.0	44.4

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory. Samples received in acceptable condition unless otherwise noted. ND = Not Detected. Liability Limited To Cost Of Analysis. This Report Must Not be Used by the Client to Claim Product Endorsement by NVLAP or Any Agency of the US Government.
These Results Cannot Be Used To Claim That NOB Items Tested Are Non-Asbestos Containing (Unless "% Other Inorganic", As Reported Above, Is Less Than One Percent).
This method does not remove vermiculite and may underestimate the level of asbestos present in a sample containing greater than 10% vermiculite.
AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.
Chain of Custody Form

EAS Client:	QuES&T, Inc. 1376 Route 9 Wappingers Falls, NY 12590	EAS Batch No.	2209206
		Turn-Around:	5 Day
		Shipped Via:	NY DB004
Analyte:	Grav Plm	State of Origin:	NY
No. of Samples Received:	2	Sample Disposition:	Standard x Return
No. of Samples Analyzed:	2		
Client Project Number/Name:	RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY		

Lab ID Numbers: 2877979-2877980

Collected By:	N. Salerno/T. McAfee		Date: 11/11/2022	
Received By:	Damien Warner		Date: 11/11/2022	Time: 1959
Logged In By:	Damien Warner		Date: 11/20/2022	
Prepped By:	Marita Prado		Date: 11/21/2022	
Analyzed By :	George Htay		Date: 11/21/2022	Time: 1545
Re-Analyzed By:			Date:	
Checked By:	Damien Warner		Date: 11/22/2022	
E-Transmitted By:	Damien Warner		Date: 11/22/2022	Time: 1128
Logged Out By:			Date:	

EAS Batch No. 2209207

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY

Date Collected : 11/11/2022
Collected By : N. Salerno/T. McAfee
Date Received : 11/11/2022
Date Analyzed : 11/22/2022
Analyzed By : Fahrudin Lalic
Signature :
Analytical Method : NYS-DOH 198.4
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

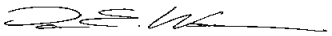
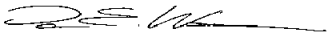
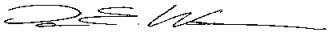
Sample ID Number		4988-HS-A-01	4988-HS-A-01	4988-HS-A-02	4988-HS-A-02
Layer Number		1	2	1	2
Lab ID Number		2877979	2877979	2877980	2877980
Sample Location		First Floor, Band Room, Floor, On Concrete, 1' x 1', Gray	First Floor, Band Room, Floor, On Concrete, 1' x 1', Gray	First Floor, Band Room, Floor, On Concrete, 1' x 1', Gray	First Floor, Band Room, Floor, On Concrete, 1' x 1', Gray
Sample Description		Floor Tile and Mastic (Tile Layer)	Floor Tile and Mastic (Mastic Layer)	Floor Tile and Mastic (Tile Layer)	Floor Tile and Mastic (Mastic Layer)
Analytical Method		NOB Tem	NOB Tem	NOB Tem	NOB Tem
Appearance	Layered	No	Yes	No	Yes
	Homogenous	Yes	No	Yes	No
	Fibrous	No	No	No	No
	Color	Gray	Black/Brown	Gray	Black/Brown
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND	ND	ND	ND
Other Materials Present	% Organic	17.3	32.6	16.9	33.1
	% Carbonates	78.2	22.6	79.1	22.5
	% Other Inorganic	4.5	44.8	4.0	44.4

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory. Samples received in acceptable condition unless otherwise noted. ND = Not Detected. Liability Limited To Cost Of Analysis. This Report Must Not be Used by the Client to Claim Product Endorsement by NVLAP or Any Agency of the US Government.
AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.
Chain of Custody Form

EAS Client:	QuES&T, Inc. 1376 Route 9 Wappingers Falls, NY 12590	EAS Batch No.	2209207
		Turn-Around:	Five Day
		Shipped Via:	NY DB004
Analyte:	Grav Tem	State of Origin:	NY
No. of Samples Received:	2	Sample Disposition:	Standard x Return
No. of Samples Analyzed:	2		
Client Project Number/Name:	RE: CPN 22-4988 - Nanuet UFSD - Nanuet High School - 103 Church Street - Nanuet, NY		

Lab ID Numbers: 2877979-2877980

Collected By:	N. Salerno/T. McAfee		Date: 11/11/2022	
Received By:	Damien Warner		Date: 11/11/2022	Time: 1959
Logged In By:	Damien Warner		Date: 11/20/2022	
Prepped By:	Fahrudin Lalic		Date: 11/21/2022	
Analyzed By :	Fahrudin Lalic		Date: 11/22/2022	Time: 0125
Re-Analyzed By:			Date:	
Checked By:	Damien Warner		Date: 11/22/2022	
E-Transmitted By:	Damien Warner		Date: 11/22/2022	Time: 1128
Logged Out By:			Date:	

Quality Environmental Solutions and Technologies, Inc.
Bulk Sample Chain of Custody

CLIENT: **Nanuet UFSD**

SAMPLED BY: **N. Salerno & T. McAfee**

ADDRESS: **101 Church Street**
Nanuet, NY 10954

DATE SAMPLED: **11-Nov-22**

CONTACT: **Rudy Villianyi**

ANALYSIS METHOD: **PLM/ PLM-NOB/QTEM**

PROJECT ID: **Nanuet High School**
103 Church Street, Nanuet, NY 10954

TURN-AROUND TIME: **Standard**

PROJECT # : **22-4988**

Sample	HM#	Floor	Space Name/ID #	Location	Material
2877979 4988-HS-A-01	1	First	Band Room	FLOOR, ON CONCRETE, 1'x1", GRAY	FLOOR TILE AND MASTIC
2877980 4988-HS-A-02	1	First	Band Room	FLOOR, ON CONCRETE, 1'x1", GRAY	FLOOR TILE AND MASTIC

Comments:

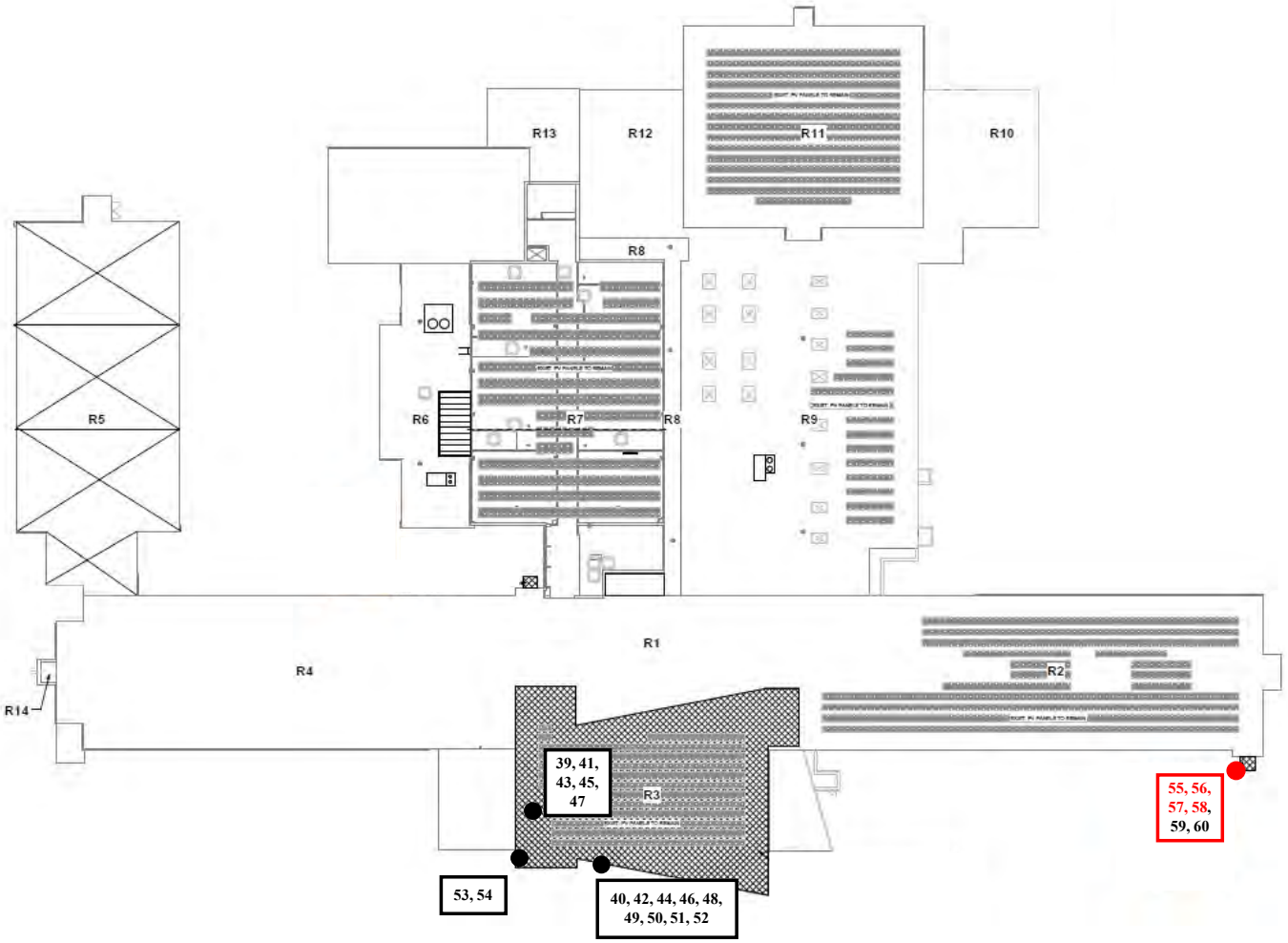
SUBMITTED BY:

DATE: 11/11/22

RECEIVED BY:

NOV 11 '22 19:59
DATE:

PAGE 1 OF 1



SAMPLE LOCATION KEY	
●	Sample Location (Non-ACM)
●	Sample Location (ACM)

N

Drawing Not to Scale
This Drawing is not intended to be used as the sole basis for soliciting pricing for asbestos abatement. An abatement plan, specification, drawing and/or variances should be developed to identify scope, timing, phasing and remediation means & methods for any asbestos project.

Date: 10/21/2022	**Version #** 1
Issued For: Asbestos Survey	
QuES&T Project #: 22-4988	
Project Manager: TM	**Prepared By:** NDS

QuES&T

Quality Environmental Solutions & Technologies, Inc.
1376 Route 9
Wappingers Falls, NY 12590
Phone: (845) 298- 6031
Fax: (845) 298-6251

CLIENT

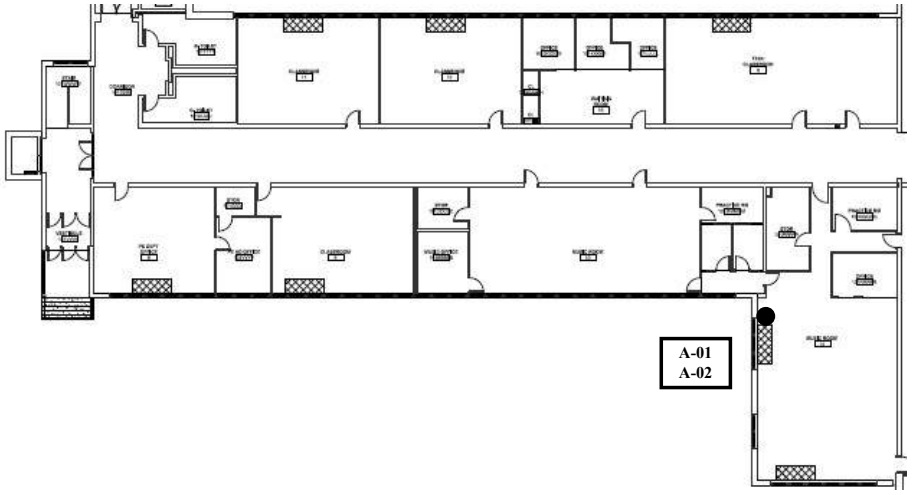
NANUET UFSD
101 Church Street
Nanuet, NY 10954

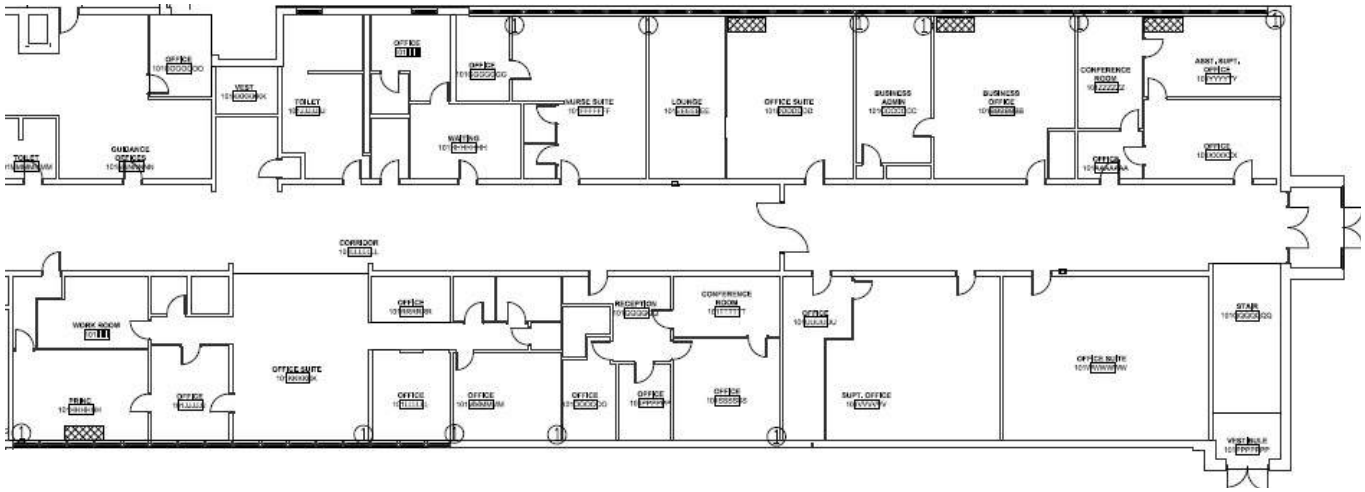
PROJECT LOCATION

NANUET HIGH SCHOOL
103 Church Street
Nanuet, NY 10954

ROOF SAMPLE LOCATIONS

SL-03





SAMPLE LOCATION KEY	
●	Sample Location (Non-ACM)
●	Sample Location (ACM)

N

Drawing Not to Scale
This Drawing is not intended to be used as the sole basis for soliciting pricing for asbestos abatement. An abatement plan, specification, drawing and/or variances should be developed to identify scope, timing, phasing and remediation means & methods for any asbestos project.

Date: 10/21/2022	**Version #** 1
Issued For: Asbestos Survey	
QuES&T Project #: 22-4988	
Project Manager: TM	**Prepared By:** NDS

QuES&T

Quality Environmental
Solutions & Technologies, Inc.
1376 Route 9
Wappingers Falls, NY 12590
Phone: (845) 298- 6031
Fax: (845) 298-6251

CLIENT

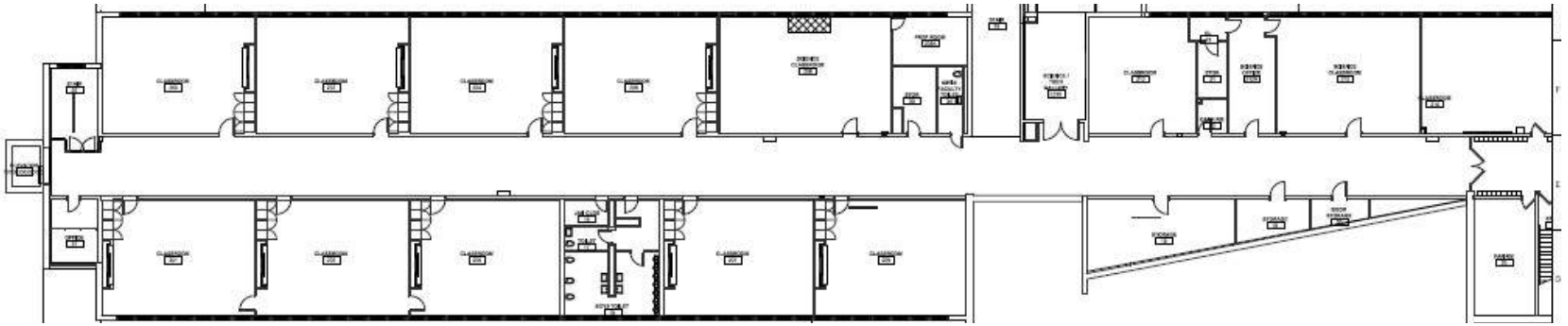
NANUET UFSD
101 Church Street
Nanuet, NY 10954

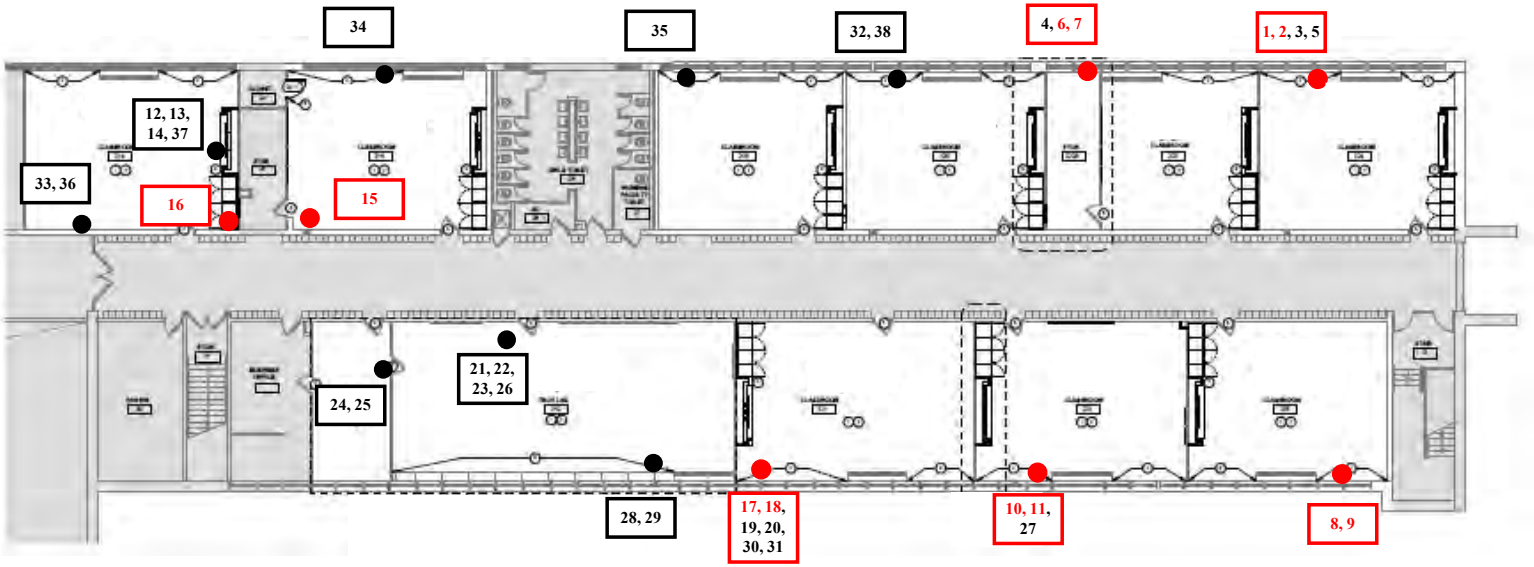
PROJECT LOCATION

NANUET HIGH SCHOOL
103 Church Street
Nanuet, NY 10954

PARTIAL FIRST FLOOR SAMPLE LOCATIONS

SL-01





SAMPLE LOCATION KEY	
●	Sample Location (Non-ACM)
●	Sample Location (ACM)

N

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Date: 10/21/2022	Version # 1
Issued For: Asbestos Survey	
QuES&T Project #: 22-4988	
Project Manager: TM	**Prepared By:** NDS

QuES&T

Quality Environmental Solutions & Technologies, Inc.
1376 Route 9
Wappingers Falls, NY 12590
Phone: (845) 298- 6031
Fax: (845) 298-6251

CLIENT

NANUET UFSD
101 Church Street
Nanuet, NY 10954

PROJECT LOCATION

NANUET HIGH SCHOOL
103 Church Street
Nanuet, NY 10954

PARTIAL SECOND FLOOR SAMPLE LOCATIONS

SL-02

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/18/2022
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.1
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client: QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-MS-06	4988-MS-06	4988-MS-07	4988-MS-07
Layer Number		1	2	1	2
Lab ID Number		2869344	2869344	2869345	2869345
Sample Location		First Floor, Wood Shop, Room 110, Wall	First Floor, Wood Shop, Room 110, Wall	First Floor, Technology Room 108, Wall	First Floor, Technology Room 108, Wall
Sample Description		Block and Mortar (Block Layer)	Block and Mortar (Mortar Layer)	Block and Mortar (Block Layer)	Block and Mortar (Mortar Layer)
Method of Quantification		Scanning Option	Scanning Option	Scanning Option	Scanning Option
Appearance	Layered	Yes	Yes	Yes	Yes
	Homogenous	No	No	No	No
	Fibrous	No	No	No	No
	Color	Gray/White	Gray/White	Gray/White	Gray/White
Sample Treatment		Homogenized	Homogenized	Homogenized	Homogenized
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND	ND	ND	ND
Other Fibrous Materials Present	% Fibrous Glass	ND	ND	ND	ND
	% Cellulose	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Unidentified	ND	ND	ND	ND
Non-Fibrous Materials Present	% Silicates	25.0	30.0	25.0	30.0
	% Carbonates	30.0	25.0	25.0	25.0
	% Other	ND	ND	ND	ND
	% Unidentified	45.0	45.0	50.0	45.0

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory. ND = Not Detected. Reporting Limit is <1%.
Liability Limited To Cost Of Analysis. This Report Must Not be Used by the Client to Claim Product Endorsement by NVLAP or Any Agency of the US Government.
These Results Can Not Be Used To Claim That NOB Items Tested Are Non-Asbestos Containing. Overall Lab Accuracy ± 17%. Samples received in acceptable condition unless otherwise noted.
AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
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Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.1
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client: QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-MS-14	4988-MS-15	4988-MS-18	4988-MS-18
Layer Number				1	2
Lab ID Number		2869346	2869347	2869348	2869348
Sample Location		First Floor, Classroom 118, Floor, Under Floor Tile	First Floor, Classroom 112, Floor, Under Floor Tile	First Floor, Classroom 112, Wall with Door, On Wire Lath	First Floor, Classroom 112, Wall with Door, On Wire Lath
Sample Description		Concrete Slab	Concrete Slab	Plaster (Plaster Layer)	Plaster (Scratch Layer)
Method of Quantification		Scanning Option	Scanning Option	Scanning Option	Scanning Option
Appearance	Layered	No	No	Yes	No
	Homogenous	No	No	No	Yes
	Fibrous	No	No	No	No
	Color	Gray/Brown	Gray/Brown	White/Gray	Gray
Sample Treatment		Homogenized	Homogenized	Homogenized	None
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND	ND	ND	ND
Other Fibrous Materials Present	% Fibrous Glass	ND	ND	ND	ND
	% Cellulose	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Unidentified	ND	ND	ND	ND
Non-Fibrous Materials Present	% Silicates	20.0	25.0	10.0	30.0
	% Carbonates	35.0	35.0	45.0	25.0
	% Other	ND	ND	ND	ND
	% Unidentified	45.0	40.0	45.0	45.0

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Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/18/2022
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.1
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client: QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-MS-19	4988-MS-19	4988-MS-20	4988-MS-20
Layer Number		1	2	1	2
Lab ID Number		2869349	2869349	2869350	2869350
Sample Location		First Floor, Classroom 112, Wall with Door, On Wire Lath	First Floor, Classroom 112, Wall with Door, On Wire Lath	First Floor, Classroom 112, Wall with Door, On Wire Lath	First Floor, Classroom 112, Wall with Door, On Wire Lath
Sample Description		Plaster (Plaster Layer)	Plaster (Scratch Layer)	Plaster (Plaster Layer)	Plaster (Scratch Layer)
Method of Quantification		Scanning Option	Scanning Option	Scanning Option	Scanning Option
Appearance	Layered	Yes	No	Yes	No
	Homogenous	No	Yes	No	Yes
	Fibrous	No	No	No	No
	Color	White/Gray	Gray	White/Gray	Gray
Sample Treatment		Homogenized	None	Homogenized	None
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND	ND	ND	ND
Other Fibrous Materials Present	% Fibrous Glass	ND	ND	ND	ND
	% Cellulose	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Unidentified	ND	ND	ND	ND
Non-Fibrous Materials Present	% Silicates	10.0	30.0	15.0	30.0
	% Carbonates	50.0	25.0	45.0	ND
	% Other	ND	ND	ND	20.0
	% Unidentified	40.0	45.0	40.0	50.0

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AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/18/2022
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.1
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client: QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-MS-30	4988-MS-31	4988-MS-32	4988-MS-33
Layer Number					
Lab ID Number		2869351	2869352	2869353	2869354
Sample Location		First Floor, Classroom 114, Wall	2nd Floor, Library, Wall	First Floor, Classroom 114, Wall, On Sheetrock	2nd Floor, Library, Wall, On Sheetrock
Sample Description		Sheetrock	Sheetrock	Joint Compound	Joint Compound
Method of Quantification		Scanning Option	Scanning Option	Scanning Option	Scanning Option
Appearance	Layered	Yes	Yes	Yes	Yes
	Homogenous	No	No	No	No
	Fibrous	Yes	Yes	No	No
	Color	Gray/Brown	Gray/Brown	White	White
Sample Treatment		Homogenized	Homogenized	Homogenized	Homogenized
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND	ND	ND	ND
Other Fibrous Materials Present	% Fibrous Glass	5.0	5.0	ND	ND
	% Cellulose	10.0	15.0	ND	ND
	% Other	ND	ND	ND	ND
	% Unidentified	ND	ND	ND	ND
Non-Fibrous Materials Present	% Silicates	25.0	25.0	30.0	25.0
	% Carbonates	30.0	25.0	30.0	30.0
	% Other	ND	ND	ND	ND
	% Unidentified	30.0	30.0	40.0	45.0

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Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY

Client: QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/18/2022
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.1
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Sample ID Number		4988-MS-34
Layer Number		
Lab ID Number		2869355
Sample Location		2nd Floor, Library, Wall, On Sheetrock
Sample Description		Joint Compound
Method of Quantification		Scanning Option
Appearance	Layered	Yes
	Homogenous	No
	Fibrous	No
	Color	White
Sample Treatment		Homogenized
Asbestos Content	% Amosite	ND
	% Chrysotile	ND
	% Other	ND
	% Total Asbestos	ND
Other Fibrous Materials Present	% Fibrous Glass	ND
	% Cellulose	ND
	% Other	ND
	% Unidentified	ND
Non-Fibrous Materials Present	% Silicates	30.0
	% Carbonates	30.0
	% Other	ND
	% Unidentified	40.0

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AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.
Chain of Custody Form

EAS Client:	QuES&T, Inc. 1376 Route 9 Wappingers Falls, NY 12590	EAS Batch No.	2208537
		Turn-Around:	5 Day
		Shipped Via:	NY DB004
Analyte:	% Asb	State of Origin:	NY
No. of Samples Received:	12	Sample Disposition:	Standard x Return
No. of Samples Analyzed:	12		
Client Project Number/Name:	RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY		
Lab ID Numbers:	2869344-2869345;2869346-2869347;2869348-2869350;2869351-2869355		

Collected By:	N. Salerno/J. Mages		Date: 10/12-13/2022	
Received By:	Damien Warner		Date: 10/14/2022	Time: 1856
Logged In By:	Marita Prado		Date: 10/17/2022	
Prepped By:	Marita Prado		Date: 10/18/2022	
Analyzed By :	George Htay		Date: 10/18/2022	Time: 1235
Re-Analyzed By:			Date:	
Checked By:	Damien Warner		Date: 10/26/2022	
E-Transmitted By:	Damien Warner		Date: 10/26/2022	Time: 1031
Logged Out By:			Date:	

Phone 914-592-8380 e-mail Lab@EASInc.com Fax 914-592-8956

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/24/2022
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-MS-01	4988-MS-02	4988-MS-03	4988-MS-04	
Layer Number						
Lab ID Number		2870369	2870370	2870371	2870372	
Sample Location		1st Floor, Classroom 118, In UV, On Pipe	1st Floor, Classroom 120, In UV, On Pipe	2nd Floor, Classroom 238, In UV, On Pipe	1st Floor, Technology Room 108, Floor, Under Carpet, On Concrete	
Sample Description		Wrap	Wrap	Wrap	Adhesive	
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm	
Appearance	Layered	No	No	No	No	
	Homogenous	Yes	Yes	Yes	Yes	
	Fibrous	No	No	No	No	
	Color	Black	Black	Black	Tan	
Asbestos Content	% Amosite	ND	ND	ND	ND	
	% Chrysotile	ND	ND	ND	ND	
	% Other	ND	ND	ND	ND	
	% Total Asbestos	ND	ND	ND	ND	Inconclusive
Other Materials Present	% Organic	82.4	81.5	81.0	46.0	
	% Carbonates	17.2	18.3	18.6	11.4	
	% Other Inorganic	0.4	0.2	0.4	42.6	

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This method does not remove vermiculite and may underestimate the level of asbestos present in a sample containing greater than 10% vermiculite.
AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
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Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-MS-05	4988-MS-08	4988-MS-08	4988-MS-09
Layer Number			1	2	1
Lab ID Number		2870373	2870374	2870374	2870375
Sample Location		1st Floor, Technology Room 108, Floor, Under Carpet, On Concrete	1st Floor, Technology Room 108, On Concrete Block, Wall	1st Floor, Technology Room 108, On Concrete Block, Wall	1st Floor, Technology Room 108, On Concrete Block, Wall
Sample Description		Adhesive	Covebase Molding and Adhesive (Molding Layer)	Covebase Molding and Adhesive (Adhesive Layer)	Covebase Molding and Adhesive (Molding Layer)
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	No	No	Yes	No
	Homogenous	Yes	Yes	No	Yes
	Fibrous	No	No	No	No
	Color	Tan	Blue	Beige/Brown	Blue
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND Inconclusive	ND Inconclusive	ND Inconclusive	ND Inconclusive
Other Materials Present	% Organic	49.7	56.9	42.6	57.3
	% Carbonates	16.4	41.1	3.8	40.7
	% Other Inorganic	33.9	2.0	53.6	2.0

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Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY

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Collected By : N. Salerno/J. Mages
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Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-MS-09	4988-MS-10	4988-MS-10	4988-MS-11
Layer Number		2	1	2	1
Lab ID Number		2870375	2870376	2870376	2870377
Sample Location		1st Floor, Technology Room 108, On Concrete Block, Wall	1st Floor, Classroom 112, Floor, Under 1' x 1', On Concrete	1st Floor, Classroom 112, Floor, Under 1' x 1', On Concrete	1st Floor, Classroom 112, Floor, Under 1' x 1', On Concrete
Sample Description		Covebase Molding and Adhesive (Adhesive Layer)	Floor Tile and Mastic (Tile Layer)	Floor Tile and Mastic (Mastic Layer)	Floor Tile and Mastic (Tile Layer)
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	Yes	No	No	No
	Homogenous	No	Yes	Yes	Yes
	Fibrous	No	No	No	No
	Color	Beige/Brown	Gray/Beige	Black	Gray/Beige
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	0.9	ND	0.5
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND Inconclusive	0.9 Inconclusive	ND Inconclusive	0.5 Inconclusive
Other Materials Present	% Organic	45.3	28.5	60.6	28.6
	% Carbonates	3.0	37.5	20.6	39.0
	% Other Inorganic	51.7	33.1	18.8	31.9

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Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/24/2022
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-MS-11	4988-MS-12	4988-MS-12	4988-MS-13
Layer Number		2	1	2	1
Lab ID Number		2870377	2870378	2870378	2870379
Sample Location		1st Floor, Classroom 112, Floor, Under 1' x 1', On Concrete	1st Floor, Classroom 112, Floor, On 9" x 9" Floor Tile, 1' x 1', Beige	1st Floor, Classroom 112, Floor, On 9" x 9" Floor Tile, 1' x 1', Beige	1st Floor, Classroom 112, Floor, On 9" x 9" Floor Tile, 1' x 1', Beige
Sample Description		Floor Tile and Mastic (Mastic Layer)	Floor Tile and Mastic (Tile Layer)	Floor Tile and Mastic (Mastic Layer)	Floor Tile and Mastic (Tile Layer)
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	No	No	No	No
	Homogenous	Yes	Yes	Yes	Yes
	Fibrous	No	No	No	No
	Color	Black	Beige/Black	Black	Beige/Black
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND Inconclusive	ND Inconclusive	ND Inconclusive	ND Inconclusive
Other Materials Present	% Organic	69.1	24.2	61.8	24.4
	% Carbonates	11.8	54.4	27.2	67.2
	% Other Inorganic	19.1	21.4	11.0	8.4

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AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/24/2022
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-MS-13	4988-MS-16	4988-MS-16	4988-MS-17
Layer Number		2	1	2	1
Lab ID Number		2870379	2870380	2870380	2870381
Sample Location		1st Floor, Classroom 112, Floor, On 9" x 9" Floor Tile, 1' x 1', Beige	1st Floor, Classroom 112, Floor, On Cementitious Wall, Black, 4 Inch	1st Floor, Classroom 112, Floor, On Cementitious Wall, Black, 4 Inch	1st Floor, Classroom 112, Floor, On Cementitious Wall, Black, 4 Inch
Sample Description		Floor Tile and Mastic (Mastic Layer)	Covebase Molding and Adhesive (Molding Layer)	Covebase Molding and Adhesive (Adhesive Layer)	Covebase Molding and Adhesive (Molding Layer)
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	No	No	No	No
	Homogenous	Yes	Yes	Yes	Yes
	Fibrous	No	No	No	No
	Color	Black	Black	Tan	Black
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND Inconclusive	ND	ND Inconclusive	ND
Other Materials Present	% Organic	55.0	56.8	71.3	56.2
	% Carbonates	14.7	42.8	2.3	43.2
	% Other Inorganic	30.3	0.4	26.4	0.6

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Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY

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Collected By : N. Salerno/J. Mages
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Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-MS-17	4988-MS-21	4988-MS-21	4988-MS-22
Layer Number		2	1	2	1
Lab ID Number		2870381	2870382	2870382	2870383
Sample Location		1st Floor, Classroom 112, Floor, On Cementitious Wall, Black, 4 Inch	1st Floor, Classroom 106, Floor, On Concrete, 9 x 9, Gray	1st Floor, Classroom 106, Floor, On Concrete, 9 x 9, Gray	1st Floor, Classroom 104, Floor, On Concrete, 12" x 12", Light Blue
Sample Description		Covebase Molding and Adhesive (Adhesive Layer)	Floor Tile and Mastic (Tile Layer)	Floor Tile and Mastic (Mastic Layer)	Floor Tile and Mastic (Tile Layer)
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	No	No	No	No
	Homogenous	Yes	Yes	Yes	Yes
	Fibrous	No	No	No	No
	Color	Tan	Gray	Black	Blue
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	< 0.3	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND Inconclusive	< 0.3 Inconclusive	ND Inconclusive	ND Inconclusive
Other Materials Present	% Organic	70.4	29.6	73.5	15.7
	% Carbonates	1.9	41.7	17.8	82.5
	% Other Inorganic	27.7	28.7	8.7	1.8

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Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/24/2022
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-MS-22	4988-MS-23	4988-MS-23	4988-MS-24
Layer Number		2	1	2	1
Lab ID Number		2870383	2870384	2870384	2870385
Sample Location		1st Floor, Classroom 104, Floor, On Concrete, 12" x 12", Light Blue	2nd Floor, Classroom 230, Floor, On Concrete, 12" x 12", White	2nd Floor, Classroom 230, Floor, On Concrete, 12" x 12", White	2nd Floor, Classroom 228, Floor, On Concrete, 12" x 12", White
Sample Description		Floor Tile and Mastic (Mastic Layer)	Floor Tile and Mastic (Tile Layer)	Floor Tile and Mastic (Mastic Layer)	Floor Tile and Mastic (Tile Layer)
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	No	No	No	No
	Homogenous	Yes	Yes	Yes	Yes
	Fibrous	No	No	No	No
	Color	Black	White	Black	White
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND Inconclusive	ND Inconclusive	ND Inconclusive	ND Inconclusive
Other Materials Present	% Organic	83.3	16.1	77.1	14.4
	% Carbonates	4.7	81.8	5.5	83.2
	% Other Inorganic	12.0	2.1	17.4	2.4

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Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/24/2022
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-MS-24	4988-MS-25	4988-MS-25	4988-MS-26
Layer Number		2	1	2	1
Lab ID Number		2870385	2870386	2870386	2870387
Sample Location		2nd Floor, Classroom 228, Floor, On Concrete, 12" x 12", White	2nd Floor, Classroom 200, Wall, 4", Black	2nd Floor, Classroom 200, Wall, 4", Black	2nd Floor, Classroom 222, Wall, 4", Gray
Sample Description		Floor Tile and Mastic (Mastic Layer)	Covebase Molding and Adhesive (Molding Layer)	Covebase Molding and Adhesive (Adhesive Layer)	Covebase Molding and Adhesive (Molding Layer)
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	No	No	Yes	No
	Homogenous	Yes	Yes	No	Yes
	Fibrous	No	No	No	No
	Color	Black	Black	Tan/Brown	Gray
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND Inconclusive	ND	ND Inconclusive	ND
Other Materials Present	% Organic	86.7	62.1	65.4	52.9
	% Carbonates	3.3	37.4	7.1	46.6
	% Other Inorganic	10.0	0.5	27.5	0.5

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Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/24/2022
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-MS-26	4988-MS-27	4988-MS-27	4988-MS-28
Layer Number		2	1	2	1
Lab ID Number		2870387	2870388	2870388	2870389
Sample Location		2nd Floor, Classroom 222, Wall, 4", Gray	1st Floor, Classroom 114, Wall, 4", Gray	1st Floor, Classroom 114, Wall, 4", Gray	2nd Floor, Classroom 202, Floor, Top Layer, On Floor Tile, 12" x 12", White/Black
Sample Description		Covebase Molding and Adhesive (Adhesive Layer)	Covebase Molding and Adhesive (Molding Layer)	Covebase Molding and Adhesive (Adhesive Layer)	Floor Tile and Mastic (Tile Layer)
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	Yes	No	Yes	No
	Homogenous	No	Yes	No	Yes
	Fibrous	No	No	No	No
	Color	Beige/Brown	Gray	Beige/Brown	White/Black
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND Inconclusive	ND Inconclusive	ND Inconclusive	ND Inconclusive
Other Materials Present	% Organic	45.4	56.4	46.7	23.2
	% Carbonates	34.7	41.5	33.0	67.4
	% Other Inorganic	19.9	2.1	20.3	9.4

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Eastern Analytical Services, Inc.

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RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
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Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-MS-28	4988-MS-29	4988-MS-29	4988-MS-35
Layer Number		2	1	2	1
Lab ID Number		2870389	2870390	2870390	2870391
Sample Location		2nd Floor, Classroom 202, Floor, Top Layer, On Floor Tile, 12" x 12", White/Black	2nd Floor, Classroom 240, Floor Tile, On Slab, 9 x 9, Gray	2nd Floor, Classroom 240, Floor Tile, On Slab, 9 x 9, Gray	2nd Floor, Resource Room 1, Floor, 12" x 12", Light Blue, On Slab
Sample Description		Floor Tile and Mastic (Mastic Layer)	Floor Tile and Mastic (Tile Layer)	Floor Tile and Mastic (Mastic Layer)	Floor Tile and Mastic (Tile Layer)
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	No	No	No	No
	Homogenous	Yes	Yes	Yes	Yes
	Fibrous	No	No	No	No
	Color	Black	Beige/Black	Black	Blue
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	< 0.3	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND Inconclusive	< 0.3 Inconclusive	ND Inconclusive	ND Inconclusive
Other Materials Present	% Organic	74.5	31.0	80.6	16.3
	% Carbonates	11.7	39.0	7.4	79.7
	% Other Inorganic	13.8	30.0	12.0	4.0

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Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/24/2022
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Sample ID Number		4988-MS-35	
Layer Number		2	
Lab ID Number		2870391	
Sample Location		2nd Floor, Resource Room 1, Floor, 12" x 12", Light Blue, On Slab	
Sample Description		Floor Tile and Mastic (Mastic Layer)	
Analytical Method		NOB Plm	
Appearance	Layered	No	
	Homogenous	Yes	
	Fibrous	No	
	Color	Black	
Asbestos Content	% Amosite	ND	
	% Chrysotile	ND	
	% Other	ND	
	% Total Asbestos	ND	Inconclusive
Other Materials Present	% Organic	56.8	
	% Carbonates	34.5	
	% Other Inorganic	8.7	

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Eastern Analytical Services, Inc.
Chain of Custody Form

EAS Client:	QuES&T, Inc. 1376 Route 9 Wappingers Falls, NY 12590	EAS Batch No.	2208538
		Turn-Around:	5 Day
		Shipped Via:	NY DB004
Analyte:	Grav Plm	State of Origin:	NY
No. of Samples Received:	23	Sample Disposition:	Standard x Return
No. of Samples Analyzed:	23		
Client Project Number/Name:	RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY		
Lab ID Numbers:	2870369-2870373;2870374-2870379;2870380-2870381;2870382-2870390;2870391		

Collected By:	N. Salerno/J. Mages		Date: 10/12-13/2022	
Received By:	Damien Warner		Date: 10/14/2022	Time: 1856
Logged In By:	Meghan A. Warner		Date: 10/20/2022	
Prepped By:	Damien Warner		Date: 10/23/2022	
Analyzed By :	George Htay		Date: 10/24/2022	Time: 1210
Re-Analyzed By:			Date:	
Checked By:	Damien Warner		Date: 10/26/2022	
E-Transmitted By:	Damien Warner		Date: 10/26/2022	Time: 1031
Logged Out By:			Date:	

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/26/2022
Analyzed By : Ernest Sanchez
Signature :
Analytical Method : NYS-DOH 198.4
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-MS-04	4988-MS-05	4988-MS-08	4988-MS-08
Layer Number				1	2
Lab ID Number		2870372	2870373	2870374	2870374
Sample Location		1st Floor, Technology Room 108, Floor, Under Carpet, On Concrete	1st Floor, Technology Room 108, Floor, Under Carpet, On Concrete	1st Floor, Technology Room 108, On Concrete Block, Wall	1st Floor, Technology Room 108, On Concrete Block, Wall
Sample Description		Adhesive	Adhesive	Covebase Molding and Adhesive (Molding Layer)	Covebase Molding and Adhesive (Adhesive Layer)
Analytical Method		NOB Tem	NOB Tem	NOB Tem	NOB Tem
Appearance	Layered	No	No	No	Yes
	Homogenous	Yes	Yes	Yes	No
	Fibrous	No	No	No	No
	Color	Tan	Tan	Blue	Beige/Brown
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND	ND	ND	ND
Other Materials Present	% Organic	46.0	49.7	56.9	42.6
	% Carbonates	11.4	16.4	41.1	3.8
	% Other Inorganic	42.6	33.9	2.0	53.6

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Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/26/2022
Analyzed By : Ernest Sanchez
Signature :
Analytical Method : NYS-DOH 198.4
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-MS-09	4988-MS-09	4988-MS-10	4988-MS-10
Layer Number		1	2	1	2
Lab ID Number		2870375	2870375	2870376	2870376
Sample Location		1st Floor, Technology Room 108, On Concrete Block, Wall	1st Floor, Technology Room 108, On Concrete Block, Wall	1st Floor, Classroom 112, Floor, Under 1' x 1', On Concrete	1st Floor, Classroom 112, Floor, Under 1' x 1', On Concrete
Sample Description		Covebase Molding and Adhesive (Molding Layer)	Covebase Molding and Adhesive (Adhesive Layer)	Floor Tile and Mastic (Tile Layer)	Floor Tile and Mastic (Mastic Layer)
Analytical Method		NOB Tem	NOB Tem	NOB Tem	NOB Tem
Appearance	Layered	No	Yes	No	No
	Homogenous	Yes	No	Yes	Yes
	Fibrous	No	No	No	No
	Color	Blue	Beige/Brown	Gray/Beige	Black
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	18.7	4.7
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND	ND	18.7	4.7
Other Materials Present	% Organic	57.3	45.3	28.5	60.6
	% Carbonates	40.7	3.0	37.5	20.6
	% Other Inorganic	2.0	51.7	15.3	14.1

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Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
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Analyzed By : Ernest Sanchez
Signature : 
Analytical Method : NYS-DOH 198.4
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-MS-11	4988-MS-11	4988-MS-12	4988-MS-12
Layer Number		1	2	1	2
Lab ID Number		2870377	2870377	2870378	2870378
Sample Location		1st Floor, Classroom 112, Floor, Under 1' x 1', On Concrete	1st Floor, Classroom 112, Floor, Under 1' x 1', On Concrete	1st Floor, Classroom 112, Floor, On 9" x 9" Floor Tile, 1' x 1', Beige	1st Floor, Classroom 112, Floor, On 9" x 9" Floor Tile, 1' x 1', Beige
Sample Description		Floor Tile and Mastic (Tile Layer)	Floor Tile and Mastic (Mastic Layer)	Floor Tile and Mastic (Tile Layer)	Floor Tile and Mastic (Mastic Layer)
Analytical Method		NOB Tem	NOB Tem	NOB Tem	NOB Tem
Appearance	Layered	No	No	No	No
	Homogenous	Yes	Yes	Yes	Yes
	Fibrous	No	No	No	No
	Color	Gray/Beige	Black	Beige/Black	Black
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	17.8	3.8	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	17.8	3.8	ND	ND
Other Materials Present	% Organic	28.6	69.1	24.2	61.8
	% Carbonates	39.0	11.8	54.4	27.2
	% Other Inorganic	14.6	15.3	21.4	11.0

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory. Samples received in acceptable condition unless otherwise noted. ND = Not Detected. Liability Limited To Cost Of Analysis. This Report Must Not be Used by the Client to Claim Product Endorsement by NVLAP or Any Agency of the US Government.
AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/26/2022
Analyzed By : Ernest Sanchez
Signature :
Analytical Method : NYS-DOH 198.4
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-MS-13	4988-MS-13	4988-MS-16	4988-MS-17
Layer Number		1	2	2	2
Lab ID Number		2870379	2870379	2870380	2870381
Sample Location		1st Floor, Classroom 112, Floor, On 9" x 9" Floor Tile, 1' x 1', Beige	1st Floor, Classroom 112, Floor, On 9" x 9" Floor Tile, 1' x 1', Beige	1st Floor, Classroom 112, Floor, On Cementitious Wall, Black, 4 Inch	1st Floor, Classroom 112, Floor, On Cementitious Wall, Black, 4 Inch
Sample Description		Floor Tile and Mastic (Tile Layer)	Floor Tile and Mastic (Mastic Layer)	Covebase Molding and Adhesive (Adhesive Layer)	Covebase Molding and Adhesive (Adhesive Layer)
Analytical Method		NOB Tem	NOB Tem	NOB Tem	NOB Tem
Appearance	Layered	No	No	No	No
	Homogenous	Yes	Yes	Yes	Yes
	Fibrous	No	No	No	No
	Color	Beige/Black	Black	Tan	Tan
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	< 0.1	< 0.3	< 0.3	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	< 0.1	< 0.3	< 0.3	ND
Other Materials Present	% Organic	24.4	55.0	71.3	70.4
	% Carbonates	67.2	14.7	2.3	1.9
	% Other Inorganic	8.4	30.3	26.4	27.7

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AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/26/2022
Analyzed By : Ernest Sanchez
Signature :
Analytical Method : NYS-DOH 198.4
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-MS-21	4988-MS-21	4988-MS-22	4988-MS-22
Layer Number		1	2	1	2
Lab ID Number		2870382	2870382	2870383	2870383
Sample Location		1st Floor, Classroom 106, Floor, On Concrete, 9 x 9, Gray	1st Floor, Classroom 106, Floor, On Concrete, 9 x 9, Gray	1st Floor, Classroom 104, Floor, On Concrete, 12" x 12", Light Blue	1st Floor, Classroom 104, Floor, On Concrete, 12" x 12", Light Blue
Sample Description		Floor Tile and Mastic (Tile Layer)	Floor Tile and Mastic (Mastic Layer)	Floor Tile and Mastic (Tile Layer)	Floor Tile and Mastic (Mastic Layer)
Analytical Method		NOB Tem	NOB Tem	NOB Tem	NOB Tem
Appearance	Layered	No	No	No	No
	Homogenous	Yes	Yes	Yes	Yes
	Fibrous	No	No	No	No
	Color	Gray	Black	Blue	Black
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	15.8	0.4	ND	1.2
	% Other	ND	ND	ND	ND
	% Total Asbestos	15.8	0.4	ND	1.2
Other Materials Present	% Organic	29.6	73.5	15.7	83.3
	% Carbonates	41.7	17.8	82.5	4.7
	% Other Inorganic	12.9	8.3	1.8	10.8

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AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/26/2022
Analyzed By : Ernest Sanchez
Signature : 
Analytical Method : NYS-DOH 198.4
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-MS-23	4988-MS-23	4988-MS-24	4988-MS-24
Layer Number		1	2	1	2
Lab ID Number		2870384	2870384	2870385	2870385
Sample Location		2nd Floor, Classroom 230, Floor, On Concrete, 12" x 12", White	2nd Floor, Classroom 230, Floor, On Concrete, 12" x 12", White	2nd Floor, Classroom 228, Floor, On Concrete, 12" x 12", White	2nd Floor, Classroom 228, Floor, On Concrete, 12" x 12", White
Sample Description		Floor Tile and Mastic (Tile Layer)	Floor Tile and Mastic (Mastic Layer)	Floor Tile and Mastic (Tile Layer)	Floor Tile and Mastic (Mastic Layer)
Analytical Method		NOB Tem	NOB Tem	NOB Tem	NOB Tem
Appearance	Layered	No	No	No	No
	Homogenous	Yes	Yes	Yes	Yes
	Fibrous	No	No	No	No
	Color	White	Black	White	Black
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND	ND	ND	ND
Other Materials Present	% Organic	16.1	77.1	14.4	86.7
	% Carbonates	81.8	5.5	83.2	3.3
	% Other Inorganic	2.1	17.4	2.4	10.0

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AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/26/2022
Analyzed By : Ernest Sanchez
Signature :
Analytical Method : NYS-DOH 198.4
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-MS-25	4988-MS-26	4988-MS-27	4988-MS-27
Layer Number		2	2	1	2
Lab ID Number		2870386	2870387	2870388	2870388
Sample Location		2nd Floor, Classroom 200, Wall, 4", Black	2nd Floor, Classroom 222, Wall, 4", Gray	1st Floor, Classroom 114, Wall, 4", Gray	1st Floor, Classroom 114, Wall, 4", Gray
Sample Description		Covebase Molding and Adhesive (Adhesive Layer)	Covebase Molding and Adhesive (Adhesive Layer)	Covebase Molding and Adhesive (Molding Layer)	Covebase Molding and Adhesive (Adhesive Layer)
Analytical Method		NOB Tem	NOB Tem	NOB Tem	NOB Tem
Appearance	Layered	Yes	Yes	No	Yes
	Homogenous	No	No	Yes	No
	Fibrous	No	No	No	No
	Color	Tan/Brown	Beige/Brown	Gray	Beige/Brown
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND	ND	ND	ND
Other Materials Present	% Organic	65.4	45.4	56.4	46.7
	% Carbonates	7.1	34.7	41.5	33.0
	% Other Inorganic	27.5	19.9	2.1	20.3

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AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/26/2022
Analyzed By : Ernest Sanchez
Signature :
Analytical Method : NYS-DOH 198.4
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-MS-28	4988-MS-28	4988-MS-29	4988-MS-29
Layer Number		1	2	1	2
Lab ID Number		2870389	2870389	2870390	2870390
Sample Location		2nd Floor, Classroom 202, Floor, Top Layer, On Floor Tile, 12" x 12", White/Black	2nd Floor, Classroom 202, Floor, Top Layer, On Floor Tile, 12" x 12", White/Black	2nd Floor, Classroom 240, Floor Tile, On Slab, 9 x 9, Gray	2nd Floor, Classroom 240, Floor Tile, On Slab, 9 x 9, Gray
Sample Description		Floor Tile and Mastic (Tile Layer)	Floor Tile and Mastic (Mastic Layer)	Floor Tile and Mastic (Tile Layer)	Floor Tile and Mastic (Mastic Layer)
Analytical Method		NOB Tem	NOB Tem	NOB Tem	NOB Tem
Appearance	Layered	No	No	No	No
	Homogenous	Yes	Yes	Yes	Yes
	Fibrous	No	No	No	No
	Color	White/Black	Black	Beige/Black	Black
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	5.5	18.0	2.4
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND	5.5	18.0	2.4
Other Materials Present	% Organic	23.2	74.5	31.0	80.6
	% Carbonates	67.4	11.7	39.0	7.4
	% Other Inorganic	9.4	8.3	12.0	9.6

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory. Samples received in acceptable condition unless otherwise noted. ND = Not Detected. Liability Limited To Cost Of Analysis. This Report Must Not be Used by the Client to Claim Product Endorsement by NVLAP or Any Agency of the US Government.
AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY

Date Collected : 10/12-13/2022
Collected By : N. Salerno/J. Mages
Date Received : 10/14/2022
Date Analyzed : 10/26/2022
Analyzed By : Ernest Sanchez
Signature :
Analytical Method : NYS-DOH 198.4
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-MS-35	4988-MS-35
Layer Number		1	2
Lab ID Number		2870391	2870391
Sample Location		2nd Floor, Resource Room 1, Floor, 12" x 12", Light Blue, On Slab	2nd Floor, Resource Room 1, Floor, 12" x 12", Light Blue, On Slab
Sample Description		Floor Tile and Mastic (Tile Layer)	Floor Tile and Mastic (Mastic Layer)
Analytical Method		NOB Tem	NOB Tem
Appearance	Layered	No	No
	Homogenous	Yes	Yes
	Fibrous	No	No
	Color	Blue	Black
Asbestos Content	% Amosite	ND	ND
	% Chrysotile	ND	ND
	% Other	ND	ND
	% Total Asbestos	ND	ND
Other Materials Present	% Organic	16.3	56.8
	% Carbonates	79.7	34.5
	% Other Inorganic	4.0	8.7

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AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.
Chain of Custody Form

EAS Client:	QuES&T, Inc. 1376 Route 9 Wappingers Falls, NY 12590	EAS Batch No.	2208539
		Turn-Around:	Five Day
		Shipped Via:	NY DB004
Analyte:	Grav Tem	State of Origin:	NY
No. of Samples Received:	23	Sample Disposition:	Standard x Return
No. of Samples Analyzed:	16		
Client Project Number/Name:	RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY		
Lab ID Numbers:	2870369-2870373;2870374-2870379;2870380-2870381;2870382-2870390;2870391		

Collected By:	N. Salerno/J. Mages		Date: 10/12-13/2022	
Received By:	Damien Warner		Date: 10/14/2022	Time: 1856
Logged In By:	Meghan A. Warner		Date: 10/20/2022	
Prepped By:	Damien Warner		Date: 10/25/2022	
Analyzed By :	Ernest Sanchez		Date: 10/26/2022	Time: 0945
Re-Analyzed By:			Date:	
Checked By:	Damien Warner		Date: 10/26/2022	
E-Transmitted By:	Damien Warner		Date: 10/26/2022	Time: 1031
Logged Out By:			Date:	

Phone 914-592-8380 e-mail Lab@EASInc.com Fax 914-592-8956

Quality Environmental Solutions and Technologies, Inc.
Bulk Sample Chain of Custody

CLIENT: Nanuet UFSD

SAMPLED BY: N.Salerno & J.Mages

ADDRESS: 101 Church Street
Nanuet, NY 10954

DATE SAMPLED: 10/12/22 & 10/13/22

CONTACT: Rudy Villanyl 845-627-9852

ANALYSIS METHOD: PLM/ PLM-NOB/QTEM

PROJECT ID: Nanuet Middle School
143 Church Street, Nanuet NY 10954

TURN-AROUND TIME: Standard

PROJECT # : 22-4988

Sample	HM#	Floor	Space Name/ID #	Location	Material
2870369 4988-MS-01	85	FIRST	CLASSROOM 118	IN UV , ON PIPE	WRAP
2870370 4988-MS-02	85	FIRST	CLASSROOM 120	IN UV , ON PIPE	WRAP
2870371 4988-MS-03	85	SECOND	CLASSROOM 238	IN UV , ON PIPE	WRAP
2870372 4988-MS-04	2	FIRST	TECHNOLOGY ROOM 108	FLOOR, UNDER CARPET, ON CONCRETE	ADHESIVE
2870373 4988-MS-05	2	FIRST	TECHNOLOGY ROOM 108	FLOOR, UNDER CARPET, ON CONCRETE	ADHESIVE
4988-MS-06	67	FIRST	WOOD SHOP, ROOM 110	WALL	BLOCK AND MORTAR
4988-MS-07	67	FIRST	TECHNOLOGY ROOM 108	WALL	BLOCK AND MORTAR
2870374 4988-MS-08	74	FIRST	TECHNOLOGY ROOM 108	ON CONCRETE BLOCK, WALL	COVEBASE MOLDING AND ADHESIVE
2870375 4988-MS-09	74	FIRST	TECHNOLOGY ROOM 108	ON CONCRETE BLOCK, WALL	COVEBASE MOLDING AND ADHESIVE
2870376 4988-MS-10	63	FIRST	CLASSROOM 112	FLOOR, UNDER 1'X1', ON CONCRETE	FLOOR TILE AND MASTIC
2870377 4988-MS-11	63	FIRST	CLASSROOM 112	FLOOR, UNDER 1'X1', ON CONCRETE	FLOOR TILE AND MASTIC
2870378 4988-MS-12	63	FIRST	CLASSROOM 112	FLOOR, ON 9"X9" FLOOR TILE, 1'X1', BEIGE	FLOOR TILE AND MASTIC
2870379 4988-MS-13	63	FIRST	CLASSROOM 112	FLOOR, ON 9"X9" FLOOR TILE, 1'X1', BEIGE	FLOOR TILE AND MASTIC
4988-MS-14	46	FIRST	CLASSROOM 118	FLOOR, UNDER FLOOR TILE	CONCRETE SLAB
4988-MS-15	46	FIRST	CLASSROOM 112	FLOOR, UNDER FLOOR TILE	CONCRETE SLAB

Comments:

SUBMITTED BY: Nicholas Salerno

DATE: 10/14/2022

RECEIVED BY:

OCT 14 '22 3:56

DATE:

Quality Environmental Solutions and Technologies, Inc.
Bulk Sample Chain of Custody

CLIENT: Nanuet UFSD

SAMPLED BY: N.Salerno & J.Mages

ADDRESS: 101 Church Street
Nanuet, NY 10954

DATE SAMPLED: 10/12/22 & 10/13/22

CONTACT: Rudy Villanyi 845-627-9852

ANALYSIS METHOD: PLM/ PLM-NOB/QTEM

PROJECT ID: Nanuet Middle School
143 Church Street, Nanuet NY 10954

TURN-AROUND TIME: Standard

PROJECT # : 22-4988

	Sample	HMA	Floor	Space Name/ID #	Location	Material
2870380	4988-MS-16	74	FIRST	CLASSROOM 112	ON CEMENTITOUS WALL, BLACK, 4 INCH	COVEBASE MOLDING AND ADHESIVE
2870381	4988-MS-17	74	FIRST	CLASSROOM 112	ON CEMENTITOUS WALL, BLACK, 4 INCH	COVEBASE MOLDING AND ADHESIVE
	4988-MS-18	69	FIRST	CLASSROOM 112	WALL WITH DOOR, ON WIRE LATHE	PLASTER
	4988-MS-19	69	FIRST	CLASSROOM 112	WALL WITH DOOR, ON WIRE LATHE	PLASTER
	4988-MS-20	69	FIRST	CLASSROOM 112	WALL WITH DOOR, ON WIRE LATHE	PLASTER
2870382	4988-MS-21	63	FIRST	CLASSROOM 106	FLOOR, ON CONCRETE, 9X9, GREY	FLOOR TILE AND MASTIC
2870383	4988-MS-22	63	FIRST	CLASSROOM 104	FLOOR, ON CONCRETE, 12"X12", LIGHT BLUE	FLOOR TILE AND MASTIC
2870384	4988-MS-23	63	SECOND	CLASSROOM 230	FLOOR, ON CONCRETE, 12"X12", WHITE	FLOOR TILE AND MASTIC
2870385	4988-MS-24	63	SECOND	CLASSROOM 228	FLOOR, ON CONCRETE, 12"X12", WHITE	FLOOR TILE AND MASTIC
2870386	4988-MS-25	74	SECOND	CLASSROOM 200	WALL, 4", BLACK	COVEBASE MOLDING AND ADHESIVE
2870387	4988-MS-26	74	SECOND	CLASSROOM 222	WALL, 4", GREY	COVEBASE MOLDING AND ADHESIVE
2870388	4988-MS-27	74	FIRST	CLASSROOM 114	WALL, 4", GREY	COVEBASE MOLDING AND ADHESIVE
2870389	4988-MS-28	63	SECOND	CLASSROOM 202	FLOOR, TOP LAYER, ON FLOOR TILE, 12"X12", WHITE/BLACK	FLOOR TILE AND MASTIC
2870390	4988-MS-29	63	SECOND	CLASSROOM 240	FLOOR TILE, ON SLAB, 9X9, GREY	FLOOR TILE AND MASTIC
	4988-MS-30	51	FIRST	CLASSROOM 114	WALL	SHEETROCK

Comments:

SUBMITTED BY: [signature]

DATE: 10/14/2022

RECEIVED BY: [signature]

DATE: [illegible]

Quality Environmental Solutions and Technologies, Inc.
Bulk Sample Chain of Custody

CLIENT: **Nanuet UFSD**

SAMPLED BY: **N.Salerno & J.Mages**

ADDRESS: **101 Church Street**
Nanuet, NY 10954

DATE SAMPLED: **10/12/22 & 10/13/22**

CONTACT: **Rudy Villanyi 845-627-9852**

ANALYSIS METHOD: **PLM/ PLM-NOB/QTEM**

PROJECT ID: **Nanuet Middle School**
143 Church Street, Nanuet NY 10954

TURN-AROUND TIME: **Standard**

PROJECT # : **22-4988**

Sample	HM	Floor	Space Name/ID	Location	Material
4988-MS-31	51	SECOND	LIBRARY	WALL	SHEETROCK
4988-MS-32	30	FIRST	CLASSROOM 114	WALL, ON SHEETROCK	JOINT COMPOUND
4988-MS-33	30	SECOND	LIBRARY	WALL, ON SHEETROCK	JOINT COMPOUND
4988-MS-34	30	SECOND	LIBRARY	WALL, ON SHEETROCK	JOINT COMPOUND
2670391 4988-MS-35	63	SECOND	RESOURCE ROOM 1	FLOOR, 12"X12", LIGHT BLUE, ON SLAB	FLOOR TILE AND MASTIC

Comments: _____

SUBMITTED BY: [signature]

DATE: 10/14/2022

RECEIVED BY: [signature]

OCT 14 '22 [illegible]

DATE: _____

ENS

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY

Date Collected : 11/10/2022
Collected By : N. Salerno/T. McAfee
Date Received : 11/11/2022
Date Analyzed : 11/14/2022
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.1
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client: QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-MS-A-03	4988-MS-A-04	4988-MS-A-10	4988-MS-A-13
Layer Number					
Lab ID Number		2875954	2875955	2875956	2875957
Sample Location		Upper Roof, Field, At RTU Location, Over Metal Deck, 2nd Layer	Upper Roof, Field, At RTU Location, Over Metal Deck, 2nd Layer	Lower Roof, Field, Over Security Vestibule, Over Metal Deck, 2nd Layer	2nd Floor, Hallway, Above Suspended Ceiling, On Metal Pipe Elbow
Sample Description		Perlite	Perlite	Perlite	Mudded Joint Packing
Method of Quantification		Scanning Option	Scanning Option	Scanning Option	Scanning Option
Appearance	Layered	Yes	Yes	Yes	No
	Homogenous	No	No	No	No
	Fibrous	Yes	Yes	Yes	Yes
	Color	Gray/Brown/Black	Gray/Brown/Black	Gray/Brown/Black	Gray
Sample Treatment		Homogenized	Homogenized	Homogenized	Homogenized
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND	ND	ND	ND
Other Fibrous Materials Present	% Fibrous Glass	ND	ND	ND	30.0
	% Cellulose	35.0	30.0	30.0	ND
	% Other	ND	ND	ND	ND
	% Unidentified	ND	ND	ND	ND
Non-Fibrous Materials Present	% Silicates	5.0	5.0	5.0	5.0
	% Carbonates	ND	ND	ND	20.0
	% Other	15.0 Perlite	15.0 Perlite	20.0 Perlite	ND
	% Unidentified	45.0	50.0	45.0	45.0

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory. ND = Not Detected. Reporting Limit is <1%.
Liability Limited To Cost Of Analysis. This Report Must Not be Used by the Client to Claim Product Endorsement by NVLAP or Any Agency of the US Government.
These Results Can Not Be Used To Claim That NOB Items Tested Are Non-Asbestos Containing. Overall Lab Accuracy ± 17%. Samples received in acceptable condition unless otherwise noted.
AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY

Date Collected : 11/10/2022
Collected By : N. Salerno/T. McAfee
Date Received : 11/11/2022
Date Analyzed : 11/14/2022
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.1
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client: QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-MS-A-14	4988-MS-A-15
Layer Number			
Lab ID Number		2875958	2875959
Sample Location		2nd Floor, Hallway, Above Suspended Ceiling, On Metal Pipe Elbow	2nd Floor, Hallway, Above Suspended Ceiling, On Metal Pipe Elbow
Sample Description		Mudded Joint Packing	Mudded Joint Packing
Method of Quantification		Scanning Option	Scanning Option
Appearance	Layered	No	No
	Homogenous	No	No
	Fibrous	Yes	Yes
	Color	Gray	Gray
Sample Treatment		Homogenized	Homogenized
Asbestos Content	% Amosite	ND	ND
	% Chrysotile	ND	ND
	% Other	ND	ND
	% Total Asbestos	ND	ND
Other Fibrous Materials Present	% Fibrous Glass	30.0	30.0
	% Cellulose	ND	ND
	% Other	ND	ND
	% Unidentified	ND	ND
Non-Fibrous Materials Present	% Silicates	5.0	5.0
	% Carbonates	25.0	25.0
	% Other	ND	ND
	% Unidentified	40.0	40.0

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory. ND = Not Detected. Reporting Limit is <1%.
Liability Limited To Cost Of Analysis. This Report Must Not be Used by the Client to Claim Product Endorsement by NVLAP or Any Agency of the US Government.
These Results Can Not Be Used To Claim That NOB Items Tested Are Non-Asbestos Containing. Overall Lab Accuracy ± 17%. Samples received in acceptable condition unless otherwise noted.
AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.
Chain of Custody Form

EAS Client:	QuES&T, Inc. 1376 Route 9 Wappingers Falls, NY 12590	EAS Batch No.	2209203
		Turn-Around:	5 Day
		Shipped Via:	NY DB004
Analyte:	% Asb	State of Origin:	NY
No. of Samples Received:	6	Sample Disposition:	Standard x Return
No. of Samples Analyzed:	6		
Client Project Number/Name:	RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY		

Lab ID Numbers: 2875954-2875955;2875956;2875957-2875959

Collected By:	N. Salerno/T. McAfee		Date: 11/10/2022	
Received By:	Damien Warner		Date: 11/11/2022	Time: 1959
Logged In By:	Marita Prado		Date: 11/14/2022	
Prepped By:	Marita Prado		Date: 11/14/2022	
Analyzed By :	George Htay		Date: 11/14/2022	Time: 1525
Re-Analyzed By:			Date:	
Checked By:	Damien Warner		Date: 11/22/2022	
E-Transmitted By:	Damien Warner		Date: 11/22/2022	Time: 1114
Logged Out By:			Date:	

Phone 914-592-8380 e-mail Lab@EASInc.com Fax 914-592-8956

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY

Date Collected : 11/10/2022
Collected By : N. Salerno/T. McAfee
Date Received : 11/11/2022
Date Analyzed : 11/21/2022
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-MS-A-01	4988-MS-A-02	4988-MS-A-05	4988-MS-A-06
Layer Number					
Lab ID Number		2877968	2877969	2877970	2877971
Sample Location		Upper Roof, Field, At RTU Location, Over Metal Deck, Top Layer	Upper Roof, Field, At RTU Location, Over Metal Deck, Top Layer	Upper Roof, Field, At RTU Location, Over Metal Deck, 3rd Layer	Upper Roof, Field, At RTU Location, Over Metal Deck, 3rd Layer
Sample Description		Rolled Roofing	Rolled Roofing	Isofoam	Isofoam
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	Yes	Yes	No	No
	Homogenous	No	No	Yes	Yes
	Fibrous	Yes	Yes	No	No
	Color	Black/Gray	Black/Gray	Yellow	Yellow
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND Inconclusive	ND Inconclusive	ND	ND
Other Materials Present	% Organic	60.0	64.9	99.3	98.4
	% Carbonates	14.9	12.7	0.5	1.4
	% Other Inorganic	25.1	22.4	0.2	0.2

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory. Samples received in acceptable condition unless otherwise noted. ND = Not Detected. Liability Limited To Cost Of Analysis. This Report Must Not be Used by the Client to Claim Product Endorsement by NVLAP or Any Agency of the US Government.
These Results Cannot Be Used To Claim That NOB Items Tested Are Non-Asbestos Containing (Unless "% Other Inorganic", As Reported Above, Is Less Than One Percent).
This method does not remove vermiculite and may underestimate the level of asbestos present in a sample containing greater than 10% vermiculite.
AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY

Date Collected : 11/10/2022
Collected By : N. Salerno/T. McAfee
Date Received : 11/11/2022
Date Analyzed : 11/21/2022
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-MS-A-07	4988-MS-A-07	4988-MS-A-08	4988-MS-A-08
Layer Number		1	2	1	2
Lab ID Number		2877972	2877972	2877973	2877973
Sample Location		Upper Roof, Field, At RTU Location, Over Metal Deck, Bottom Layer	Upper Roof, Field, At RTU Location, Over Metal Deck, Bottom Layer	Upper Roof, Field, At RTU Location, Over Metal Deck, Bottom Layer	Upper Roof, Field, At RTU Location, Over Metal Deck, Bottom Layer
Sample Description		Tar/Tar Paper (Tar Layer)	Tar/Tar Paper (Tar Paper Layer)	Tar/Tar Paper (Tar Layer)	Tar/Tar Paper (Tar Paper Layer)
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	No	Yes	No	Yes
	Homogenous	Yes	No	Yes	No
	Fibrous	No	Yes	No	Yes
	Color	Black	Black/Gray	Black	Black/Gray
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	< 0.1	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND	ND Inconclusive	< 0.1	ND Inconclusive
Other Materials Present	% Organic	99.6	92.7	99.7	92.4
	% Carbonates	0.2	4.6	0.1	5.1
	% Other Inorganic	0.2	2.7	0.2	2.5

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory. Samples received in acceptable condition unless otherwise noted. ND = Not Detected. Liability Limited To Cost Of Analysis. This Report Must Not be Used by the Client to Claim Product Endorsement by NVLAP or Any Agency of the US Government.
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AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY

Date Collected : 11/10/2022
Collected By : N. Salerno/T. McAfee
Date Received : 11/11/2022
Date Analyzed : 11/21/2022
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-MS-A-09	4988-MS-A-11	4988-MS-A-12	4988-MS-A-12
Layer Number				1	2
Lab ID Number		2877974	2877975	2877976	2877976
Sample Location		Lower Roof, Field, Over Security Vestibule, Over Metal Deck, Top Layer	Lower Roof, Field, Over Security Vestibule, Over Metal Deck, 3rd Layer	Lower Roof, Field, Over Security Vestibule, Over Metal Deck, Bottom Layer	Lower Roof, Field, Over Security Vestibule, Over Metal Deck, Bottom Layer
Sample Description		Rolled Roofing	Isofoam	Tar/Tar Paper (Tar Layer)	Tar/Tar Paper (Tar Paper Layer)
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	Yes	No	No	Yes
	Homogenous	No	Yes	Yes	No
	Fibrous	Yes	No	No	Yes
	Color	Black	Yellow	Black	Black
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND Inconclusive	ND	ND	ND Inconclusive
Other Materials Present	% Organic	90.3	98.7	99.3	31.6
	% Carbonates	8.0	1.2	0.4	67.2
	% Other Inorganic	1.7	0.1	0.3	1.2

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory. Samples received in acceptable condition unless otherwise noted. ND = Not Detected. Liability Limited To Cost Of Analysis. This Report Must Not be Used by the Client to Claim Product Endorsement by NVLAP or Any Agency of the US Government.
These Results Cannot Be Used To Claim That NOB Items Tested Are Non-Asbestos Containing (Unless "% Other Inorganic", As Reported Above, Is Less Than One Percent).
This method does not remove vermiculite and may underestimate the level of asbestos present in a sample containing greater than 10% vermiculite.
AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY

Date Collected : 11/10/2022
Collected By : N. Salerno/T. McAfee
Date Received : 11/11/2022
Date Analyzed : 11/21/2022
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-MS-A-16	4988-MS-A-17
Layer Number			
Lab ID Number		2877977	2877978
Sample Location		2nd Floor, Hallway, Suspended Ceiling, 2' x 4' Textured	2nd Floor, Hallway, Suspended Ceiling, 2' x 4' Textured
Sample Description		Ceiling Tile	Ceiling Tile
Analytical Method		NOB Plm	NOB Plm
Appearance	Layered	Yes	Yes
	Homogenous	No	No
	Fibrous	Yes	Yes
	Color	Gray/White/Beige	Gray/White
Asbestos Content	% Amosite	ND	ND
	% Chrysotile	ND	ND
	% Other	ND	ND
	% Total Asbestos	ND Inconclusive	ND Inconclusive
Other Materials Present	% Organic	13.9	13.6
	% Carbonates	37.7	35.7
	% Other Inorganic	48.4	50.7

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory. Samples received in acceptable condition unless otherwise noted. ND = Not Detected. Liability Limited To Cost Of Analysis. This Report Must Not be Used by the Client to Claim Product Endorsement by NVLAP or Any Agency of the US Government.
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This method does not remove vermiculite and may underestimate the level of asbestos present in a sample containing greater than 10% vermiculite.
AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.
Chain of Custody Form

EAS Client:	QuES&T, Inc. 1376 Route 9 Wappingers Falls, NY 12590	EAS Batch No.	2209204
		Turn-Around:	5 Day
		Shipped Via:	NY DB004
Analyte:	Grav Plm	State of Origin:	NY
No. of Samples Received:	11	Sample Disposition:	Standard x Return
No. of Samples Analyzed:	11		
Client Project Number/Name:	RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY		
Lab ID Numbers:	2877968-2877969;2877970-2877974;2877975-2877976;2877977-2877978		

Collected By:	N. Salerno/T. McAfee		Date: 11/10/2022	
Received By:	Damien Warner		Date: 11/11/2022	Time: 1959
Logged In By:	Damien Warner		Date: 11/20/2022	
Prepped By:	Marita Prado		Date: 11/21/2022	
Analyzed By :	George Htay		Date: 11/21/2022	Time: 1540
Re-Analyzed By:			Date:	
Checked By:	Damien Warner		Date: 11/22/2022	
E-Transmitted By:	Damien Warner		Date: 11/22/2022	Time: 1114
Logged Out By:			Date:	

Phone 914-592-8380 e-mail Lab@EASInc.com Fax 914-592-8956

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY

Date Collected : 11/10/2022
Collected By : N. Salerno/T. McAfee
Date Received : 11/11/2022
Date Analyzed : 11/22/2022
Analyzed By : Fahrudin Lalic
Signature :
Analytical Method : NYS-DOH 198.4
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-MS-A-01	4988-MS-A-02	4988-MS-A-07	4988-MS-A-08
Layer Number				2	2
Lab ID Number		2877968	2877969	2877972	2877973
Sample Location		Upper Roof, Field, At RTU Location, Over Metal Deck, Top Layer	Upper Roof, Field, At RTU Location, Over Metal Deck, Top Layer	Upper Roof, Field, At RTU Location, Over Metal Deck, Bottom Layer	Upper Roof, Field, At RTU Location, Over Metal Deck, Bottom Layer
Sample Description		Rolled Roofing	Rolled Roofing	Tar/Tar Paper (Tar Paper Layer)	Tar/Tar Paper (Tar Paper Layer)
Analytical Method		NOB Tem	NOB Tem	NOB Tem	NOB Tem
Appearance	Layered	Yes	Yes	Yes	Yes
	Homogenous	No	No	No	No
	Fibrous	Yes	Yes	Yes	Yes
	Color	Black/Gray	Black/Gray	Black/Gray	Black/Gray
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND	ND	ND	ND
Other Materials Present	% Organic	60.0	64.9	92.7	92.4
	% Carbonates	14.9	12.7	4.6	5.1
	% Other Inorganic	25.1	22.4	2.7	2.5

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory. Samples received in acceptable condition unless otherwise noted. ND = Not Detected. Liability Limited To Cost Of Analysis. This Report Must Not be Used by the Client to Claim Product Endorsement by NVLAP or Any Agency of the US Government.
AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY

Date Collected : 11/10/2022
Collected By : N. Salerno/T. McAfee
Date Received : 11/11/2022
Date Analyzed : 11/22/2022
Analyzed By : Fahrudin Lalic
Signature :
Analytical Method : NYS-DOH 198.4
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		4988-MS-A-09	4988-MS-A-12	4988-MS-A-16	4988-MS-A-17
Layer Number			2		
Lab ID Number		2877974	2877976	2877977	2877978
Sample Location		Lower Roof, Field, Over Security Vestibule, Over Metal Deck, Top Layer	Lower Roof, Field, Over Security Vestibule, Over Metal Deck, Bottom Layer	2nd Floor, Hallway, Suspended Ceiling, 2' x 4' Textured	2nd Floor, Hallway, Suspended Ceiling, 2' x 4' Textured
Sample Description		Rolled Roofing	Tar/Tar Paper (Tar Paper Layer)	Ceiling Tile	Ceiling Tile
Analytical Method		NOB Tem	NOB Tem	NOB Tem	NOB Tem
Appearance	Layered	Yes	Yes	Yes	Yes
	Homogenous	No	No	No	No
	Fibrous	Yes	Yes	Yes	Yes
	Color	Black	Black	Gray/White/Beige	Gray/White
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND	ND	ND	ND
Other Materials Present	% Organic	90.3	31.6	13.9	13.6
	% Carbonates	8.0	67.2	37.7	35.7
	% Other Inorganic	1.7	1.2	48.4	50.7

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory. Samples received in acceptable condition unless otherwise noted. ND = Not Detected. Liability Limited To Cost Of Analysis. This Report Must Not be Used by the Client to Claim Product Endorsement by NVLAP or Any Agency of the US Government.
AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DHP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.
Chain of Custody Form

EAS Client:	QuES&T, Inc. 1376 Route 9 Wappingers Falls, NY 12590	EAS Batch No.	2209205
		Turn-Around:	Five Day
		Shipped Via:	NY DB004
Analyte:	Grav Tem	State of Origin:	NY
No. of Samples Received:	11	Sample Disposition:	Standard x Return
No. of Samples Analyzed:	5		
Client Project Number/Name:	RE: CPN 22-4988 - Nanuet UFSD - Nanuet Middle School - 143 Church Street - Nanuet, NY		
Lab ID Numbers:	2877968-2877969;2877970-2877974;2877975-2877976;2877977-2877978		

Collected By:	N. Salerno/T. McAfee		Date: 11/10/2022	
Received By:	Damien Warner		Date: 11/11/2022	Time: 1959
Logged In By:	Damien Warner		Date: 11/20/2022	
Prepped By:	Fahrudin Lalic		Date: 11/21/2022	
Analyzed By :	Fahrudin Lalic		Date: 11/22/2022	Time: 0055
Re-Analyzed By:			Date:	
Checked By:	Damien Warner		Date: 11/22/2022	
E-Transmitted By:	Damien Warner		Date: 11/22/2022	Time: 1114
Logged Out By:			Date:	

Quality Environmental Solutions and Technologies, Inc.
Bulk Sample Chain of Custody

CLIENT: Nanuet UFSD
SAMPLED BY: N.Salerno & T. McAfee

ADDRESS: 101 Church Street
Nanuet, NY 10954
DATE SAMPLED: 10-Nov-22

CONTACT: Rudy Villanyi 845-627-9852
ANALYSIS METHOD: PLM/ PLM-NOB/QTEM

PROJECT ID: Nanuet Middle School
143 Church Street, Nanuet NY 10954
TURN-AROUND TIME: Standard

PROJECT # : 22-4988

	Sample	HM#	Floor	Space Name/ID #	Location	Material
2877968	4988-MS-A-01	1	Upper Roof	Upper Roof	Field, at RTU Location, over Metal Deck, Top Layer	Rolled Roofing
2877969	4988-MS-A-02	1	Upper Roof	Upper Roof	Field, at RTU Location, over Metal Deck, Top Layer	Rolled Roofing
	4988-MS-A-03	2	Upper Roof	Upper Roof	Field, at RTU Location, over Metal Deck, 2nd Layer	Perlite
	4988-MS-A-04	2	Upper Roof	Upper Roof	Field, at RTU Location, over Metal Deck, 2nd Layer	Perlite
2877970	4988-MS-A-05	3	Upper Roof	Upper Roof	Field, at RTU Location, over Metal Deck, 3rd Layer	Isofoam
2877971	4988-MS-A-06	3	Upper Roof	Upper Roof	Field, at RTU Location, over Metal Deck, 3rd Layer	Isofoam
2877972	4988-MS-A-07	4	Upper Roof	Upper Roof	Field, at RTU Location, over Metal Deck, Bottom Layer	Tar/Tar Paper
2877973	4988-MS-A-08	4	Upper Roof	Upper Roof	Field, at RTU Location, over Metal Deck, Bottom Layer	Tar/Tar Paper
2877974	4988-MS-A-09	1	Lower Roof	Lower Roof	Field, over Security Vesitbule, over Metal Deck, Top Layer	Rolled Roofing
	4988-MS-A-10	2	Lower Roof	Lower Roof	Field, over Security Vesitbule, over Metal Deck, 2nd Layer	Perlite
2877975	4988-MS-A-11	3	Lower Roof	Lower Roof	Field, over Security Vesitbule, over Metal Deck, 3rd Layer	Isofoam
2877976	4988-MS-A-12	4	Lower Roof	Lower Roof	Field, over Security Vesitbule, over Metal Deck, Bottom Layer	Tar/Tar Paper
	4988-MS-A-13	5	2nd Floor	2nd Floor, Hallway	Above Suspended Ceiling, on Metal Pipe Elbow	Mudded Joint Packing
	4988-MS-A-14	5	2nd Floor	2nd Floor, Hallway	Above Suspended Ceiling, on Metal Pipe Elbow	Mudded Joint Packing
	4988-MS-A-15	5	2nd Floor	2nd Floor, Hallway	Above Suspended Ceiling, on Metal Pipe Elbow	Mudded Joint Packing

Comments:

SUBMITTED BY:

DATE: 11/11/22

RECEIVED BY: D. Lamanna

DATE: NOV 11 '22 19:59

PAGE ___ OF ___

Quality Environmental Solutions and Technologies, Inc.
Bulk Sample Chain of Custody

CLIENT: Nanuet UFSD

SAMPLED BY: N.Salerno & T. McAfee

ADDRESS: 101 Church Street
Nanuet, NY 10954

DATE SAMPLED: 10-Nov-22

CONTACT: Rudy Villanyi 845-627-9852

ANALYSIS METHOD: PLM/ PLM-NOB/QTEM

PROJECT ID: Nanuet Middle School
143 Church Street, Nanuet NY 10954

TURN-AROUND TIME: Standard

PROJECT # : 22-4988

	Sample	HM#	Floor	Space Name/ID #	Location	Material
2877977	4988-MS-A-16	6	2nd Floor	2nd Floor, Hallway	Suspended Ceiling, 2'x4' Textured	Ceiling Tile
2877978	4988-MS-A-17	6	2nd Floor	2nd Floor, Hallway	Suspended Ceiling, 2'x4' Textured	Ceiling Tile

Comments:

SUBMITTED BY:

DATE: 11/11/22
NOV 11'22 19:59

RECEIVED BY: D Villanyi

DATE:

PAGE ____ OF ____

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 23-5368 - Nanuet UFSD - George W. Miller Elementary School - Roofing - ACM Testing

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Date Collected : 01/22/2024
Collected By : T. McAfee
Date Received : 01/22/2024
Date Analyzed : 01/24/2024
Analyzed By : Fahrudin Lalic
Signature :
Analytical Method : NYS-DOH 198.4
NVLAP Lab Code : 101646-0 (Testing)
NYS Lab No. 10851
Paul Stascavage ,Lab Director

Sample ID Number		5368-07	5368-08	5368-09
Layer Number				
Lab ID Number		2977927	2977928	2977929
Sample Location		Roof 1A, Field, Top Layer	Roof 4, Field, Top Layer	Roof 5, Field, Top Layer
Sample Description		Built-up Roofing	Built-up Roofing	Built-up Roofing
Analytical Method		NOB Tem	NOB Tem	NOB Tem
Appearance	Layered	No	No	No
	Homogenous	Yes	Yes	Yes
	Fibrous	Yes	Yes	Yes
	Color	Black	Black	Black
Asbestos Content	% Amosite	ND	ND	ND
	% Chrysotile	ND	ND	ND
	% Other	ND	ND	ND
	% Total Asbestos	ND	ND	ND
Other Materials Present	% Organic	88.9	89.5	92.2
	% Carbonates	2.5	4.3	2.9
	% Other Inorganic	8.6	6.2	4.9

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory. Samples received in acceptable condition unless otherwise noted. ND = Not Detected. Liability Limited To Cost Of Analysis. This Report Must Not be Used by the Client to Claim Product Endorsement by NVLAP or Any Agency of the US Government.
AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 23-5368 - Nanuet UFSD - George W. Miller Elementary School - Roofing - ACM Testing

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Date Collected : 01/22/2024
Collected By : T. McAfee
Date Received : 01/22/2024
Date Analyzed : 01/23/2024
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab Code : 101646-0 (Testing)
NYS Lab No. 10851
Paul Stascavage ,Lab Director

Sample ID Number		5368-01	5368-02	5368-03	5368-07
Layer Number					
Lab ID Number		2977924	2977925	2977926	2977927
Sample Location		Roof 1A, Field, Bottom Layer	Roof 4, Field, Bottom Layer	Roof 5, Field, Bottom Layer	Roof 1A, Field, Top Layer
Sample Description		Isofoam	Isofoam	Isofoam	Built-up Roofing
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	No	No	No	No
	Homogenous	Yes	Yes	Yes	Yes
	Fibrous	No	No	No	Yes
	Color	Yellow	Yellow	Yellow	Black
Asbestos Content	% Amosite	ND	ND	ND	ND
	% Chrysotile	ND	ND	ND	ND
	% Other	ND	ND	ND	ND
	% Total Asbestos	ND	ND	ND	ND Inconclusive
Other Materials Present	% Organic	99.3	99.3	99.8	88.9
	% Carbonates	0.5	0.6	0.1	2.5
	% Other Inorganic	0.2	0.1	0.1	8.6

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory. Samples received in acceptable condition unless otherwise noted. ND = Not Detected.
Liability Limited To Cost Of Analysis. This Report Must Not be Used by the Client to Claim Product Endorsement by NVLAP or Any Agency of the US Government.
These Results Cannot Be Used To Claim That NOB Items Tested Are Non-Asbestos Containing (Unless "% Other Inorganic", As Reported Above, Is Less Than One Percent).
This method does not remove vermiculite and may underestimate the level of asbestos present in a sample containing greater than 10% vermiculite.

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 23-5368 - Nanuet UFSD - George W. Miller Elementary School - Roofing - ACM Testing

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Date Collected : 01/22/2024
Collected By : T. McAfee
Date Received : 01/22/2024
Date Analyzed : 01/23/2024
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.6
NVLAP Lab Code : 101646-0 (Testing)
NYS Lab No. 10851
Paul Stascavage ,Lab Director

Sample ID Number		5368-08	5368-09
Layer Number			
Lab ID Number		2977928	2977929
Sample Location		Roof 4, Field, Top Layer	Roof 5, Field, Top Layer
Sample Description		Built-up Roofing	Built-up Roofing
Analytical Method		NOB Plm	NOB Plm
Appearance	Layered	No	No
	Homogenous	Yes	Yes
	Fibrous	Yes	Yes
	Color	Black	Black
Asbestos Content	% Amosite	ND	ND
	% Chrysotile	ND	ND
	% Other	ND	ND
	% Total Asbestos	ND Inconclusive	ND Inconclusive
Other Materials Present	% Organic	89.5	92.2
	% Carbonates	4.3	2.9
	% Other Inorganic	6.2	4.9

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory. Samples received in acceptable condition unless otherwise noted. ND = Not Detected.
Liability Limited To Cost Of Analysis. This Report Must Not be Used by the Client to Claim Product Endorsement by NVLAP or Any Agency of the US Government.
These Results Cannot Be Used To Claim That NOB Items Tested Are Non-Asbestos Containing (Unless "% Other Inorganic", As Reported Above, Is Less Than One Percent).
This method does not remove vermiculite and may underestimate the level of asbestos present in a sample containing greater than 10% vermiculite.

EAS Batch No. 2400315

Eastern Analytical Services, Inc.

Bulk Sample Results

RE: CPN 23-5368 - Nanuet UFSD - George W. Miller Elementary School - Roofing - ACM Testing

Client: QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Date Collected : 01/22/2024
Collected By : T. McAfee
Date Received : 01/22/2024
Date Analyzed : 01/23/2024
Analyzed By : George Htay
Signature :
Analytical Method : NYS-DOH 198.1
NVLAP Lab Code : 101646-0 (Testing)
NYS Lab No. 10851
Paul Stascavage ,Lab Director

Sample ID Number		5368-04	5368-05	5368-06
Layer Number				
Lab ID Number		2977943	2977944	2977945
Sample Location		Roof, Roof 1A, Field, 2nd Layer	Roof, Roof 4, Field, 2nd Layer	Roof, Roof 5, Field, 2nd Layer
Sample Description		Perlite	Perlite	Perlite
Method of Quantification		Scanning Option	Scanning Option	Scanning Option
Appearance	Layered	No	Yes	No
	Homogenous	No	No	No
	Fibrous	Yes	Yes	Yes
	Color	Brown	Brown/Black	Brown
Sample Treatment		Homogenized	Homogenized	Homogenized
Asbestos Content	% Amosite	ND	ND	ND
	% Chrysotile	ND	ND	ND
	% Other	ND	ND	ND
	% Total Asbestos	ND	ND	ND
Other Fibrous Materials Present	% Fibrous Glass	ND	ND	ND
	% Cellulose	30.0	25.0	30.0
	% Other	ND	ND	ND
	% Unidentified	ND	ND	ND
Non-Fibrous Materials Present	% Silicates	5.0	5.0	10.0
	% Carbonates	ND	ND	ND
	% Other	20.0 Perlite	15.0 Perlite	20.0 Perlite
	% Unidentified	45.0	55.0	40.0

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory. ND = Not Detected. Reporting Limit is <1%.
Liability Limited To Cost Of Analysis. This Report Must Not be Used by the Client to Claim Product Endorsement by NVLAP or Any Agency of the US Government.
These Results Can Not Be Used To Claim That NOB Items Tested Are Non-Asbestos Containing. Overall Lab Accuracy ± 17%. Samples received in acceptable condition unless otherwise noted.
AIHA LAP, LLC No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Quality Environmental Solutions and Technologies, Inc.
Bulk Sample Chain of Custody

CLIENT: **NANUET UFSD**

ADDRESS: **101 CHURCH STREET**
NANUET, NY 10954

CONTACT: **RUDY VILLANYI**

PROJECT ID: **GEORGE W. MILLER ELEMENTARY SCHOOL**
ROOFING - ACM TESTING

PROJECT # : **23-5368**

SAMPLED BY: **T. MCAFEE**

DATE SAMPLED: **22-Jan-24**

ANALYSIS METHOD: PLM/PLM-NOB/QTEM **AS NESCESSARY**

TURN-AROUND TIME: **2 Day**

Sample	HM#	Floor	Space Name/ID #	Location	Material
5368-01	1	Roof	Roof 1A, Field	Bottom Layer	Isofoam
5368-02	1	Roof	Roof 4, Field	Bottom Layer	Isofoam
5368-03	1	Roof	Roof 5, Field	Bottom Layer	Isofoam
2977943 5368-04	2	Roof	Roof 1A, Field	2nd Layer	Perlite
2977944 5368-05	2	Roof	Roof 4, Field	2nd Layer	Perlite
2977945 5368-06	2	Roof	Roof 5, Field	2nd Layer	Perlite
5368-07	3	Roof	Roof 1A, Field	Top Layer	Built-up Roofing
5368-08	3	Roof	Roof 4, Field	Top Layer	Built-up Roofing
5368-09	3	Roof	Roof 5, Field	Top Layer	Built-up Roofing

AS LABELED ON PAPERWORK
INITIAL/DATE: MP, 1/23/2024

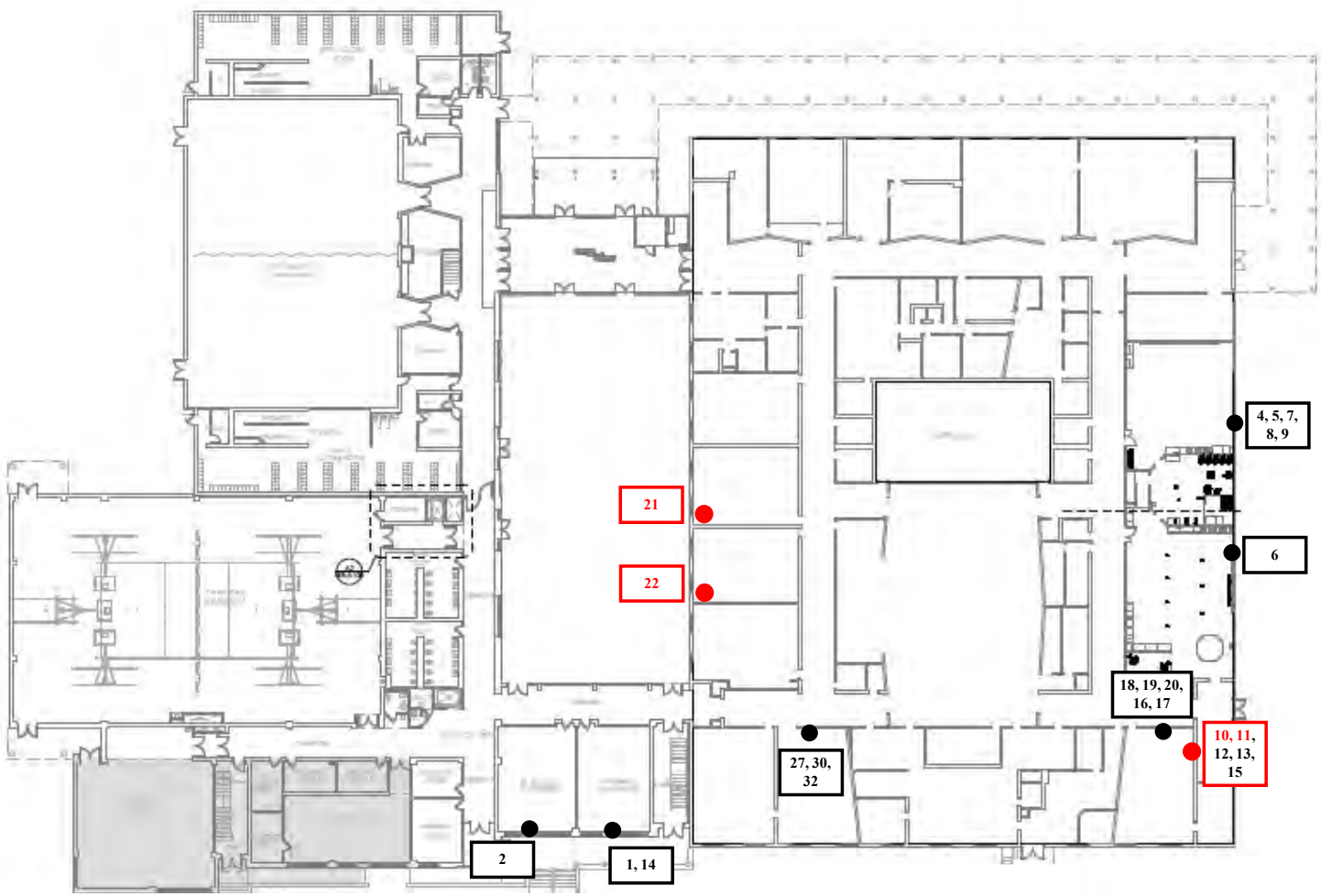
Comments:

SUBMITTED BY:

JAN 22 '24 19:59 DATE: 1/22/24

RECEIVED BY: MDWARNER

DATE:



SAMPLE LOCATION KEY	
●	Sample Location (Non-ACM)
●	Sample Location (ACM)

N

Drawing Not to Scale
This Drawing is not intended to be used as the sole basis for soliciting pricing for asbestos abatement. An abatement plan, specification, drawing and/or variances should be developed to identify scope, timing, phasing and remediation means & methods for any asbestos project.

Date: 10/21/2022	**Version #** 1
Issued For: Asbestos Survey	
QuES&T Project #: 22-4988	
Project Manager: TM	**Prepared By:** NDS

QuES&T

Quality Environmental Solutions & Technologies, Inc.
1376 Route 9
Wappingers Falls, NY 12590
Phone: (845) 298- 6031
Fax: (845) 298-6251

CLIENT

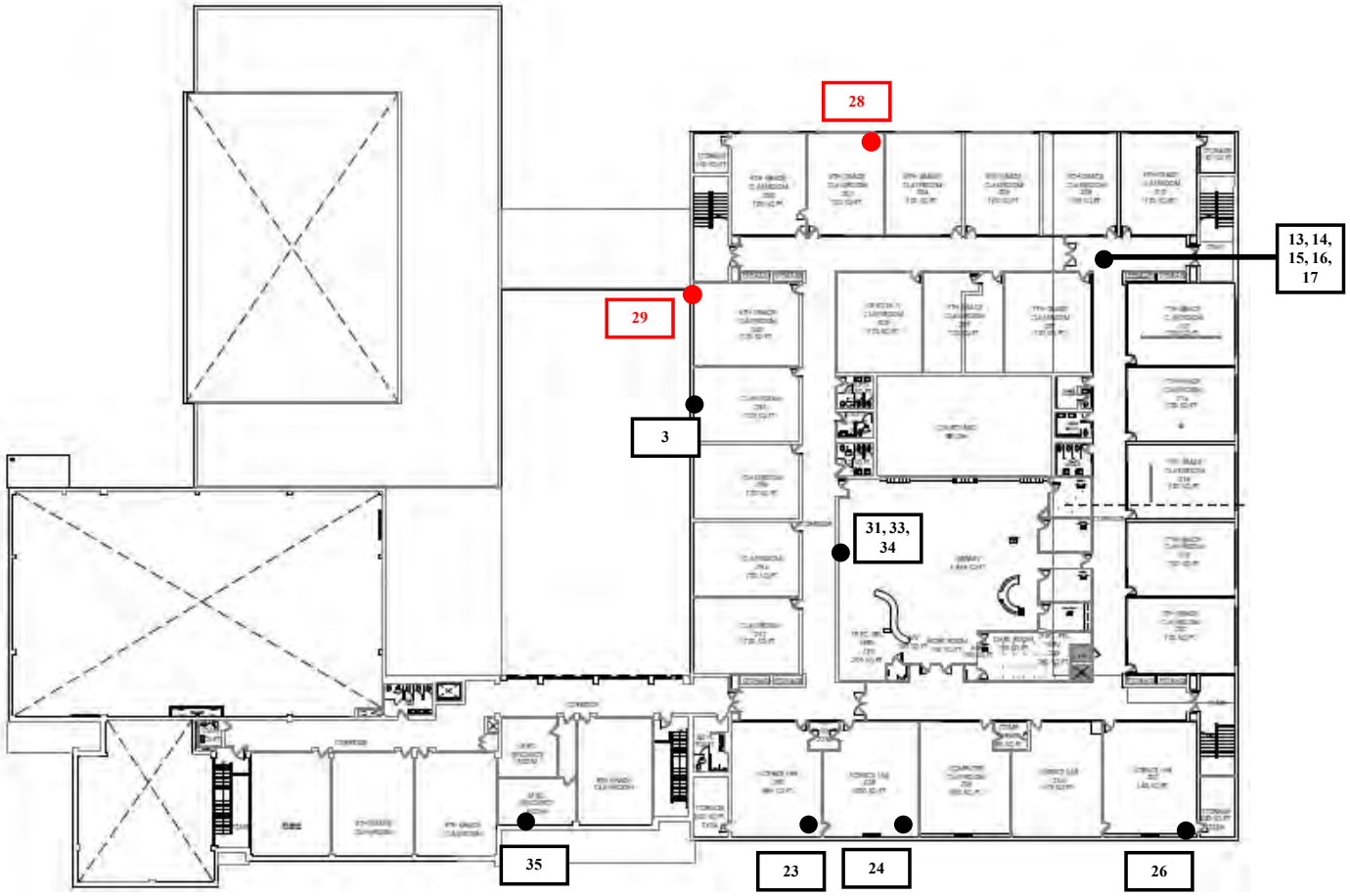
NANUET UFSD
101 Church Street
Nanuet, NY 10954

PROJECT LOCATION

NANUET MIDDLE SCHOOL
143 Church Street
Nanuet, NY 10954

FIRST FLOOR SAMPLE LOCATIONS

SL-04



SAMPLE LOCATION KEY	
●	Sample Location (Non-ACM)
●	Sample Location (ACM)

N

Drawing Not to Scale

This Drawing is not intended to be used as the sole basis for soliciting pricing for asbestos abatement. An abatement plan, specification, drawing and/or variances should be developed to identify scope, timing, phasing and remediation means & methods for any asbestos project.

Date: 10/26/2022	**Version #** 1
Issued For: Asbestos Survey	
QuES&T Project #: 22-4988	
Project Manager: TM	**Prepared By:** NDS

QuES&T

Quality Environmental Solutions & Technologies, Inc.
1376 Route 9
Wappingers Falls, NY 12590
Phone: (845) 298- 6031
Fax: (845) 298-6251

CLIENT

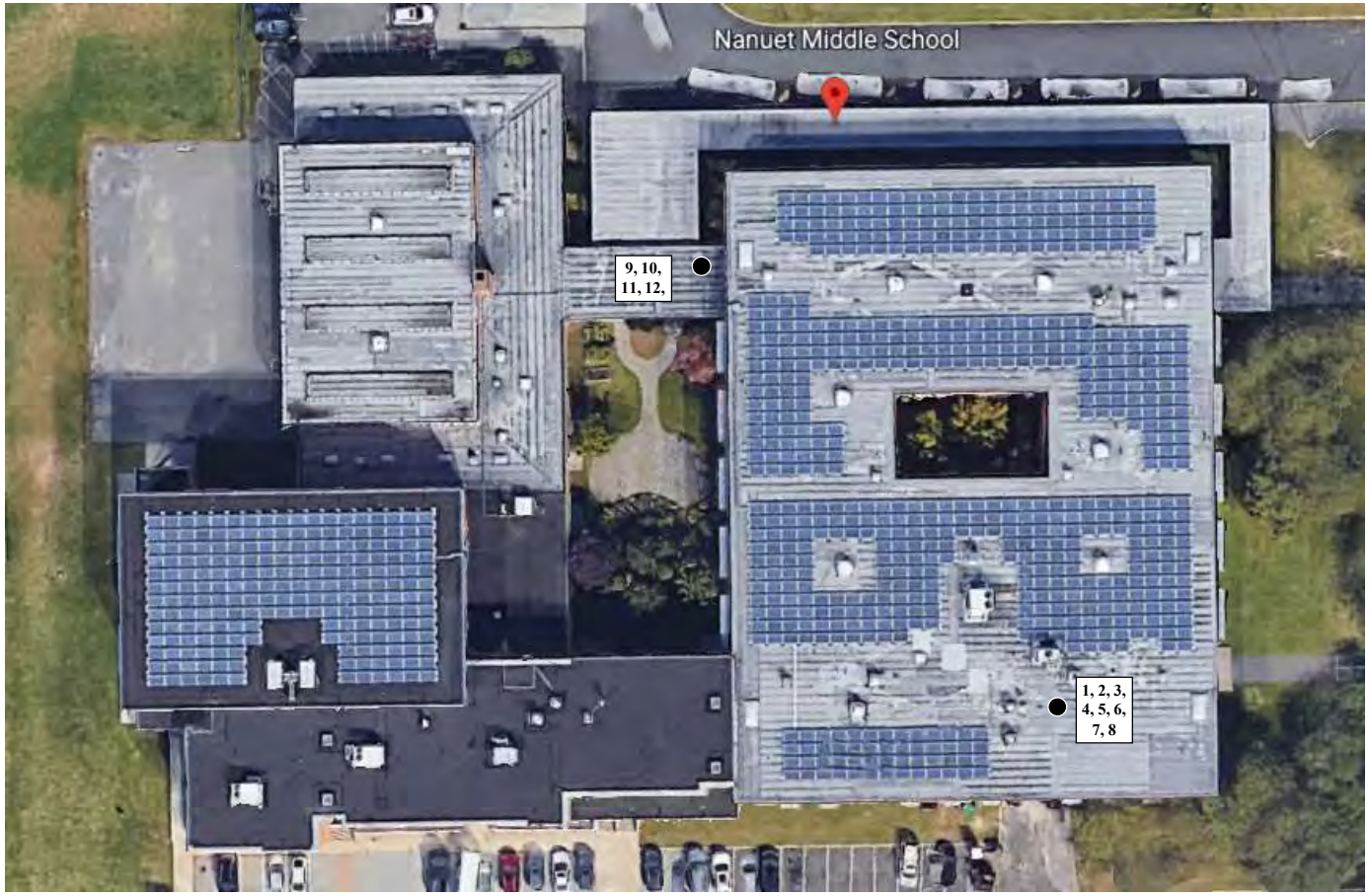
NANUET UFSD
101 Church Street
Nanuet, NY 10954

PROJECT LOCATION

NANUET MIDDLE SCHOOL
143 Church Street
Nanuet, NY 10954

SECOND FLOOR SAMPLE LOCATIONS

SL-05



SAMPLE LOCATION KEY	
●	Sample Location (Non-ACM)
●	Sample Location (ACM)

N

Drawing Not to Scale
This Drawing is not intended to be used as the sole basis for soliciting pricing for asbestos abatement. An abatement plan, specification, drawing and/or variances should be developed to identify scope, timing, phasing and remediation means & methods for any asbestos project.

Date: 10/21/2022	**Version #** 1
Issued For: Asbestos Survey	
QuES&T Project #: 22-4988	
Project Manager: TM	**Prepared By:** NDS

QuES&T

Quality Environmental
Solutions & Technologies, Inc.
1376 Route 9
Wappingers Falls, NY 12590
Phone: (845) 298- 6031
Fax: (845) 298-6251

CLIENT

NANUET UFSD
101 Church Street
Nanuet, NY 10954

PROJECT LOCATION

NANUET MIDDLE SCHOOL
143 Church Street
Nanuet, NY 10954

ROOF SAMPLE LOCATIONS

SL-06

Appendix C:
LEAD BASED PAINT PHOTOS
& XRF ANALYTICAL DATA



ABOVE: LBP Tack Boards – White – Throughout Scope of Work

Quality Environmental Solutions & Technologies
1376 Route 9
Wappingers Falls, NY 12590
(845) 298-6031

Limited XRF LBP Testing

Nanuet UFSD
101 Church Street
Nanuet, NY 10954
@Nanuet High School
22-4988

Sample	Building/Address	Interior/Exterior	Floor	Space/Room/Description	Object	Component	Substrate	Color	Condition	Result	Pb Concentration (mg/cm2)
1	Shutter Calibration										3.14
2	NIST (<0.01)									Negative	0
3	***NIST (1.04 +/- 0.06)***									***Positive***	***1***
4	Nanuet High School	Interior	2nd	Classroom 224	Wall		Plaster	White	Fair	Negative	0
5	Nanuet High School	Interior	2nd	Classroom 224	Wall	Cove Base	Vinyl	Black	Fair	Negative	0
6	Nanuet High School	Interior	2nd	Classroom 224	Window	Sill	Metal	Brown	Fair	Negative	0.11
7	Nanuet High School	Interior	2nd	Classroom 224	Radiator	Cover	Metal	Brown	Fair	Negative	0.01
8	Nanuet High School	Interior	2nd	Classroom 224	Casework		Wood	White	Fair	Negative	0.14
9	Nanuet High School	Interior	2nd	Classroom 225	Door	Casing	Metal	Grey	Fair	Negative	0.06
10	Nanuet High School	Interior	2nd	Classroom 225	Ceiling		Plaster	White	Fair	Negative	0
11	Nanuet High School	Interior	2nd	Classroom 222	Wall		Sheetrock	White	Fair	Negative	0
12	Nanuet High School	Interior	2nd	Classroom 221	Wall	Cove Base	Vinyl	Blue	Fair	Negative	0
13	Nanuet High School	Interior	2nd	Classroom 221	Wall		Metal	White	Fair	Negative	0.07
14	***Nanuet High School***	***Interior***	***2nd***	***Tech Lab 219***	***Wall***	***Tack Board***	***Cork***	***White***	***Fair***	***Positive***	***3.2***
15	Nanuet High School	Interior	2nd	Tech Lab 219	Wall	Cove Base	Vinyl	Black	Fair	Negative	0.01
16	Nanuet High School	Interior	2nd	Tech Lab 219	Casework		Metal	Brown	Fair	Negative	0
17	***Nanuet High School***	***Interior***	***2nd***	***Classroom 216***	***Wall***	***Tack Board***	***Cork***	***White***	***Fair***	***Positive***	***2.1***
18	***Nanuet High School***	***Interior***	***2nd***	***Classroom 214***	***Wall***	***Tack Board***	***Cork***	***White***	***Fair***	***Positive***	***2.6***
19	***Nanuet High School***	***Interior***	***2nd***	***Classroom 218***	***Wall***	***Tack Board***	***Cork***	***White***	***Fair***	***Positive***	***2.3***
20	***Nanuet High School***	***Interior***	***2nd***	***Classroom 221***	***Wall***	***Tack Board***	***Cork***	***White***	***Fair***	***Positive***	***2.9***
21	***Nanuet High School***	***Interior***	***2nd***	***Classroom 220***	***Wall***	***Tack Board***	***Cork***	***White***	***Fair***	***Positive***	***2.2***
22	***Nanuet High School***	***Interior***	***2nd***	***Classroom 223***	***Wall***	***Tack Board***	***Cork***	***White***	***Fair***	***Positive***	***2.4***
23	***Nanuet High School***	***Interior***	***2nd***	***Classroom 225***	***Wall***	***Tack Board***	***Cork***	***White***	***Fair***	***Positive***	***2.8***
24	***Nanuet High School***	***Interior***	***2nd***	***Classroom 222***	***Wall***	***Tack Board***	***Cork***	***White***	***Fair***	***Positive***	***2.8***
25	NIST (<0.01)									Negative	0
26	***NIST (1.04 +/- 0.06)***									***Positive***	***1.1***

Conducted: October 12, 2022
Niton XRF Technician(s): Nicholas Salerno

Quality Environmental Solutions & Technologies
1376 Route 9
Wappingers Falls, NY 12590
(845) 298-6031

Limited XRF LBP Testing

Nanuet UFSD
101 Church Street
Nanuet, NY 10954
@Nanuet High School
22-4988

Sample	*Building/Address*	*Interior/Exterior*	*Floor*	*Space/Room/Description*	*Object*	*Component*	*Substrate*	*Color*	*Condition*	*Result*	*Pb Concentration (mg/cm2)*
1	Shutter Calibration										3.14
2	NIST (<0.01)									Negative	0
3	***NIST (1.04 +/- 0.06)***									***Positive***	***1***
4	Nanuet High School	Interior	1st	Office Suite	Wall		Plaster	White	Intact	Negative	0
5	Nanuet High School	Interior	1st	Nurse Office	Wall		Plaster	White	Intact	Negative	0
6	Nanuet High School	Interior	1st	Admin Offcie	Wall		Plaster	White	Intact	Negative	0.11
7	Nanuet High School	Interior	1st	Music Room	Wall		Plaster	White	Intact	Negative	0.01
8	Nanuet High School	Interior	1st	Classroom 9	Wall		Plaster	White	Intact	Negative	0.14
9	Nanuet High School	Interior	1st	Classroom 11	Wall		Plaster	White	Intact	Negative	0.06
10	Nanuet High School	Interior	2nd	Classroom 207	Wall		Plaster	White	Intact	Negative	0
11	Nanuet High School	Interior	2nd	Classroom 208	Wall		Plaster	White	Intact	Negative	0
12	NIST (<0.01)									Negative	0
13	***NIST (1.04 +/- 0.06)***									***Positive***	***1.1***

Conducted: November 10, 2022
Niton XRF Technician(s): Todd McAfee

QuES&T
Quality Environmental Solutions & Technologies, Inc.

Appendix D:
PCB ANALYTICAL DATA

1376 Route 9, Wappingers Falls, NY 12590 Phone (845) 298-6031 Fax (845) 298-6251
NYS MWBD MBE Cert # 49952-2006 NYSUCP DBE Certified NJUCP DBE Certified www.Qualityenv.com

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Appendix E:
PERSONNEL LICENSES & CERTIFICATIONS

NEW YORK STATE

MINORITY- AND WOMEN-OWNED BUSINESS ENTERPRISE ("MWBE")

CERTIFICATION

Empire State Development's Division of Minority and Women's Business Development grants a

Women Business Enterprise (WBE)

pursuant to New York State Executive Law, Article 15-A to:

Quality Environmental Solutions & Technologies Inc.

Certification Awarded on: March 28, 2019
Expiration Date: March 28, 2024
File ID#: WBE- 49952

NEW YORK STATE OF OPPORTUNITY. Division of Minority and Women's Business Development

A Division of Empire State Development

New York State – Department of Labor
Division of Safety and Health
License and Certificate Unit
State Campus, Building 12
Albany, NY 12240

ASBESTOS HANDLING LICENSE

Quality Environmental Solutions & Technologies, Inc.

1376 Route 9

Wappinger Falls, NY 12590

FILE NUMBER: 99-0018
LICENSE NUMBER: 29085
LICENSE CLASS: RESTRICTED
DATE OF ISSUE: 01/21/2022
EXPIRATION DATE: 01/31/2023

Duly Authorized Representative – Lawrence J Holzapfel:

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

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

Amy Phillips, Director
For the Commissioner of Labor

SH 432 (8/12)

STATE OF NEW YORK - DEPARTMENT OF LABOR
ASBESTOS CERTIFICATE

N.Y.S



NICHOLAS D SALERNO
CLASS(EXPIRES)
C ATEC(06/23) D INSP(06/23)
H PM (06/23)

CERT# 16-10991
DMV# 102522202

MUST BE CARRIED ON ASBESTOS PROJECTS

01213 006454714 40

EYES BRO
HAIR BRO
HGT 6' 00"

IF FOUND RETURN TO:
NYSDOL - L&C UNIT
ROOM 161A BUILDING 12
STATE OFFICE CAMPUS
ALBANY NY 12240

OSHA Occupational Safety and Health Administration

This card acknowledges that the recipient has successfully completed a 10-hour Occupational Safety and Health Training Course in

Construction Safety and Health

NICHOLAS SALERNO

CURTIS CHAMBERS — (Trainer name – print or type)

11/1/2018 — (Course end date)

OSHA recommends Outreach Training Courses as an orientation to occupational safety and health for workers. Participation is voluntary. Workers must receive additional training on specific hazards of their job. This course completion card does not expire.

Use or distribution of this card for fraudulent purposes, including false claims of having received training, may result in prosecution under 18 U.S.C. 1001. Potential penalties include substantial criminal fines, imprisonment up to five years, or both.

For OSHA Outreach Training Program go to "Training" at www.osha.gov

Rev. 9/2009

United States Environmental Protection Agency

This is to certify that



Nicholas D Salerno

has fulfilled the requirements of the Toxic Substances Control Act (TSCA) Section 402, and has received certification to conduct lead-based paint activities pursuant to 40 CFR Part 745.226 as:

Inspector

In the Jurisdiction of:

All EPA Administered Lead-based Paint Activities Program States, Tribes and Territories

This certification is valid from the date of issuance and expires March 14, 2023

LBP-I-I210690-1

Certification #

February 29, 2020

Issued On

Susan Schulz, Acting Chief

Chemicals and Multimedia Programs Branch

ThermoFisher
SCIENTIFIC

CERTIFICATE

This Certifies that

Nicholas Salerno

Has successfully completed

Safety Training for
~ US Regulations for Handheld XRF Analyzers with Radioactive Sealed Sources ~

Supervisor Signature

1/22/2021
COMPLETION DATE

Jean Geslin
Jean Geslin, RSO
Thermo Fisher Scientific

ThermoFisher
SCIENTIFIC

CERTIFICATE

This Certifies that

Nicholas Salerno

Has successfully completed

Safety Training for
~ Sealed Source XRF - Radiation Safety~

Supervisor Signature

1/22/2021
COMPLETION DATE

Jean Geslin
Jean Geslin, RSO
Thermo Fisher Scientific

ThermoFisher
SCIENTIFIC

CERTIFICATE

This Certifies that

Nicholas Salerno

Has successfully completed

Safety Training for
~ Transport of Li Ion Batteries ~

Supervisor Signature

1/22/2021
COMPLETION DATE

Jean Geslin
Jean Geslin, RSO
Thermo Fisher Scientific

ThermoFisher
SCIENTIFIC

CERTIFICATE

This Certifies that

Nicholas Salerno

Has successfully completed

Safety Training for
~ Transport of Radioactive Sealed Sources in XRF Analyzers ~

Supervisor Signature

1/22/2021
COMPLETION DATE

Jean Geslin
Jean Geslin, RSO
Thermo Fisher Scientific

ThermoFisher
SCIENTIFIC

CERTIFICATE

This Certifies that

Nicholas Salerno

Has successfully completed

Safety Training for
~ Radiation Safety for X-ray Tube Based Instruments ~

Supervisor Signature

1/22/2021
COMPLETION DATE

Jean Geslin
Jean Geslin, RSO
Thermo Fisher Scientific

STATE OF NEW YORK - DEPARTMENT OF LABOR
ASBESTOS CERTIFICATE

N.Y.S



TODD J MCAFEE
CLASS(EXPIRES)
C ATEC(12/22) D INSP(12/22)
E MGPL(12/22) H PM (12/22)
I PD (12/22)

CERT# 12-10881
DMV# 238089839

MUST BE CARRIED ON ASBESTOS PROJECTS

01213 006208373 83

EYES BLU
HAIR BRO
HGT 5' 08"

IF FOUND RETURN TO:
NYSDOL - L&C UNIT
ROOM 161A BUILDING 12
STATE OFFICE CAMPUS
ALBANY NY 12240

OSHA Occupational Safety and Health Administration

12-003776375

his card acknowledges that the recipient has successfully completed a
10-hour Occupational Safety and Health Training Course in
Construction Safety and Health

Todd Mc Afee

David Veit — 06/06/2012

ainer name – print or type) — (Course end date)

HA recommends Outreach Training Courses as an orientation to occupational safety
l health for workers. Participation is voluntary. Workers must receive additional
ining on specific hazards of their job. This course completion card does not expire.

: or distribution of this card for fraudulent purposes, including false claims of having
eived training, may result in prosecution under 18 U.S.C. 1001. Potential penalties
lude substantial criminal fines, imprisonment up to five years, or both.

OSHA Outreach Training Program go to "Training" at www.osha.gov

Rev. 02/2009

United States Environmental Protection Agency

This is to certify that



Todd J McAfee

has fulfilled the requirements of the Toxic Substances Control Act (TSCA) Section 402, and has received certification to conduct lead-based paint activities pursuant to 40 CFR Part 745.226 as:

Risk Assessor

In the Jurisdiction of:

All EPA Administered Lead-based Paint Activities Program States, Tribes and Territories

This certification is valid from the date of issuance and expires April 17, 2024

LBP-R-I151913-2

Certification #

March 19, 2021

Issued On

Ben Conetta, Chief

Chemicals and Multimedia Programs Branch

United States Environmental Protection Agency

This is to certify that



Todd J McAfee

has fulfilled the requirements of the Toxic Substances Control Act (TSCA) Section 402, and has received certification to conduct lead-based paint activities pursuant to 40 CFR Part 745.226 as:

Inspector

In the Jurisdiction of:

All EPA Administered Lead-based Paint Activities Program States, Tribes and Territories

This certification is valid from the date of issuance and expires April 17, 2024

LBP-I-I151913-2

Certification #

March 19, 2021

Issued On

Ben Conetta

Ben Conetta, Chief

Chemicals and Multimedia Programs Branch

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. PAUL STASCAVAGE
EAS INC - EASTERN ANALYTICAL SERVICES INC
4 WESTCHESTER PLAZA
ELMSFORD, NY 10523-1610

NY Lab Id No: 10851

is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved subcategories and/or analytes are listed below:

Miscellaneous

Asbestos in Friable Material	Item 198.1 of Manual
	EPA 600/M4/82/020
Asbestos in Non-Friable Material-PLM	Item 198.6 of Manual (NOB by PLM)
Asbestos in Non-Friable Material-TEM	Item 198.4 of Manual
Asbestos-Vermiculite-Containing Material	Item 198.8 of Manual
Lead in Dust Wipes	EPA 7000B
Lead in Paint	EPA 7000B

Sample Preparation Methods

	EPA 3050B

Serial No.: 64479

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SECTION 02 4100 – SELECTIVE DEMOLITION

PART 1 - GENERAL

SECTION INCLUDES

A. Selective demolition of building elements for alteration purposes.

1.1 SUMMARY

A. Section 01 1000 - Summary: Limitations on Contractor's use of site and premises.

B. Section 01 7700 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.

1.2 REFERENCE STANDARDS

A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.

B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.

1.3 SUBMITTALS

A. See Section 01 3300 - Administrative Requirements, for submittal procedures.

1.4 QUALITY ASURRANCE

A. Demolition Firm Qualifications: Company specializing in the type of work required.

PART 2 PRODUCTS

2.1 REPAIR MATERIALS

A. Use repair materials identical to existing materials. Where identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.

B. Use materials whose installed performance equals or surpasses that of existing materials.

PART 3 EXECUTION

3.1 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.

1. Obtain required permits.
2. Comply with applicable requirements of NFPA 241.
3. Use of explosives is not permitted.
4. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
5. Provide, erect, and maintain temporary barriers and security devices.
6. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
7. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
8. Do not close or obstruct roadways or sidewalks without permit.
9. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.

B. Do not begin removal until receipt of notification to proceed from Owner.

C. Do not begin removal until built elements to be salvaged or relocated have been removed.

D. Protect existing structures and other elements that are not to be removed.

1. Provide bracing and shoring.
2. Prevent movement or settlement of adjacent structures.
3. Stop work immediately if adjacent structures appear to be in danger.

E. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

F. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.

G. Perform demolition in a manner that maximizes salvage and recycling of materials.

1. Comply with requirements of Section 01 7419 - Waste Management.
2. Dismantle existing construction and separate materials.
3. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.

3.2 EXISTING UTILITIES

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.

E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.

F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

H. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone; identify and mark utilities to be subsequently reconnected, in same manner as other utilities to remain.

3.3 SELECTIVE DEMOLITION FOR ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.

1. Verify that construction and utility arrangements are as shown.
2. Report discrepancies to Architect before disturbing existing installation.
3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.

B. Separate areas in which demolition is being conducted from other areas that are still occupied.

1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01 5000 in locations indicated on drawings.

C. Remove existing work as indicated and as required to accomplish new work.

1. Remove items indicated on drawings.

D. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.

1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
3. Verify that abandoned services serve only abandoned facilities before removal.
4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.

E. Protect existing work to remain.

1. Prevent movement of structure; provide shoring and bracing if necessary.
2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
3. Repair adjacent construction and finishes damaged during removal work.
4. Patch as specified for patching new work.

3.4 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash from site.

B. Remove from site all materials not to be reused on site; comply with requirements of Section 01 7419 - Waste Management.

C. Leave site in clean condition, ready for subsequent work.

D. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

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SECTION 03 54 00 - SELF-LEVELING TOPPINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 General Requirments, apply to this Section.

1.2 SUMMARY

A. This Section includes floor patching / leveling over existing substrates to provide a smooth floor surface on interior surfaces only.

1.3 REFERENCES

A. ASTM C 109M, Compressive Strength Air-Cure Only

B. ASTM C348, Flexural Strength of Hydraulic-Cement Mortars

C. ASTM E84, Surface Burning Characteristics of Building Materials

D. ASTM F2170, Relative Humidity in Concrete Floor Slabs Using in situ Probes

E. ASTM F1869, Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride

F. ASTM 710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring

1.4 SUBMITTALS

A. Furnish product data, samples, laboratory test reports, and materials certificates as specified in Section "Resilient Tile Flooring."

1.5 QUALITY ASSURANCE

A. Perform work in accordance with ACI 301.

B. Maintain copy of manufacturer’s installation instructions on site, with criteria for preparation and application.

PART 2 - PRODUCTS

3.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering pre-packaged topping mixes that may be incorporated in the Work include, but are not limited to, the following:

1. K-15, Ardex Inc.
2. Mapei Novaplan II .
3. Other products equal to above.

B. Design mix to produce topping material with the following characteristics:

1. Compressive strength: Minimum 4000 psi at 28 days.

C. Absolutely no gypsum based products will be allowed on the project.

3.2 MIXING

A. Site-mix per-packaged materials in accordance with manufacturer's instructions.

B. Mix to a consistency to achieve self-leveling.

C. Do not add water unless otherwise instructed, in writing, in the manufacturer's installation instructions and approved by the Architect.

D. Do not add additional aggregate unless otherwise instructed, in writing, in the manufacturer's installation instructions for extending.

PART 3 - EXECUTION

3.1 CONDITION OF SURFACES

A. Topping Applied to Hardened Concrete: Remove exiting floor finishes as required. Remove dirt, loose material, oil, grease, paint, or other contaminants, leaving a clean surface. Remove high points and projections from concrete.

B. Non-porous subfloors such as ceramic and quarry tile as well as terrazzo should be clean and free of all waxes and sealers.

C. Joints: Mark locations of joints in base slab so that joints in top course will be placed directly over them.

3.2 PLACING AND FINISHING

A. Apply products in accordance with manufacturer's instructions on floor surfaces. Do not proceed with installation until unsatisfactory conditions are corrected. Screed level in accordance with following tolerances:

1. Tolerances: Maximum variation of surface flatness shall not exceed 1/8 inch in 10 feet.

B. Steel trowel any surfaces which are scheduled to receive ceramic tile or to be exposed.

C. Coordinate installation with adjacent work to ensure proper sequence of construction. Protect adjacent areas from contact due to mixing and handling of materials.

3.3 CURING AND PROTECTION

A. Cure and protect topping applications and finishes in accordance with manufacturer's recommendations.

3.4 PERFORMANCE

A. Failure of concrete topping to bond to substrate (as evidenced by a hollow sound when tapped), or disintegration or other failure of topping to perform as a floor finish, will be considered failure of materials and workmanship. Repair or replace toppings in areas of such failures, as directed.

3.5 WASTE MANAGEMENT

A. Coordinate with Section 017423.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 03 54 00

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SECTION 03 73 30 – CONCRETE REPAIR WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including the General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
   1. Division 3

1.2 SUMMARY

A. Provide labor, materials, equipment, and services to provide for the repair of concrete members with manufactured repair concrete/mortar as specified herein. Work includes removing spalled concrete and cleaning and coating of exposed steel reinforcement.

1.3 REFERENCES

A. References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by governing codes or regulations, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work
   1. American Society of Testing and Materials (ASTM)
   2. Steel Structures Painting Council (SSPC)
      a. Hand Tool Cleaning - SP2
      b. Power Tool Cleaning – SP3
   3. International Concrete Restoration Institute (ICRI)

1.4 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Provide manufacturer's information on the anti-corrosion coating and repair concrete/mortar, including application instructions and specifications.

1.5 QUALITY ASSURANCE

A. Manufacturer: Company specializing in the manufacture of concrete repair mortars to be used in this Contract shall have a minimum of ten years experience.

1.6 DELIVERY, STORAGE AND HANDLING

A. Materials specified shall be delivered to the site in sealed, properly labeled containers. Containers shall indicate manufacturer's name, trade name of product, lot number, shelf life of product, and mix ratio (if applicable).

B. Keep containers tightly closed when not in use. Comply with manufacturer's printed instructions for storing and protecting materials.

C. Do not store liquid material in hot sun. Keep material from freezing.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Do not apply if the temperature is below 50°F or above 85°F unless the material manufacturer is consulted for recommendations.

B. Do not use frozen materials or materials coated with ice or frost.

C. Do not apply when there is expectation of rain within 24 hours.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Sika Corp, Lyndhurst, NJ 07071

B. Strongwall Industries, Ridgewood, NJ 07451

C. Mapei Corp, Deerfiled Beach, FL 33442

2.2 MATERIALS

A. Repair Concrete - Non-formed Application

1. Shall have non-shrink characteristics and be of high compressive and bond strength. Material shall be non-sag, capable of being troweled in place for vertical and overhead applications without the need of formwork and conform to the following properties:

a. Compressive strength of 5000 psi in 28 days when tested in accordance with ASTM C109.
b. Bond strength of 1700 psi in 28 days when tested in accordance with ASTM C882 (modified). Results of tests showing failure of base material is acceptable alternative.
c. Flexural strength of 1100 psi in 28 days when tested in accordance with ASTM C78 or ASTM C293 or 1400 psi when tested in accordance with ASTM C348.
d. Maximum linear length change shall be 0.080% when tested in accordance with ASTM C157 (dry cure).
e. Modulus of elasticity shall be between 3.0 and 3.5 x 10^6 when tested in accordance with ASTM C469.

2. Repair concrete/mortar shall be:

    a. Sikatop 123 Plus as manufactured by Sika.
    b. SWI-88 as manufactured by Strongwall Industries.
    c. Planitop 23 by Mapei.

B. Anti-corrosion Coating

1. Corrosion-inhibiting, epoxy/acrylic resin, protective coating for steel reinforcing bars that will not form a vapor barrier or bond break with the repair mortar with the following properties:

    a. Bond strength of 1500 psi in 2 hours when tested in accordance with ASTM C882.
    b. Flexural strength of 2000 psi in 28 days when tested in accordance with ASTM C78.
    c. Tensile strength of 800 psi in 28 days when tested in accordance with ASTM C190.

2. Anti-corrosion coating shall be:

    a. Armatec 110 as manufactured by Sika.
    b. Planibond 3C by Mapei.

C. Miscellaneous Materials

1. Water: Potable water, ASTM C94
    a.. J hooks: 1/4" diameter threaded rod, Type 316 stainless steel

2. Epoxy paste adhesive: ASTM C882
    a. Coarse aggregate: Clean, washed crushed stone, 3/8" maximum size, conforming to ASTM C33.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine all adjoining work on which this Work is in anyway dependent for proper installation and workmanship. Report any conditions that prevent the performance of this Work.

3.2 PREPARATION AND PROTECTION

A. Protect adjacent surfaces not to be restored. Protect sills, ledges, and projections from material droppings.

B. Surface Preparation

1. Remove spalled and weak concrete and remove all loose and foreign material. Chip substrate by bush hammering or other mechanical means acceptable to the repair concrete/mortar manufacturer to obtain a minimum aggregate-fractured surface profile of 1/8+" conforming to an ICRI CSP 7 or greater surface preparation. Minimum depth of repair shall be 1/2", with the perimeter of the repair having a minimum of 1/8" in depth. Feather edging is not permitted.

2. If steel reinforcing is exposed, chip out behind the reinforcing steel. Chip a minimum of 1/2" behind the bar and 3" past the point where the bar is exposed. Concrete behind bars shall be removed enough to allow for the entire circumference of the bar to be cleaned. Remove concrete to the point past where sound material begins.

3. Exposed steel reinforcement and steel beams shall be free of all rust, scale, oil, paint, grease, loose mill scale, and all other foreign matter that will prevent bonding with the repair concrete. Use power chipping or power driven brushes and clean to an SSPC-SP2 or SP3 surface preparation.

4. Where additional reinforcement is not shown to be anchored in and for patches greater than $1^1/_2$" in depth and overhead patches, install stainless steel threaded J hooks set in epoxy paste adhesive. Anchor is to be 3/4" clear minimum from finished face of repair. Hooks are to be embedded a minimum of 3" into concrete, installed diagonally to plane of concrete surface. Holes are to drilled 1/8" larger than rod diameter and shall be cleaned thoroughly. Space hooks at 16" o.c.

3.3 ANTI-CORROSION COATING APPLICATION

A. Mix anti-corrosion coating in accordance with manufacturer's instructions. Apply to dry reinforcing steel using a stiff bristle brush. Brush in well to ensure continuous coverage. Apply in two coats of approximately 10 mils each or as per manufacturer's latest recommendations.

B. Protect coated steel from weather and allow to dry a minimum of 30-45 minutes between coats or repair concrete/mortar application. However, apply repair material within 20 hours after last coating. If 20 hour period elapses, reapply bonding agent and allow to dry as above.

3.1 REPAIR CONCRETE/ MORTAR APPLICATION

A. Mix structural repair concrete in accordance with manufacturer's instruction. Follow time limits set by manufacturer to prevent hardening of material prior to placement. For material requiring extension with aggregate due to depth of repair, provide 3/8" aggregate of proportions specified by the repair mortar manufacturer.

B. Prior to application of material, thoroughly saturate surface with water. Remove any standing water prior to patching.

C. Apply a scrub coat of the repair material of proportions determined by manufacturer (indicate in written repair procedure). While still damp, apply repair concrete/mortar.

D. Apply material behind and around rebars first to completely fill void.

3.2 PROTECTION AND CLEANING

A. Clean all adjacent areas of excess material and clean all floors and walls of powder and droppings. Remove misplaced materials from surfaces immediately.

B. Protect material from freezing and from rainfall prior to final set.

END OF SECTION 03 73 30

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SECTION 04 01 20 - MAINTENANCE AND RESTORATION OF BRICK MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. The work of this Section consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all maintenance and restoration of unit masonry consisting of brick masonry restoration, re-pointing and cleaning as required by this section, schedules, keynotes and drawings, including, but not limited to the following:

1. Unused anchor removal.
2. Repair cracked brickwork in which cracks extend more than three courses by removing cracked brick, all mortar from around cracked brick, and mortar from joints in which mortar is cracked and providing salvaged brick set in new mortar.
3. Repair cracked brickwork in which cracks extend no more than three courses by filling cracks with composite patching mortar.
4. Painting steel uncovered during the work.
5. Restoration mortars and re-pointing joints.
6. Rake cracks through mortal' joints and brick units and provide sealant.
7. Preliminary cleaning, including removing plant growth.
8. Anti-graffiti coating.
9. Cleaning exposed unit masonry surfaces.

B. Related Sections:
1. Division 04 Section “Restoration Mortars.”
2. Division 07 Section “Joint Sealants.”

1.3 DEFINITIONS

A. Very Low-Pressure Spray: Under 100 psi.

B. Low-Pressure Spray: 100 to 400 psi; 4 to 6 gpm.

C. Medium-Pressure Spray: 400 to 800 psi; 4 to 6 gpm.

D. High-Pressure Spray: 800 to 1200 psi; 4 to 6 gpm.

E. Saturation Coefficient: Ratio of the weight of water absorbed during immersion in cold water to weight absorbed during immersion in boiling water; used as an indication of resistance of masonry units to freezing and thawing.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include recommendations for application and use. Include test data substantiating that products comply with requirements.

B. Shop Drawings: For the following:

1. Provisions for expansion joints or other sealant joints.
2. Provisions for flashing, lighting fixtures, conduits, and weep holes as required.
3. Replacement and repair anchors. Include details of anchors within individual masonry units, with locations of anchors and dimensions of holes and recesses in units required for anchors.

C. Samples for Initial Selection: For the following:

1. Pointing Mortar: Submit sets of mortar for pointing in the form of sample mortar strips, 6 inches long by 1/4 inch wide, set in aluminum or plastic channels.
    a. Submit with precise measurements on ingredients, proportions, gradations, and sources of colored sands from which each Sample was made.
2. Patching Compound: Submit sets of patching compound Samples in the form of plugs (patches in drilled holes) in sample units of masonry representative of the range of masonry colors on the building.
3. Sealant Materials: See Division 07 Section "Joint Sealants."
4. Include similar Samples of accessories involving color selection.

D. Samples for Verification: For the following:

1. Each type of sand used for pointing mortar; minimum 1 lb of each in plastic screw-top jars.
    a. For blended sands, provide Samples of each component and blend.
    b. Identify sources, both supplier and quarry, of each type of sand.
2. Each type, color, and texture of pointing mortar in the form of sample mortar strips, 6 inches long by 3/8” wide, set in aluminum or plastic channels.
    a. Include with each Sample a list of ingredients with proportions of each. Identify sources, both supplier and quarry, of each type of sand and brand names of cementitious materials and pigments if any.
3. Each type of masonry patching compound in the form of briquettes, at least 3 inches long by 1-1/2 inches wide. Document each Sample with manufacturer and stock number or other information necessary to order additional material.
4. Sealant Materials: See Division 07 Section "Joint Sealants."
5. Accessories: Each type of anchor, accessory, and miscellaneous support.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: Qualification data for firm and personnel specified in “Quality Assurance” Article that demonstrates that both firm and personnel have capabilities and experience complying with requirements specified. For firm and foreman, provide a list of at least five completed projects similar in size and scope to the work required on this Project. For each project list project name, address, architect, conservator (if applicable), scope of contractor’s work, and other relevant information. Submit this information with the bid.

B. Quality-Control Program.

C. Restoration Program.

D. Cleaning Program.

1.6 QUALITY ASSURANCE

A. Restoration Specialist Qualifications: Award brick masonry restoration to a firm regularly engaged in restoration of brick masonry that can demonstrate to Owner's satisfaction that, within previous ten years, firm has successfully performed and completed in a timely manner at least five projects similar in scope and type to work required on this Project Retain first subparagraph below if required or customary in Project area. Firms often specialize in and compete for either masonry repair or cleaning work, and they typically have different crews for each.

1. Field Supervision: Brick masonry restoration shall be directly supervised by a full-time foreman with experience equal to or greater than that required of Masonry Restoration Specialist. Foreman shall read and speak English fluently. Foreman shall be on site daily for duration of work of this Section. Same foreman shall remain on Project throughout work unless his performance is deemed unacceptable. Restoration specialist firms shall maintain experienced full-time supervisors on Project site during times that clay masonry restoration and cleaning work is in progress.
2. Restoration Worker Qualifications: Brick masonry restoration shall be carried out by a steady crew of skilled mechanics who are thoroughly experienced with restoration of brick masonry and materials and methods specified and have a minimum of three years' experience with work on buildings similar to that required by this Section. In acceptance or rejection of work of this Section, no allowance will be made for workers' incompetence or lack of skill.
    a. When masonry units are being patched, assign at least one worker among those performing patching work who is trained and certified by manufacturer of patching compound to apply its products.

B. Source Limitations: Obtain each type of material for masonry restoration (face brick, cement, sand, etc.) from one source with resources to provide materials of consistent quality in appearance and physical properties.

C. Quality-Control Program: Prepare a written quality-control program for this Project to systematically demonstrate the ability of personnel to properly follow methods and use materials and tools without damaging masonry. Include provisions for supervising performance and preventing damage due to worker fatigue.

D. Restoration Program: Prepare a written, detailed description of materials, methods, equipment, and sequence of operations to be used for each phase of restoration work including protection of surrounding materials and Project site.

1. Include methods for keeping pointing mortar damp during curing period.
2. If materials and methods other than those indicated are proposed for any phase of restoration work, add to the Quality-Control Program a written description of such materials and methods, including evidence of successful use on comparable projects, and demonstrations to show their effectiveness for this Project and worker's ability to use such materials and methods properly.

E. Cleaning Program: Prepare a written cleaning program that describes cleaning process in detail, including materials, methods, and equipment to be used, protection of surrounding materials, and control of runoff during operations.

1. If materials and methods other than those indicated are proposed for any phase of restoration work, add to the Quality-Control Program a written description of such

materials and methods, including evidence of successful use on comparable projects, and demonstrations to show their effectiveness for this Project and worker's ability to use such materials and methods properly.

F. Cleaning and Repair Appearance Standard: Cleaned and repaired surfaces are to have a uniform appearance as viewed from 20 feet away by Architect. Perform additional paint and stain removal, general cleaning, and spot cleaning of small areas that are noticeably different, so that surface blends smoothly into surrounding areas.

G. Mockups: Prepare mockups of restoration and cleaning to demonstrate aesthetic effects and set quality standards for materials and execution and for fabrication and installation.

1. Masonry Repair: Prepare sample areas for each type of masonry material indicated to have repair work performed. If not otherwise indicated, size each mockup not smaller than 2 adjacent whole units or approximately 48 inches in least dimension. Demonstrate quality of materials, workmanship, and ability to blend with existing work. Include the following as a minimum:

   a. Replacement:
      1) Four brick units replaced.
   b. Patching: Three small holes at least 1 inch in diameter as directed for each type of masonry material indicated to be patched, so as to leave no evidence of repair.
2. Re-pointing: Rake out joints in 2 separate areas, each approximately 36 inches by 48 inches wide for each type of re-pointing required and re-point one of the areas.
3. Cleaning: Clean an area approximately 25 sq. ft. as indicated for each type of masonry and surface condition.
4. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
5. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

H. Pre-installation Conference: Conduct conference at Project site.

1. Review methods and procedures related to masonry restoration and cleaning including, but not limited to, the following:
   a. Construction schedule. Verify availability of materials, Restoration Specialist's personnel, equipment, and facilities needed to make progress and avoid delays.
   b. Materials, material application, sequencing, tolerances, and required clearances.

1.7 REFERENCE STANDARDS

A. Work of this Section shall comply with applicable requirements and recommendations of latest editions of the documents listed herein, except as modified by more stringent requirements of the Contract Documents and of applicable laws, codes, and regulations of authorities having jurisdiction. Where the language in any of the documents referred to herein is in the form of a recommendation or suggestion, such recommendations or suggestions shall be deemed to be mandatory under this Contract unless specifically indicated otherwise in Contract Documents. Provide a reference copy of each of the following standards at Project site during all periods when work of this Section is being performed. In each case in which there is a conflict between requirements of referenced standards; requirements of laws, codes, and regulations; and requirements of this Section, the most stringent or restrictive requirement shall govern.

1. ASTM International (ASTM)
   a. ASTM A 276, Standard Specification for Stainless Steel Bars and Shapes.
   b. ASTM A 580, Standard Specification for Stainless Steel Wire.

c. ASTM A 666, Standard Specification for Annealed or Cold' Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
d. ASTM A 780, Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
e. ASTM A 951, Standard Specification for Masonry Joint Reinforcement.
f. ASTM C 62, Standard Specification for Building Brick.
g. ASTM C 67, Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile.
h. ASTM C 216, Standard Specification for Facing Brick.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in manufacturer's original and unopened containers, labeled with manufacturer's name and type of products.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store hydrated lime in manufacturer's original and unopened containers. Discard lime if containers have been damaged or have been opened for more than two days.

D. Store lime putty covered with water in sealed containers.

E. Store sand where grading and other required characteristics can be maintained and contamination avoided.

1.9 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit masonry restoration and cleaning work to be performed according to manufacturers' written instructions and specified requirements.

B. Repair masonry units and re-point mortar joints only when air temperature is between 40 and 90 deg F and is predicted to remain so for at least 7 days after completion of the Work unless otherwise indicated. Do not use any material in brick masonry restoration work unless air and masonry temperatures arc within range recommended by material manufacturer or specified herein. In case of conflict, the most restrictive requirement shall govern.

C. Cold-Weather Requirements: Comply with the following procedures for masonry repair and mortar-joint pointing unless otherwise indicated:
1. When air temperature is below 40 deg F heat mortar ingredients, masonry repair materials, and existing masonry walls to produce temperatures between 40 and 120 deg F
2. When mean daily air temperature is below 40 deg F provide enclosure and heat to maintain temperatures above 32 deg F within the enclosure for 7 days after repair and pointing.
3. Damage Caused by Freezing: Remove brick masonry restoration work determined by
4. Architect to have been damaged by freezing conditions. Replace work to comply with requirements of this Section.

D. Hot-Weather Requirements: Protect masonry repair and mortar-joint pointing when temperature and humidity conditions produce excessive evaporation of water from mortar and repair materials. Provide artificial shade and wind breaks and use cooled materials as required to minimize evaporation. Do not apply mortar to substrates with temperatures of 90 deg F and above unless otherwise indicated.

E. Use of Epoxy Patching Adhesive: Apply epoxy patching adhesive only when temperature of brick to be patched, temperature of air, and temperature of patching adhesive are between 50 deg F and 85 deg F or range recommended for use by adhesive manufacturer, whichever is more restrictive.

F. Contract Drawings

1. The Drawings are two-dimensional representations of three-dimensional objects and do not show all surfaces. Perform work on all surfaces of projections, reveals, returns, and other elements and surfaces associated with areas on which work is indicated.
2. Where elements interface with existing work or work that is in place, field measure dimensions of existing and in-place elements before preparing shop drawings or beginning work.

G. For manufactured repair materials, perform work within the environmental limits set by each manufacturer.

H. Clean masonry surfaces only when air temperature is 40 deg F and above and is predicted to remain so for at least 7 days after completion of cleaning.

1.10 COORDINATION

A. Coordinate masonry restoration and cleaning with public circulation patterns at Project site. Some work is near public circulation patterns Public circulation patterns cannot be closed off entirely, and in places can be only temporarily redirected around small areas of work. Plan and execute the Work accordingly.

B. Access for Observation and Approvals: Provide Architect access on a continuing basis to locations on which mock-ups are being carried out, on which work is ongoing, and where work has been completed to allow for observation and approvals. Provide pipe scaffolding and manpower to move, alter, and reconfigure scaffolding and planking; personnel lift and manpower to operate lift; or other means of access complying with all laws and regulations regarding safety and acceptable to Architect. Provide manpower and equipment to facilitate observation and approvals.

1. Extent of Access: Provide Architect hands-on access to each and every area of brick masonry that is restored as work of this Section. No approval of brick masonry restoration will be given before Architect is provided hands-on access to areas of brick masonry affected. Provide access for re-inspection of areas where work was not approved on first or subsequent inspections until Architect approves work.
2. Relocation of Means of Access: If Contractor moves scaffolding, lift, or other means of access before providing Architect with hands-on access to each and every surface of restored brick masonry and each and every surface of brick masonry that has been restored after previous work was rejected, Contractor shall reinstall means of access to provide for close-up inspection by Architect at no additional cost.

C. Knowledge of Site and Project Conditions: Before submitting bid, Bidders shall make themselves thoroughly familiar with the Drawings and Specifications, with the scope of this Project, and with all conditions at the Project site relating to requirements of this Section and limitations under which the work will be performed and shall determine or verify dimensions and quantities. Submission of a bid shall be considered conclusive evidence that Contractor is thoroughly familial' with Project requirements and site conditions and limitations.

D. Restoration of Damaged Masonry Units: Repair or replace all broken, lost, and damaged masonry units resulting from work of this Section to Architect’s satisfaction at no additional cost.

E. Protection of Building: Protect building elements and finishes from damage and from deterioration caused by work of this Section. Repair damage to materials and damage to finishes to Architect's satisfaction at no additional cost.

1. Exclusion of Water: Cover open joints and areas from which units have been removed during periods when work is suspended to ensure materials and finishes are not damaged by water penetration.
2. Prevention of Staining: Prevent grout, mortar, and patching materials from staining exposed faces of masonry.
3. Protection from Fire: Take all necessary precautions to prevent fire and spread of fire.

F. Restoration and Replacement of Damaged and Removed Interior Finishes: Repair, restore, or replace as required all interior finishes that are damaged or deteriorated due to exterior rehabilitation work. At the completion of the Work, all interior finishes shall be in a condition at least as good as or better than they were before work began. Comply with the requirements of Division 01 -"Execution and Closeout."

1.11 SEQUENCING AND SCHEDULING

A. Order replacement materials at earliest possible date to avoid delaying completion of the Work.

B. Order sand and portland cement for pointing mortar (based on testing) immediately after approval of mockups. Take delivery of and store at Project site a sufficient quantity to complete Project.

C. Perform masonry restoration work in the following sequence:

1. Remove plant growth.
2. Inspect for open mortar joints and repair before cleaning to prevent the intrusion of water and other cleaning materials into the wall.
3. Remove paint.
4. Clean masonry surfaces.
5. Where water repellents, specified in Division 07, are to be used on or near masonry work, delay application of these chemicals until after pointing.
6. Rake out mortar from joints surrounding masonry to be replaced and from joints adjacent to masonry repairs along joints.
7. Repair masonry, including replacing existing masonry with new masonry materials.
8. Rake out mortar from joints to be repointed.
9. Point mortar and sealant joints.
10. After repairs and repointing have been completed and cured, perform a final cleaning to remove residues from this work.
11. Inspect for open mortar joints and repair before cleaning to prevent the intrusion of water and other cleaning materials into the wall.

D. As scaffolding or other devices are removed, patch anchor holes used to attach scaffolding or other devices. Patch holes in masonry units to comply with "Masonry Unit Patching" Article. Patch holes in mortar joints to comply with "Repointing Masonry" Article.

PART 2 - PRODUCTS

2.1 MASONRY MATERIALS

A. Salvage Face Brick and Common Brick: Salvaged face brick and common brick if removal is necessary. Salvaged brick will be used including cut, or sawed shapes where required to complete masonry restoration work. Sound existing brick salvaged during removal of brick masonry, cleaned of mortar, grout, and other contaminants, and thoroughly washed using clean water and fiber bristle brushes. Salvaged face brick as required.

1. Utilize salvaged brick for infill and repair.
2. Special Shapes:
   a. Mechanical chopping or breaking brick, or bonding pieces of brick together by adhesive, are not acceptable procedures for fabricating special shapes.

B. New Face Brick: If replacement face brick is required it shall comply with requirements of ASTM C 216, Grade SW, and shall match existing original face brick in hardness and weatherability, size, color, and surface texture and reflectance. Use new face brick matching existing original brick in work on all areas not on street facades.

1. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."

C. Common Brick: If replacement brick tor back-up construction is required it shall match existing brick in size and shall comply with requirements of ASTM C 62, Grade SW.

1. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."

2.2 MORTAR MATERIALS

A. Comply with requirements of Division 04 -"Restoration Mortars."

2.3 MANUFACTURED REPAIR MATERIALS

A. Masonry Patching Compound: Factory-mixed cementitious product that is custom manufactured for patching masonry.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Cathedral Stone Products, Inc.; Jahn M100 Terra Cotta and Brick Repair Mortar.
   b. Conproco Corporation; Mimic.
   c. Edison Coatings, Inc.; Custom System 45.
2. Use formulation that is vapor- and water permeable (equal to or more than the masonry unit), exhibits low shrinkage, has lower modulus of elasticity than the masonry units being repaired, and develops high bond strength to all types of masonry.
3. Use formulation having working qualities and retardation control to permit forming and sculpturing where necessary.
4. Formulate patching compound used for patching brick in colors and textures to match each masonry unit being patched. Provide not less than three colors to enable matching the color, texture, and variation of each unit.

2.4 TIES AND ANCHORS

A. Wire Anchors: 1I4-inch-diameter wire of AISI Type 302 stainless steel.

B. Brick Ties: 12 gage, 2-1/2-inch wide, crimped, Type 304 stainless steel buck anchors. Provide anchors of length to extend to a location 1-112 inches behind the outer face of the masonry unit in the outer wythe.

C. Brick Tie Anchors: I14-inch-diameter, 1-1/2 inch long nail drive anchor with Zamac body and Type 304 stainless steel drive screws. Provide "Zamac Hammer-Screw"® by Powers Fasteners, 2 Powers Lane, Brewster, NY 10509 (914-235-6300), or approved equal.

D. Miscellaneous Ties, Anchors, and Reinforcing: Of material indicated below and of size and configuration appropriate for use intended and approved by Architect.

1. Units That Are Not Welded: Type 302, Type 304, Type 304L, Type 316, or Type 316L stainless steel.
2. Units That Are Welded: Type 316L stainless steel.

2.5 REINFORCEMENT

A. General: Provide joint reinforcement as specified herein.

B. Joint Reinforcement: Complying with ASTM A 951 and as follows:

1. Material: AISI Type 304 stainless steel conforming to ASTM A 580.
2. Form: Welded truss design of9 gauge deformed stainless steel wire, consisting of two deformed longitudinal wires welded to a continuous diagonal cross wire at 16 inches o.c. Provide reinforcement with out-to-out spacing 1-112 to 2 inches less than the nominal thickness of the wall.
3. Corners: Provide special formed prefabricated pieces at comers.
4. Manufacturer: Subject to compliance with requirements, provide joint reinforcing by Dur-O-Wall, Hohmann & Barnard, Inc., or approved equal.

2.6 FLASHING

A. General: Refer to Sections flashings for Clay Tile, Copper Roofs, and Membrane Roofing requirements where intersecting masonry units.

B. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for priming substrates, bonding flashing sheets to each other and to substrates, terminating flashing at edges, and other uses as required to provide complete, watertight system.

2.7 MISCELLANEOUS MATERIALS

A. Injection Grout: Comply with requirements of Section 041 05 -"Restoration Mortars."

B. Sealant: Comply with requirements of Section 07900 -"Joint Sealants."

2.8 CLEANING MATERIALS

A. Water: Potable.

B. Hot Water: Water heated to a temperature of 140 to 160 deg F.

C. Job-Mixed Detergent Solution: Solution prepared by mixing 2 cups of tetrasodium polyphosphate, 1/2 cup of laundry detergent, and 20 quarts of hot water for every 5 gal. of solution required.

2.9 ACCESSORY MATERIALS

A. Liquid Strippable Masking Agent: Manufacturer's standard liquid, film-forming, strippable masking material for protecting glass, metal, and polished stone surfaces from damaging effects of acidic and alkaline masonry cleaners.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. ABR Products, Inc.; Rubber Mask.
   b. Price Research, Ltd.; Price Mask.
   c. PROSOCO; Sure Klean Strippable Masking.

B. Masking Tape: Nonstaining, nonabsorbent material, compatible with pointing mortar, joint primers, sealants, and surfaces adjacent to joints; that will easily come off entirely, including adhesive.

C. Antirust Coating: Fast-curing, lead- and chromate-free, self-curing, universal modified-alkyd primer complying with MPI #79, Alkyd Anticorrosive Metal Primer or SSPC-Paint 20 or SSPC-Paint 29 zinc-rich coating.

1. Use coating requiring no better than SSPC-SP 2, "Hand Tool Cleaning surface preparation according to manufacturer's literature or certified statement.
2. Use coating with a VOC content of 420 g/L (3.5 lb/gal.) or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.10 ANTI- GRAFFITI COATING -**NOT USED**

A. Coat all existing and newly installed brick as shown on drawings with anti-graffiti coating.

B. Product: Edison Coating Inc. Spray – Block 40 strippable/sacrificial coating for hard surfaces, or equal as judged by the Architect.

2.11 MISCELLANEOUS PRODUCTS

A. Select materials and methods of use based on the following, subject to approval of a mockup:

1. Previous effectiveness in performing the work involved.
2. Little possibility of damaging exposed surfaces.
3. Consistency of each application.
4. Uniformity of the resulting overall appearance.
5. Do not use products or tools that could do the following:
   a. Remove, alter, or in any way harm the present condition or future preservation of existing surfaces, including surrounding surfaces not in contract.
   b. Leave a residue on surfaces.

PART 3 - EXECUTION

3.1 GENERAL

A. Restoration Specialist Firms: Subject to compliance with requirements 1.9 “Quality Assurance”.

B. Protection: Before leaving fresh or unfinished work, fully cover and protect wall against rain and wind in an approved manner. Before continuing, brush clean previously laid work.

C. Welting Bricks and Existing Masonry: Thoroughly wet brick and existing masonry prior to installation to ensure that brick and masonry are nearly saturated but free of surface water (saturated, surface dry) when mortar is applied.

D. Full Shoved Joints: Ensure that all bed, head, and collar joints in masonry are shoved full so that mortar fully contacts all surfaces of masonry units in joints and there are no voids in brickwork. Do not slush joints.

3.2 PROTECTION

A. Protect persons, motor vehicles, surrounding surfaces of building being restored, building site, plants, and surrounding buildings from harm resulting from masonry restoration work.

1. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during course of restoration and cleaning work.

B. Prevent mortar from staining face of surrounding masonry and other surfaces.

1. Cover sills, ledges, and projections to protect from mortar droppings.
2. Keep wall area wet below rebuilding and pointing work to discourage mortar from adhering.
3. Immediately remove mortar in contact with exposed masonry and other surfaces.
4. Clean mortar splatters from scaffolding at end of each day.

C. Remove gutters**,** downspouts and metal fascias adjacent to masonry and store where indicated during masonry restoration and cleaning. Reinstall when masonry restoration and cleaning are complete.

1. Provide temporary rain drainage during work to direct water away from building.

3.3 UNUSED ANCHOR REMOVAL

A. Remove masonry anchors, brackets, wood nailers, and other extraneous items no longer in use unless identified as historically significant or indicated to remain.

1. Remove items carefully to avoid spalling or cracking masonry.
2. Where directed, if an item cannot be removed without damaging surrounding masonry, do the following:

a. Cut or grind off item approximately 3/4 inch beneath surface and core drill a recess of same depth in surrounding masonry as close around item as practical.

b. Immediately paint exposed end of item with two coats of antirust coating, following coating manufacturer's written instructions and without exceeding manufacturer's recommended dry film thickness per coat. Keep paint off sides of recess.

3. Patch the hole where each item was removed unless directed to remove and replace the masonry unit.

3.4 BRICK REMOVAL AND REPLACEMENT

A. Remove bricks that are damaged, spalled, or deteriorated. Carefully demolish or remove entire units from joint to joint, without damaging surrounding masonry, in a manner that permits replacement with full-size units.

1. When removing single bricks, remove material from center of brick and work toward outside edges.

B. Support and protect remaining masonry that surrounds removal area. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition.

C. Notify Architect of unforeseen detrimental conditions including voids, cracks, bulges, and loose units in existing masonry backup, rotted wood, rusted metal, and other deteriorated items.

D. Remove in an undamaged condition as many whole bricks as possible.

1. Remove mortar, loose particles, and soil from brick by cleaning with hand chisels, brushes, and water.
2. Remove sealants by cutting close to brick with utility knife and cleaning with solvents.
3. Store brick for reuse. Store off ground, on skids, and protected from weather.
4. Deliver cleaned brick not required for reuse to Owner unless otherwise indicated.

E. Clean bricks surrounding removal areas by removing mortar, dust, and loose particles in preparation for replacement.

F. Replace removed damaged brick with other removed brick and salvaged brick in good quality, where possible, or with new brick matching existing brick, including size. Do not use broken units unless they can be cut to usable size.

G. Install replacement brick into bonding and coursing pattern of existing brick. If cutting is required, use a motor-driven saw designed to cut masonry with clean, sharp, unchipped edges.

1. Maintain joint width for replacement units to match existing joints.

H. Lay replacement brick with completely filled bed, head, and collar joints. Butter ends with sufficient mortar to fill head joints and shove into place. Wet both replacement and surrounding bricks that have ASTM C 67 initial rates of absorption (suction) of more than 30 g/30 sq. in. per min. Use wetting methods that ensure that units are nearly saturated but surface is dry when laid.

1. Tool exposed mortar joints in repaired areas to match joints of surrounding existing brickwork.
2. Rake out mortar used for laying brick before mortar sets and point new mortar joints in repaired area to comply with requirements for repointing existing masonry, and at same time as re-pointing of surrounding area.

3. When mortar is sufficiently hard to support units, remove shims and other devices interfering with pointing of joints.

3.5 PAINTING STEEL UNCOVERED DURING THE WORK

A. Inspect steel exposed during masonry removal. Where Architect determines that it is structural, or for other reasons cannot be totally removed, prepare and paint it as follows:

1. Remove paint, rust, and other contaminants according to SSPC-SP 2, "Hand Tool Cleaning, as applicable to meet paint manufacturer's recommended preparation.
2. Immediately paint exposed steel with two coats of antirust coating, following coating manufacturer's written instructions and without exceeding manufacturer's recommended rate of application (dry film thickness per coat).

B. If on inspection and rust removal, the cross section of a steel member is found to be reduced from rust by more than 1/16 inch, notify Architect before proceeding.

3.6 BRICK MASONRY UNIT RESTORATION

A. General: Lay salvaged face brick, new face brick, and common brick plumb, level, and true to line in full beds of mortar with bond pattern matching original bond pattern and courses and joints meeting those of original brickwork and adjacent remaining masonry as applicable. Provide supports, anchors, and reinforcing to ensure solid, stable construction and flashing and weep holes to ensure that water is directed to exterior of wall above openings and penetrations.

B. Patch the following masonry units unless another type of replacement or repair is indicated:

1. Units indicated to be patched.
2. Units with holes.
3. Units with chipped edges or corners.
4. Units with small areas of deep deterioration.

C. Remove and replace existing patches unless otherwise indicated or approved by Architect.

D. Cutting Masonry Units: Where brick are to be cut to size, make cuts neatly with a power-driven saw. Do not expose cut face to weather.

E. Jointing: Jointing of rebuilt masonry shall match that of existing masonry. Each course shall align with and be flush with existing work. Joints shall be uniform, matching widths of existing joints.

F. Joints: Fill all joints in brick masonry completely full with mortar as each course is laid.

1. Bed Joints: Form bed joints in one of the following ways:

   a. Apply a thick layer of smooth or slightly furrowed mortar on top of units previously laid and shove brick in place.
   b. Apply a full coat of mortar to boltom of brick and shove it into place.
2. Head and Collar Joints: Form head and collar joints by applying a full coat of mortal' to entire end or entire side as case requires and then shoving mortar covered end andlor side of brick tightly against bricks previously laid. Apply 3/8- inch-thick coat of mortar to back of facing brick before brick is installed.

3. Preparation for Pointing Joints in Brick Masonry: Rake joints in exposed brick masonry to prepare for pointing as specified in Division 04 -"Masonry Pointing. "

G. Supports, Anchors, and Fasteners: Build in supports, anchors, and fasteners as shown on approved shop drawings. Anchor fasteners solidly into sound masonry.

H. Joint Reinforcement: Provide continuous joint reinforcing in bed joints as indicated on Drawings but at a spacing not to exceed 16 inches o.c. vertically.

I. Flashing: Install flashing and as specified and as shown on approved shop drawings.
1. Install embedded flashing in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
2. Prime masonry substrates and substrates of other materials as recommended by flashing membrane manufacturer for optimum installation and adhesion of flashing membrane.
3. Allow masonry to cure as recommended by flashing membrane manufacturer before priming or applying adhesive or self-adhesive membrane.
4. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Unless otherwise indicated, place flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
5. Install metal flashing termination beneath flashing at exterior face of wall where sealant joints are indicated.

J. Disturbed Masonry Units: Remove masonry units disturbed after laying and relay in fresh mortar. If adjustments are required, remove masonry units and reset in fresh mortar; do not pound or tap masonry units to adjust.

K. Damaged Masonry Units: Remove and replace brick that are loose, chipped, broken, stained or damaged by freezing or for any other reason, or if units do not match adjoining units as intended. Furnish new units to match adjoining units and install in fresh mortar, pointed to eliminate evidence of replacement.

3.7 REPAIRING CRACKED BRICK MASONRY WHERE CRACKS EXTEND MORE THAN THREE COURSES

A. General: Remove cracked brick and mortar from joints around cracked brick and from all joints in which mortar is cracked and provide new brick matching existing brick set in new mortar.

B. Carefully remove brick to be replaced and mortar from joints around it and from joints in which mortar is cracked. Do not disturb adjacent brick. If bond of any brick is broken, remove brick and mortar around brick and reset brick.

C. Remove dirt and dust from hole using stiff bristle brush followed by clean compressed air.

D. Thoroughly wet brick to be inserted and surfaces at hole in masonry to receive brick to ensure that masol1l'Y is nearly saturated but surface dry at time of installation.

E. Ensure that all voids are filled with mortar by spreading mortal' on surfaces adjacent to hole and on surfaces of brick to be inserted so that excess mortal' is squeezed out of joints around brick as it is inserted.

F. Point joints to comply with requirements of Division 04 -"Masonry Pointing."

3.8 REPAIRING CRACKED BRICK MASONRY WHERE CRACKS EXTEND NO MORE THAN THREE COURSES

A. General: Rout out cracks in brick and fill with custom patching mortal' to match color and texture of adjacent surface.

B. Rout out cracks to a depth of 1/2 inch and a width of 1/4 inch. Do not damage brick surfaces.

C. Clean cracks thoroughly using fine brush followed by clean, oil-free compressed ail' to remove granular particles and dust.

D. Protect masonry at sides of crack from contact with sealant with masking tape or other approved method.

E. Provide backer rod to ensure sealant is of profile recommended by sealant manufacturer.

F. Install sealant to fully wet joint substrates and to completely fill top portion of joint.

G. Tool sealant flush with surface of adjacent masonry units.

H. Remove protection and clean away any sealant on masonry surfaces using solvent recommended by sealant manufacturer.

3.9 ROUTING AND FILLING CRACKS IN BRICK

A. General: Rout out cracks in brick and fill with custom patching mortal' to match color and texture of adjacent surface.

B. Rout out cracks to a depth of5/8 inch and a width of 1/8 inch. Do not damage brick surfaces.

C. Clean cracks thoroughly using fine brush followed by clean, oil-free compressed ail' to remove granular particles and dust.

D. Thoroughly rinse surfaces to ensure that substrate will not rapidly absorb water from patching mortar.

E. Brush crack with a mortar slurry coat and fill with specified composite mortal' matching color of adjacent cleaned brick.

F. Strike surface of repaired crack flush with face of brick. Finish surface off filled crack to match texture and finish of adjacent cleaned brick.

G. Protect installed mortar from too rapid drying to provide optimum conditions for mortar to cure.

3.10 POINTING

A. Point mortar joints in brick masonry to comply with the requirements of Division 04 -"Masonry Pointing."

3.11 PRELIMINARY CLEANING

A. Removing Plant Growth: Completely remove visible plant, moss, and shrub growth from masonry surfaces. Carefully remove plants, creepers, and vegetation by cutting at roots and allowing to dry as long as possible before removal. Remove loose soil and debris from open masonry joints to whatever depth they occur.

B. Preliminary Cleaning: Before beginning general cleaning, remove extraneous substances that are resistant to cleaning methods being used. Extraneous substances include paint, calking, asphalt, and tar.

1. Carefully remove heavy accumulations of material from surface of masonry with a sharp chisel. Do not scratch or chip masonry surface.
2. Remove paint and calking with alkaline paint remover.
    a. Comply with requirements in "Paint Removal" Article.
    b. Repeat application up to two times if needed.
3. Remove asphalt and tar with solvent-type paint remover.
    a. Comply with requirements in "Paint Removal" Article.
    b. Apply paint remover only to asphalt and tar by brush without prewetting.
    c. Allow paint remover to remain on surface for 10 to 30 minutes.
    d. Repeat application if needed.

3.12 CLEANING MASONRY, GENERAL

A. Proceed with cleaning in an orderly manner; work from top to bottom of each scaffold width and from one end of each elevation to the other. Ensure that dirty residues and rinse water will not wash over cleaned, dry surfaces.

B. Use only those cleaning methods indicated for each masonry material and location.

1. Do not use wire brushes or brushes that are not resistant to chemical cleaner being used. Do not use plastic-bristle brushes if natural-fiber brushes will resist chemical cleaner being used.
2. Use spray equipment that provides controlled application at volume and pressure indicated, measured at spray tip. Adjust pressure and volume to ensure that cleaning methods do not damage masonry.
    a. Equip units with pressure gages.
3. For water-spray application, use fan-shaped spray tip that disperses water at an angle of 25 to 50 degrees.
4. For heated water-spray application, use equipment capable of maintaining temperature between 140 and 160 deg F at flow rates indicated.
5. For steam application, use steam generator capable of delivering live steam at nozzle.

C. Perform each cleaning method indicated in a manner that results in uniform coverage of all surfaces, including corners, moldings, and interstices, and that produces an even effect without streaking or damaging masonry surfaces.

D. Water Application Methods:

1. Water-Soak Application: Soak masonry surfaces by applying water continuously and uniformly to limited area for time indicated. Apply water at low pressures and low

volumes in multiple fine sprays using perforated hoses or multiple spray nozzles. Erect a protective enclosure constructed of polyethylene sheeting to cover area being sprayed.

2. Water-Spray Applications: Unless otherwise indicated, hold spray nozzle at least 6 inches from surface of masonry and apply water in horizontal back and forth sweeping motion, overlapping previous strokes to produce uniform coverage.

E. Steam Cleaning: Apply steam to masonry surfaces at the very low pressures indicated for each type of masonry material. Hold nozzle at least 6 inches from surface of masonry and apply steam in horizontal back and forth sweeping motion, overlapping previous strokes to produce uniform coverage.

F. After cleaning is complete, remove protection no longer required. Remove tape and adhesive marks.

3.13 FINAL CLEANING

A. After mortar has fully hardened, thoroughly clean exposed masonry surfaces of excess mortar and foreign matter; use wood scrapers, stiff-nylon or -fiber brushes, and clean water, spray applied at low pressure.

1. Do not use metal scrapers or brushes.
2. Do not use acidic or alkaline cleaners.

B. Wash adjacent woodwork and other non-masonry surfaces. Use detergent and soft brushes or cloths.

C. Clean mortar and debris from roof; remove debris from gutters and downspouts. Rinse off roof and flush gutters and downspouts.

D. Sweep and rake adjacent pavement and grounds to remove mortar and debris. Where necessary, pressure wash pavement surfaces to remove mortar, dust, dirt, and stains.

3.14 FIELD QUALITY CONTROL

A. Notify Owner’s and Architect's Project representatives in advance of times when lift devices and scaffolding will be relocated. Do not relocate lift devices and scaffolding until Owner’s and Architect’s Project representatives have had reasonable opportunity to make observations of work areas at lift device or scaffold location.

3.15 WASTE MANAGEMENT

A. Coordinate with Division 01.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 04 01 20

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SECTION 04 03 05.13 – RESTORATION MORTARS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. The work performed under this Section includes the performance criteria, labor, materials, equipment, and services necessary for the complete execution work of restoration mortars and grout as called for on the Drawings, as specified herein and as required by schedules, keynotes and drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:

1. Mortars for setting and pointing brick masonry.

1.3 QUALITY ASSURANCE

A. Restoration Specialist Qualifications: Award brick masonry restoration to a firm regularly engaged in restoration of brick masonry that can demonstrate to Owner's satisfaction that, within previous ten years, firm has successfully performed and completed in a timely manner at least five projects similar in scope and type to work required on this Project.

1. Field Supervision: Brick masonry restoration shall be directly supervised by a full-time foreman with experience equal to or greater than that required of Masonry Restoration Specialist. Foreman shall be on site daily for duration of work of this Section. Same foreman shall remain on Project throughout work unless his performance is deemed unacceptable. Restoration specialist firms shall maintain experienced full-time supervisors on Project site during times that clay masonry restoration and cleaning work is in progress.
2. Brick masonry restoration shall be carried out by a steady crew of skilled mechanics who are thoroughly experienced with restoration of materials and methods specified and have a minimum of three years' experience with work on buildings similar to that required by this Section. In acceptance or rejection of work of this Section, no allowance will be made for workers' incompetence or lack of skill.
    a. When masonry units are being patched, assign at least one worker among those performing patching work who is trained and certified by manufacturer of patching compound to apply its products.

B. Referenced Standards: Work of this Section shall comply with applicable requirements and recommendations of latest editions of the documents listed herein, except as modified by more stringent requirements of the Contract Documents and of applicable laws, codes, and regulations of authorities having jurisdiction. Where the language in any of the documents referred to herein is in the form of a recommendation or suggestion, such recommendations or suggestions shall be deemed to be mandatory under this Contract unless specifically indicated otherwise in Contract Documents. Provide a reference copy of each of the following standards

at Project site during all periods when work of this Section is being performed. In each case in which there is a conflict between requirements of referenced standards; requirements of laws, codes, and regulations; and requirements of this Section, the most stringent or restrictive requirement shall govern.

1. ASTM International (ASTM)
    a. ASTM C 144, Standard Specification for Aggregate for Masonry Mortar.
    b. ASTM C 150, Standard Specification for Portland Cement.
    c. ASTM C 207, Standard Specification for Hydrated Lime for Masonry Purposes.
    d. ASTM C 270, Standard Specification for Mortar' for Unit Masonry.

C. Source of Materials: Obtain each type of material required for restoration mortars from a single source to ensure a match in quality, performance, and appearance,

D. Knowledge of Site and Project Conditions: Before submitting bid, Bidders shall make themselves thoroughly familiar with the Drawings and Specifications, with the scope of this Project, and with all conditions at the Project site relating to requirements of this Section and limitations under which the work will be performed and shall determine or verify dimensions and quantities. Submission of a bid shall be considered conclusive evidence that Contractor is thoroughly familiar with Project requirements and site conditions and limitations.

E. Laboratory for Mortar Analysis: Laboratory regularly engaged in analysis of mortar used in historic buildings and accepted in writing by Architect.

1.4 ACTION SUBMITTALS

A. Product Data: Manufacturer's published technical data for each product to be used in work of this Section including material description, chemical composition (ingredients and proportions), physical properties, recommendations for application and use, test reports and certificates verifying that product complies with specified requirements, and Material Safety Data Sheets (MSDS).

B. Samples:

1. Existing Mortar: Samples of existing mortars from stone masonry, brick masonry, specific masonry to each project, to total one cubic inch taken from a minimum of three areas or as recommended by testing agency.

2. Aggregate from Existing Mortar: Samples of aggregate from analysis of existing mortars from masonry, each to total two cubic inches from a minimum of three areas or as recommended by testing agency. Provide sieve analysis (ASTM C 144) with samples.

3. Pointing Mortar: Cured mortar samples set in 1/2-inch by 6-inch plastic or aluminum channels for approval of color and texture. Samples shall match existing mortar. Provide the following:
    a. Mortar for each type of masonry.
4. Grouts: Cured samples of grouts for anchoring pins and patching cracked masonry units matching each masonry substrate requiring grout, minimum 3 inch diameter x 1/2 inch thick.
    a. Grout for each masonry type.
5. Sand for Pointing Mortars: Two-pound sample of each type of sand proposed for use in pointing mortars. Include sieve analysis (ASTM C 144).
6. Custom Patching Mortar for Patching Stone: 4-inch x 4-inch x I -inch cured samples of each type and color of mortar required for approval of color and texture. Samples shall match clean existing cast stone.

7. Custom Patching Mortar for Patching Brick: 4-inch x 4-inch x I -inch cured samples for approval of color and texture. Samples shall match clean existing brick.
8. Custom Mortar for Installing Stone Dutchmen: 4-inch x 4-inch x I -inch cured samples for approval of color and texture. Samples shall match clean existing cast stone.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: Qualification data for firm and personnel specified in “Quality Assurance” Article that demonstrates that both firm and personnel have capabilities and experience complying with requirements specified. For firm and foreman, provide a list of at least three completed projects similar in size and scope to the work required on this Project. For each project list project name, address, architect, conservator, supervising preservation agency, scope of contractor's work, and other relevant information.

1. Submit certification from composite patching mortar manufacturers that technicians proposed to perform the work have been trained and are certified in the application of the patching mortar.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products and materials to prevent damage, deterioration, or degradation and intrusion of foreign material.

B. Discard and remove from site deteriorated materials, contaminated materials, and products that have exceeded their expiration dates. Replace with fresh materials.

1.7 PROJECT CONDITIONS

A. General: Perform work only when temperature of products being used and all temperature and humidity comply with manufacturer's requirements and requirements of this Section. In case of conflict, the most stringent requirements shall govern.

B. Prohibited Materials: Masonry cements, masonry mortars, and ingredients not specifically specified in this Section and approved by Architect are strictly prohibited.

C. Proprietary Materials: Do not use proprietary patching mortars and adhesives unless temperatures are between 50 deg F and 80 deg F and will remain within that range for at least 48 hours after work has been completed unless work at other temperatures is specifically approved by manufacturer of patching mortar and by Architect.

D. Mortars: Do not mix or use mortars when either or both air temperature or masonry temperature is below 40 deg F or when either temperature is expected to drop below 40 deg F within 48 hours of mortar application unless Architect has approved both Contractor's work proposal for cold-weather masonry work and also specific masonry work to be done in each instance.

1. Masonry work in temperatures below 40 deg F shall comply with requirements of this Section, with requirements of sections in which mortar is used to set and point masonry, and with work proposal specifically approved by Architect.

2. Remove masonry work determined by Architect to have been damaged by freezing conditions and replace following requirements of this Section.

PART 2 - PRODUCTS

2.1 MORTAR AND GROUT PRODUCTS

A. White Portland Cement: ASTM C 150, Type I.

B. Portland Cement: ASTM C 150, Type I or Type II, non-staining. Do not use masonry cement.

C. Hydrated Lime: ASTM C 207, Type S.

D. Sand: Clean sharp sand, free of loam, silt, soluble salts, organic matter, and other deleterious substances and graded in compliance with ASTM C 144. Where mortar is to match existing original mortar, sand or other aggregate shall be selected to provide mortar matching color and texture of original mortar insofar as possible to ensure that a minimum amount of pigment is required to provide a color match. Sieve and mix sand and aggregates to provide mortar matching original mortar.

E. Water: Clean and free of substances deleterious to mortar, masonry, and embedded elements.

F. Pigments: Stable, non-fading, alkali-resistant, inorganic oxide pigments with a history of satisfactory performance in mortars containing lime.

G. Grout and Slurry for Restoration of Cracked, Broken, or Previously Grouted Masonry: Two-component, latex-modified cementitious compound, specifically manufactured for masonry restoration. Provide Custom System 45, available from Edison Chemical Systems, Inc., 25 Grant Street, Waterbury, CT 06704 (203-597-9727). Provide colors to match color of clean existing material being reinforced.

H. Composite Patching Mortar for Stone: Two-component, latex-modified cementitious compounds, specifically manufactured for masonry restoration. Provide Custom System 45, available from Edison Chemical Systems, Inc., 25 Grant Street, Waterbury, CT 06704 (203-597-9727). Provide color to match color of clean cast stone being patched.

I. Composite Patching Mortar for Brick: Two-component, latex-modified cementitious compounds, specifically manufactured for masonry restoration. Provide Custom System 45, available from Edison Chemical Systems, Inc., 25 Grant Street, Waterbury, CT 06704 (203-597-9727). Provide custom color to match color of cleaned brick being patched.

J. Admixture for Mortar for Setting Stone Dutchmen: Laticrete 4237 Grout and Mortar Admixture for "thin set" mortar as manufactured by Laticrete International Inc., or approved equal.

K. Prohibited Materials: No additives or admixtures other than those specified shall be used. No chlorides or aggressive corrosive chemicals shall be used.

2.2 MORTAR MIXES

1. Type "O" Mortar for Pointing Outer 3/4-Inch Depth of Joints in Brick and Stone Masonry ***if*** confirmed by mortar testing agency of historic mortars for the project.
    a. 1 part by volume white Portland cement, gray Portland cement, or a combination of white and gray Portland cement (Type I) as required to produce color of original mortar in masonry being pointed with no addition of pigment or with minimum addition of pigment.
    b. 2 parts by volume hydrated lime (Type S)

c. 7 parts by volume sand (selected to match sand in original mortar of masonry being pointed)
d. Oxide pigments as required to adjust color of mortar mix to as close a match to original mortar as possible using appropriate colored cements and aggregates to match original color of mortar in masonry being pointed but not to exceed 7 percent of the weight of the cement.
e. Do not use modern additives unless permitted in writing by Architect.

B. Mortars for Setting Dutchmen: Mortars specified hereinafter shall comply with ASTM C 270, "Standard Specification for Mortar for Unit Masonry." Mortar mixes may change and may require adjustment before and during construction in accordance with pre-construction conformance testing, field testing, and Architect's evaluation of testing and test results.
1. Slurry for Pre-treating Masonry to be Repaired: Grout and Slurry for Restoration of Cracked, Broken, or Previously Grouted Masonry as specified above.
2. "Thin Set" Mortar for Setting Stone Dutchmen: Use when mortar bed is less than 3/8-inch-thick to produce an initially tacky mortar exhibiting high strength properties when set.
a. 1 part by volume white Portland cement (Type I)
b. 3 parts by volume tine "00" sand (selected to match color of existing clean stone)
c. Temper to workable consistency with Laticrete 4237 polymer admixture mixed in accordance with manufacturer's recommendations for high strength I "thin set" mortar.

2.3 MIXING OF MORTAR

A. Measure mortar ingredients carefully using containers with fixed volumes so that proportions are controlled and maintained throughout all work periods.

B. Mix mortar in an approved type of power-operated batch mixer. Mix for time required to produce a homogeneous plastic mortal' but not less than five minutes: approximately two minutes for mixing dry materials and not less than three minutes for mixing after water has been added.

C. Use minimum amount of water to produce a workable consistency for mortar's intended purpose.
1. Mortar for Pointing: As dry a consistency as will produce a mortal' sufficiently plastic to be worked into joints.
2. Mortar for Slurry: Consistency as will be brushable.

D. Where mortar or grout is required in small batches of less than one cubic yard and Architect specifically approves, mortar may be mixed by hand in clean wooden or metal boxes prepared for that purpose provided that Architect approves mixing boxes and methods of mixing and transferring mortar.

E. After mixing, mortars for pointing or setting shall sit for 20 minutes prior to use to allow for initial shrinkage. Mortar shall be placed in final position within two hours of mixing. Re-tempering of partially hardened material is not permitted.

F. Mortar for grout shall be placed in final position within two hours of mixing. Re-tempering of partially hardened material is not permitted.

G. Custom Patching Mortars, Grouts, and Adhesives: Mix in strict accordance with manufacturer's written instructions.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install mortars, grouts, and patching mixtures as part of the work of the following

1. Divisions 04: Masonry Pointing, Maintenance of Stone Masonry, Cast Stone, Maintenance of Brick Masonry, Architectural Terra Cotta.

3.2 WASTE MANAGEMENT

A. Coordinate with Division 01.
1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 04 03 05.13

SECTION 04 03 05.16 – RESTORATION MASONRY REPOINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. The work performed under this Section includes the performance criteria, labor, materials, equipment, and services necessary for the complete work of masonry re-pointing as shown on the Drawings, as specified herein and as required by schedules, keynotes and drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:

1. Preparing and pointing joints in masonry.
2. Types of approved mortar removal tools
3. Required approvals for use of power tools on retooling.
4. Preparing and pointing rear portions of joints (deep pointing) in masonry.

B. Related Work Specified Elsewhere

1. Division 04: Restoration Mortars
2. Division 09: Joint sealants.

1.3 QUALITY ASSURANCE

A. Restoration Specialist Qualifications: Award brick masonry restoration to a firm regularly engaged in restoration of brick masonry that can demonstrate to Owner's satisfaction that, within previous ten years, firm has successfully performed and completed in a timely manner at least five projects similar in scope and type to work required on this Project.

1. Field Supervision: Brick masonry restoration shall be directly supervised by a full-time foreman with experience equal to or greater than that required of Masonry Restoration Specialist. Foreman shall be on site daily for duration of work of this Section. Same foreman shall remain on Project throughout work unless his performance is deemed unacceptable. Restoration specialist firms shall maintain experienced full-time supervisors on Project site during times that clay masonry restoration and cleaning work is in progress.
2. Brick masonry restoration shall be carried out by a steady crew of skilled mechanics who are thoroughly experienced with restoration of materials and methods specified and have a minimum of three years' experience with work on buildings similar to that required by this Section. In acceptance or rejection of work of this Section, no allowance will be made for workers' incompetence or lack of skill.

a. When masonry units are being patched, assign at least one worker among those performing patching work who is trained and certified by manufacturer of patching compound to apply its products.

1.4 ACTION SUBMITTALS

A. Samples
   1. Mortar and grout.

B. Prepare mock-ups as specified in Article "Mock-Ups," below.

C. Work Description: Provide detailed description of proposed procedures for joint preparation and pointing of each masonry material and condition (including installation of lead joint covers). Work description for each condition shall include:
   1. Materials and methods: Proposed materials, methods, tools, and equipment to be used.
   2. Protection: Description, including drawings, outlining methods and procedures for protection of personnel, public, and existing construction during work of this Section.
   3. Alternate Methods and Materials (If Any): Description of proposed alternate methods and materials (if any) to those specified for any phase of masonry pointing work. Provide evidence of successful use on comparable projects and demonstrate effectiveness for use on this Project.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: Qualification data for firm and personnel specified in “Quality Assurance” Article that demonstrates that both firm and personnel have capabilities and experience complying with requirements specified. For firm and foreman, provide a list of at least three completed historic projects similar in size and scope to the work required on this Project. For each project list project name, address, architect and or conservator, supervising preservation agency, scope of contractor's work, and other relevant information.

1.6 MOCK-UPS

A. General: Before beginning general masonry pointing, prepare mock-ups to provide standards for work of this Section. Do not proceed with masonry pointing until Architect has approved mock-ups.
   1. Locate mock-ups as directed by Architect
   2. Notify Architect 48 hours prior to start of each mock-up.
   3. Architect will monitor mock-ups. Mock-ups not performed in presence of Architect will be rejected.
   4. Use crew that will execute the work and follow requirements of this Section.
   5. Allow mock-ups using mortar to dry for seven days to allow mortar to reach final color and allow potential problems to appear. Notify Architect when mock-ups are ready for review.
   6. Repeat mock-ups as necessary to obtain Architect’s approval.
   7. Protect approved mock-ups to ensure that they are without damage, deterioration, or alteration at time of Substantial Completion.
   8. Approved mock-ups in undamaged condition at time of Substantial Completion may be incorporated into the Work.

9. Approved mock-ups will represent minimum standards for masonry pointing. Subsequent masonry pointing work that does not meet standards of approved mock-ups will be rejected and will require repointing.

B. Prepare the Following Mock-Ups
   1. Joint Preparation in each type of Masonry: One panel including at least 25 square feet plus 12 linear feet of joint.
   2. Pointing of Joints in each type of Masonry: One panel including at least 25 square feet plus 12 linear feet of joint.

C. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

D. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products and materials to prevent damage, deterioration, or degradation and intrusion of foreign material.

B. Discard and remove from site deteriorated materials, contaminated materials, and products that have exceeded their expiration dates. Replace with fresh materials.

1.8 PROJECT CONDITIONS

A. General: Perform work only when temperature of products being used and air temperature and humidity comply with manufacturer's requirements and requirements of this Section. In case of conflict, the most stringent requirements shall govern.

B. Safety: Use all means necessary to protect all persons, whether or not involved in the work of this Section, from harm caused by or resulting from work of this Section.

C. Protection of Building and Property
   1. Provide all protection and procedures necessary to protect masonry not being pointed and all other elements and materials from damage and from deterioration during work of this Section.
   2. Repair damage to elements and materials caused by masonry pointing work, using mechanics experienced in the respective type of work, to Architect’s satisfaction at no additional cost.
   3. Protect components of storm drainage systems against damage and blockage caused or accelerated by work of this Section.

D. Protection from Fire: Take all necessary precautions to prevent fire and to prevent spread of fire.

E. Dust: Minimize dissemination of dust to greatest extent possible.
   1. Contractor shall hold Owner, Architect, and their consultants harmless from all claims relating to dust resulting from work of this Section.

F. Protection of Masonry Being Pointed: Use all necessary care to protect existing masonry from damage during work of this Section. Take special care in removing existing mortar to ensure that no arrises are damaged, chipped, or broken. Contractor shall replace or repair masonry units damaged by work of this Section as directed by and to complete satisfaction of the Architect at no additional cost to the Owner.

G. Staining: Prevent grout or mortar from staining face of masonry to be left exposed. Protect sills, ledges, and projections from mortar droppings. Immediately remove grout or mortar in contact with such masonry.

H. Protection from Rain: Protect pointed joints with heavy waterproof sheeting from direct attack by rain or other precipitation for at least 24 hours after mortar has been applied.

I. Contract Drawings: Drawings are two-dimensional representations of three- dimensional objects and do not show all surfaces. Perform work on all surfaces of projections, reveals, ornament, and other elements associated with areas on which work is indicated.

J. Prohibited Materials: Masonry cements, masonry mortars, and ingredients not specifically specified in this Section and approved by Architect are strictly prohibited.

K. Cold-Weather Requirements: Comply with the following procedures for masonry repair and mortar-joint pointing unless otherwise indicated:
   1. When air temperature is below 40 deg F heat mortar ingredients, masonry repair materials, and existing masonry walls to produce temperatures between 40 and 120 deg F
   2. When mean daily air temperature is below 40 deg F provide enclosure and heat to maintain temperatures above 32 deg F within the enclosure for 7 days after repair and pointing.
   3. Damage Caused by Freezing: Remove brick masonry restoration work determined by
   4. Architect to have been damaged by freezing conditions. Replace work to comply with requirements of this Section.

L. Hot-Weather Requirements: Protect masonry repair and mortar-joint pointing when temperature and humidity conditions produce excessive evaporation of water from mortar and repair materials. Provide artificial shade and wind breaks and use cooled materials as required to minimize evaporation. Do not apply mortar to substrates with temperatures of 90 deg F and above unless otherwise indicated.

PART 2 - PRODUCTS

2.1 TOOLS

A. Hand Tools for Joint Preparation: Chisels, hammers, and mallets.
   1. Thickness of Chisels: Chisels used in masonry joints shall have a maximum thickness of 5/8 times joint width extending back from tip of chisel at least two times depth at which chisel will be inserted into joint.
   2. Special Tools: Provide special knives or special thin cutter blades for use in joints less than 1/8-inch wide.

B. Power Tools for Joint Preparation: Standard tools and equipment, modified tools and equipment, and custom designed and fabricated tools and equipment as required to remove mortar from narrow joints without damaging masonry and masonry units. Use power tools only under conditions described in Part 3, below and only if specifically approved by Architect in writing. Failure to demonstrate that use of selected power tools removes mortar without damaging masonry units will result in prohibition of use of power tools and requirement that mortar be removed using hand tools only. If, after approval of power tool use for mortar removal, masonry, or masonry units are damaged through use of power tools, the further use of power tools will be prohibited and mortar shall be removed using hand tools only.
   1. Electric Grinders: Small, hand-held electric grinders with thin diamond or abrasive blades no greater than 1/16-inch-thick and a maximum of 4-1/2-inch diameter.
   2. Pneumatic Grinders: Specially modified pneumatic die grinders with thin abrasive blades (0.060 inch thick).
   3. Custom Pneumatic Head and Chisels Designed for Mortar Removal: Pneumatic head and thin carbide-tipped chisels specifically designed for removal of mortar from joints in historic masonry with air compressor, hoses, valves, and other equipment required to provide complete mortar removal system. Pneumatic head shall not have a retainer to hold chisels in place. Provide pneumatic head and chisels by Trow and Holden, Barre, VT (800-451-4349), or approved equal.

C. Brushes: Stiff, natural bristle brushes.

D. Pointing Trowels: Long, thin pointing trowels narrower than joints being pointed.
   1. Fabricate special trowels for masonry pointing if necessary to ensure proper insertion and optimum compaction of mortar.

2.2 MORTAR

A. Comply with requirements of Division 04 -"Restoration Mortars." Mortar for each type of masonry shall match existing original mortar (in clean condition) in color, texture, and other visual qualities.

2.3 Miscellaneous materials

A. Joint Sealants: Comply with requirements of Division 07 -"Joint Sealants."

PART 3 - EXECUTION

3.1 GENERAL PREPARATION

A. Examine areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of work. Do not proceed until unsatisfactory conditions have been corrected.

B. Erect dust impervious barriers and take other measures necessary to prevent dust from traveling beyond work platform before using power grinders, pneumatic chisels, or hand methods that generate airborne dust.

3.2 JOINT PREPARATION

A. General: Remove mortar from joints to a depth of 3/4 inch or to sound mortar, whichever is greater. In all cases remove all deteriorated, weathered, and loose material.
   1. Completely remove mortar from surfaces of masonry units adjacent to joint to ensure that new mortar bonds directly with masonry units.
   2. Cut surface of mortar at rear of joint at a uniform depth from and parallel to wall surface.
   3. Do not damage faces or arrises of masonry units during joint preparation. Cease joint preparation work if, in Architect's judgment, masonry units are damaged. Do not resume work until tools, workers, and methodology have been corrected to ensure that masonry units are not damaged and that work meets standard set by approved mock-up.

B. Mortar Removal Using Hand Tools: Use hand tools for removal of mortar from head joints in masonry work, all joints less than 6 inches long, and from other joints in which use of power tools might damage masonry units. Use hand tools to complete mortar removal from joints where power tools have been used to partially remove mortar.
   1. Joints 1/8-Inch or Less in Width: Rake mortar from joints manually with a sharp knife blade or cutter made for this purpose. Cutter may be used with or without aid of a hammer.
   2. Sharpening Tools: Sharpen chisels as required to maintain sharp edges that cut mortar and prevent damage to masonry units, but not less frequently than hourly.

C. Mortar Removal Using Power Tools
   1. Demonstrated Ability of Mechanics: Prior to beginning work, demonstrate that workers using power tools are proficient in use of power tools for joint preparation. Failure to demonstrate to Architect's satisfaction that each worker is proficient, and that power tool joint preparation does not result in damage to masonry units shall result in prohibition of use of power tools for joint preparation. If proficiency is not demonstrated, or if work in progress results in damage to masonry to remain, *all power tool work shall cease, and joints shall be prepared for pointing using only hand-powered tools*.
   2. Rotary Power Tools: With Architect's specific, prior written approval following successful demonstrations of skill by mechanics, power grinders and / or pneumatic grinders may be used to partially remove mortar from horizontal (bed) joints in masonry and from joints longer than 6 inches in masonry where there is no danger of cutting into adjacent masonry units.
      a. Limitations on Use of Electric Power Grinders: Do not use electric power grinders on joints less than 3/16-inch wide or less than 6 inches long or where ornament, elaborate profile, or other surface irregularity might make damage to masonry units likely.
      b. Limitations on Use of Modified Pneumatic Die Grinders: Do not use modified pneumatic die grinders with custom thin blades on joints less than1-1/2 times the width of the grinder blade.
      c. Extent of Mortar Removal Using Power Grinders: Use power grinder only to score one kerf cut in center of each joint to depth of mortar removal required. Remove remaining mortar using hand tools or, if approved, pneumatically powered chisels.
         1) Stop kerf at least 4 inches from inside corners and projecting elements. Remove remaining mortar using hand tools or pneumatically powered chisels.
      d. Jigs: Construct jigs to guide and limit power tools as required to prevent damage to masonry units.
   3. Pneumatic Heads with Chisels: With Architect's specific, prior written approval following successful demonstrations of skill by mechanics, pneumatically powered chisels may be used to remove mortar from joints in lieu of hand tools. If work using pneumatically

powered chisels results in damage to masonry to remain, work using pneumatic chisels shall cease, and joints shall be prepared using only hand tools.

D. Cleaning: Remove loose mortar and foreign material from raked joints using a fine, stiff natural bristle brush. Remove remaining particles, dust, and dirt using filtered, oil- free compressed air. Ensure that dust and dirt are not blown back into previously cleaned joints.

E. Restoration of Damaged Masonry Units: Repair or replace masonry units damaged during joint preparation to Architect's satisfaction at no additional cost.

3.3 MORTAR APPLICATION

A. Wetting: Thoroughly wet masonry 24 hours prior to and again immediately before masonry pointing. Let surfaces dry slightly. At time of masonry pointing, surfaces shall be damp, so that they do not rapidly absorb moisture, but free of standing water (saturated, surface dry).
   1. Failure to Properly Wet Substrate: Evidence that masonry to be pointed has not been properly dampened to prevent water in the mortar from being too rapidly absorbed by the masonry will be cause for Restoration Consultant to reject pointing work. Remove and replace rejected pointing, including proper joint preparation, to meet requirements of this Section at no additional cost.

B. Masonry Pointing: Point joints as follows.
   1. Using a long, thin masonry pointing trowel, tightly pack mortar into joints in layers not exceeding 1/4-inch thick to fill joint to match original sound joints.
   2. Begin by filling areas from which mortar is missing to a depth greater than 3/4 inch in 1/4-inch-thick layers to within 3/4 inch of masonry surface to provide a uniform substrate for final masonry pointing. Fill final 3/4-inch depth continuously and uniformly in 1/4-inch-thick layers.
   3. Firmly iron each layer to compact mortar and ensure full bond between mortar and masonry units and a firm, solid joint.
   4. Allow each layer to reach thumbprint hardness before applying succeeding layer. Do not let previous layer dry out before applying succeeding layer. Construct uniform joints.
   5. Do not spread mortar over edges onto exposed surfaces of masonry units. Do not featheredge mortar.
   6. When stopping work at end of each day or for other reasons, stagger layers of mortar so that there will be no through joints in masonry pointing. Stagger joints in layers so that they are at least 3 inches from each other.
   7. Where applying new work to that of a prior day, dampen previous work as well as existing masonry to ensure good bond.

3.4 JOINT TOOLING

A. Tooling: After final layer of mortar is "leather hard," tool joints with a flat rule jointer, or as directed by Architect.

B. Profile: Tool joints to profile to match original joint profiles. Solidly compress mortar so that it adheres well to masonry on both sides of joints and forms a dense surface. Premature or late tooling will result in unacceptable finishes, which will be rejected.

3.5 CURING

A. Keep newly pointed joints damp for at least 48 hours after mortar has been inserted. Do not apply a direct stream of water to joints for at least 24 hours after mortar has been placed.

B. Ensure masonry temperature remains as required by specifications until mortar is thoroughly cured.

3.6 CLEANING AND REPAIR OF MORTAR JOINTS

A. Water Washing: Wash pointed masonry with clean filtered water and nonabrasive hand tools to remove mortar debris from masonry surfaces. Do not use chemical cleaners.
   1. Wash within 48 hours following completion of masonry pointing.
   2. Use blunt-edged wood scrapers, stiff natural bristle brushes, and rough towels along with water to remove mortar debris. Do not use wire brushes.

B. Repair of Pointed Joints: As cleaning progresses, examine joints to locate cracks, holes, and other defects. Carefully point up and fill such defects with mortar. Where joints are defective in opinion of Architect, cut out joints and refill with pointing mortar exercising extreme care to ensure that color matches that of adjacent masonry pointing work. Exposed joint surfaces shall be free from protruding mortar, holes, pits, depressions, and other defects.

3.7 DEEP POINT JOINTS IN MASONRY

A. General: Remove mortar to depth of masonry using wedges, shims, and/or other approved methods to prevent displacement of masonry during removal. Clean joints. Install mortar to fill deep portion of joints (portion of joint behind 3/4 inches from the plane of the wall). Point outer 3/4-inch depth of joint as specified above.

3.8 CORRECTIVE MEASURES

A. Defective Joints: Should a crack occur in any joint surface, should mortar fail to adhere to or pull away from masonry unit, or should there be other defects in pointed joints, remove mortar and repaint following requirements of this Section to Architect’s satisfaction.

B. Should Architect determine that any masonry pointing work does not equal or exceed minimum standard established by approved mock-up, cut out mortar to a depth of 34 inch and repoint following requirements of this Section to Architect’s satisfaction at no additional cost to Owner.

3.9 WASTE MANAGEMENT

A. Coordinate with Division 01.
   1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
   2. Set aside and protect materials suitable for reuse and/or remanufacturing.
   3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 04 03 05.16

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SECTION 042200 - CONCRETE UNIT MASONRY

PART 1 - GENERAL

SCHEDULE 0 - SUMMARY

A. Section Includes:
   1. Concrete masonry units.
   2. Mortar and grout.
   3. Steel reinforcing bars.
   4. Masonry-joint reinforcement.
   5. Embedded flashing.
   6. Miscellaneous masonry accessories.
   7. Masonry-cell fill.

B. Related Requirements:
   1. Section 03 10 00 "Concrete Forms and Accessories" for installing dovetail slots for masonry anchors.
   2. Section 05 12 00 "Structural Steel Framing" for installing anchor sections of adjustable masonry anchors for connecting to structural steel frame.
   3. Section 07 19 00 "Water Repellents" for water repellents applied to unit masonry assemblies.
   4. Section 07 62 00 "Sheet Metal Flashing and Trim" for exposed sheet metal flashing and for furnishing manufactured reglets installed in masonry joints.
   5. Section 08 95 16 "Wall Vents" for wall vents (brick vents).

1.2 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).

B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For the following:
   1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
   2. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315. Show elevations of all reinforced walls at ¼" per ft scale.
   3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.

C. Samples for Initial Selection:
   1. Colored mortar.
   2. Weep holes/vents.

D. Samples for Verification: For each type and color of the following:
   1. Pigmented and colored-aggregate mortar. Make Samples using same sand and mortar ingredients to be used on Project.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Material Certificates: For each type and size of the following:
   1. Masonry units.
      a. Include data on material properties and material test reports substantiating compliance with requirements.
   2. Cementitious materials. Include name of manufacturer, brand name, and type.
   3. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
   4. Grout mixes. Include description of type and proportions of ingredients.
   5. Reinforcing bars.
   6. Joint reinforcement.
   7. Anchors, ties, and metal accessories.

C. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
   1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91/C 91M for air content.
   2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM C 1093 for testing indicated.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.

1.7 FIELD CONDITIONS

A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
   1. Extend cover a minimum of 24 inches down both sides of walls, and hold cover securely in place.

B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.

C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
   1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
   2. Protect sills, ledges, and projections from mortar droppings.
   3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
   4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.

B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

2.2 PERFORMANCE REQUIREMENTS

A. Provide unit masonry that develops indicated net-area compressive strengths at 28 days.
   1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to TMS 602/ACI 530.1/ASCE 6.

2.3 UNIT MASONRY, GENERAL

A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6 except as modified by requirements in the Contract Documents.

B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such

defects are exposed in the completed Work and will be within 20 feet vertically and horizontally of a walking surface.

2.4 CONCRETE MASONRY UNITS

A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
   1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
   2. Provide bullnose-edged units for outside corners unless otherwise indicated.

B. CMUs: ASTM C 90.
   1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2800 psi.
   2. Density Classification: Lightweight except at exposed units at exterior walls.
   3. Size (Width): Manufactured to dimensions 3/8 inch less-than-nominal dimensions.
   4. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.

2.5 CONCRETE AND MASONRY LINTELS

A. General: Provide one of the following:

B. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs matching adjacent CMUs in color, texture, and density classification, with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.6 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150/C 150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
   1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C 114.

B. Hydrated Lime: ASTM C 207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

D. Aggregate for Mortar: ASTM C 144.
   1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
   2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.

E. Aggregate for Grout: ASTM C 404.

F. Water: Potable.

2.7 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60.

B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.

C. Masonry-Joint Reinforcement, General: Ladder type complying with ASTM A 951/A 951M.
   1. Interior Walls: Hot-dip galvanized carbon steel.
   2. Exterior Walls: Hot-dip galvanized carbon steel.
   3. Wire Size for Side Rods: 0.148-inch diameter.
   4. Wire Size for Cross Rods: 0.148-inch diameter.
   5. Spacing of Cross Rods: Not more than 16 inches o.c.
   6. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

2.8 TIES AND ANCHORS

A. General: Ties and anchors shall extend at least 1-1/2 inches into masonry but with at least a 5/8-inch cover on outside face.

B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:
   1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M, with ASTM A 153/A 153M, Class B-2 coating.
   2. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, with ASTM A 153/A 153M, Class B coating.
   3. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

C. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
   1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch-diameter, hot-dip galvanized steel wire.
   2. Tie Section: Triangular-shaped wire tie made from 0.187-inch- diameter, hot-dip galvanized steel wire.

2.9 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
   1. Do not use calcium chloride in mortar or grout.
   2. Use portland cement-lime mortar unless otherwise indicated.

B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated.

1. For reinforced masonry, use Type S.
2. For interior nonload-bearing partitions, use Type N.

D. Grout for Unit Masonry: Comply with ASTM C 476.
1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
2. Proportion grout in accordance with ASTM C 476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2500 psi.
3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
2. Verify that foundations are within tolerances specified.
3. Verify that reinforcing dowels are properly placed.
4. Verify that substrates are free of substances that would impair mortar bond.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Build chases and recesses to accommodate items specified in this and other Sections.

B. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.

C. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:
1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch or minus 1/4 inch.
2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.
3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

B. Lines and Levels:
   1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet, or 1/2-inch maximum.
   2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
   3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
   4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
   5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
   6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2-inch maximum.
   7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch.

C. Joints:
   1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
   2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
   3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
   4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch.

3.4 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.

C. Lay concealed masonry with all units in a wythe in running bond. Bond and interlock each course of each wythe at corners. Do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.

D. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

F. Fill space between steel frames and masonry solidly with solid grout unless otherwise indicated.

G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.

3.5 MORTAR BEDDING AND JOINTING

A. Lay hollow CMUs as follows:
1. Bed face shells in mortar and make head joints of depth equal to bed joints.
2. Bed webs in mortar in all courses of piers, columns, and pilasters.
3. Bed webs in mortar in grouted masonry, including starting course on footings.
4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.

B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

C. Cut joints flush where indicated to receive waterproofing unless otherwise indicated.

3.6 MASONRY-JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
1. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
2. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings in addition to continuous reinforcement.

B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

C. Provide continuity at wall intersections by using prefabricated T-shaped units.

D. Provide continuity at corners by using prefabricated L-shaped units.

E. Cut and bend reinforcing units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.7 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

A. Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete, to comply with the following:
1. Anchor masonry with anchors embedded in masonry joints and attached to structure as detailed on the drawngs.

3.8 LINTELS

A. Provide lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are shown without structural steel or other supporting lintels.

B. Provide concrete or masonry lintels where indicated. Provide loose steel lintels, concrete, or masonry lintels where lintel no type is specified.

C. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.

3.9 REINFORCED UNIT MASONRY INSTALLATION

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
   1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
   2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
   1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
   2. Limit height of vertical grout pours to not more than 60 inches.
   3. Do not use mortar to fill cmu cores. Use of mortar is cause for immediate rejection and replacement of the work.

3.10 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

B. Inspections: Special inspections according to Level [**B**] [**C**] in TMS 402/ACI 530/ASCE 5.
   1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
   2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
   3. Place grout only after inspectors have verified proportions of site-prepared grout.

C. Testing Prior to Construction: One set of tests.

D. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.

E. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.

F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.

G. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.

H. Prism Test: For each type of construction provided, according to ASTM C 1314 at 28 days.

3.11 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
   1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
   2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
   3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
   4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
   5. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

END OF SECTION 042200

SECTION 05 12 00 – STRUCTURAL STEEL

PART 1 - GENERAL

1.1 SCOPE

A. The extent of Structural Steel is as shown on the Contract Documents and as herein specified. The General and Supplementary Conditions and Division 1 Specification sections apply to work of this section.

1.2 ENERAL PROVISIONS

A. Standard Specifications and Codes issued by professional organizations and governmental agencies are specified hereinafter by basic designations and only the latest editions and revisions thereto shall apply to the work of this Section.

B. Applicable Standard Specifications and Codes:

1. The 2015 International Building Code with Current New York State Supplement.

2. Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings issued by the American Institute of Steel Construction. (AISC).

3. AWS D1.1 “Structural Welding Code – Steel” issued by the American Welding Society (AWS).

4. “Specification for Structural Joints Using ASTM A325 or A490 Bolts” issued by the AISC.

5. Painting Manual, Volume 2, “Systems and Specifications”, as issued by the Steel Structures Painting Council (SSPC).

6. "Code of Standard Practice for Steel Buildings and Bridges" as issued by the AISC.

C. In case of any conflict between the referenced standards and these specifications, the one having more stringent requirements shall prevail.

D. Coordination: Carry out the work of this Section in coordination and cooperation with contiguous work of other trades and/or Contracts involved.

1.3 SHOP DRAWINGS

Retain "Preinstallation Conference" Paragraph below if Work of this Section is extensive or complex enough to justify a preinstallation conference.

A. Submit Shop Drawings for the Architect's approval in accordance with the provisions of Section 013300.

B. The submittals shall include the following:

1. Erection plans: Shall be submitted for approval as early as possible.

2. Standard and special details: Submit standard and special details for approval as soon as possible.

3. Shop drawings shall indicate type, size and dimensions of all welds, and shall include details of the surface preparation and shop painting.

4. The details shall be made in such a way as to avoid having steel connections, bracing, etc. interfere with architectural details or in any way reduce the areas of shafts, openings, clearances, etc.

5. Shop drawings submitted electronically shall follow proper channels of submission as established with the owner and the design team. In addition, provisions of the General Conditions, as well as Section 013300 shall be followed as established for hard copy submissions. Shop drawings shall be submitted under a separate cover, include the title block and clearly identify the project on each drawing. Provide all other pertinent information and include the general contractor's review comments and review status on the electronic submission.

C. No fabrication shall be undertaken until respective shop drawings are marked "No Exception Taken" or "No Exception Except as Noted".

1.4 ALTERATIONS AND ADDITIONS TO EXISTING STEEL STRUCTURE

A. The Contractor shall verify existing conditions before submitting shop drawings for approval, including:

1. Dimensions and elevations.

2. Sizes.

3. Acceptable condition (not deteriorated or damaged).

B. The Contractor shall notify the Architect of any varying or interfering conditions affecting the alterations or additions so that the design may be adjusted to suit.

C. The Contractor shall carefully fit new connections to safe and acceptable tolerances.

D. Cutting of existing steel shall be done with extreme care. Do not over cut. Shore and brace whenever safety is questionable.

Verify available warranties and warranty periods for fire extinguishers with manufacturers.

PART 2 - PRODUCTS

See Editing Instruction No. 1 in the Evaluations for cautions about named manufacturers and products. For an explanation of options and Contractor's product selection procedures, see Section 01 60 00 "Product Requirements."

2.1 MATERIALS

A. Structural Steel shall conform to the following unless otherwise noted:

1. Channels, angles, plates and bars – ASTM A36

2. Round HSS – ASTM A53, Grade B

3. Square and rectangular HSS - ASTM A500, Grade B

4. HP shapes – ASTM A572, Grade 50

5. All others – ASTM A992, Grade 50

B. Bolts shall be ASTM A325, or A490. A307 may be used, if approved by the Structural Engineer of Record.

C. High Strength Bolts:

1. Bolts: Use ASTM A325 or A490 bolts manufactured by Infasco or approved equal. ASTM F1852 twist-off type tension control bolts produced by manufacturer may be used if approved by the Structural Engineer of Record.

2. Hardened washers: Use ASTM F436 washers manufactured by Infasco or approved equal.

3. Heavy hex nuts: Use only ASTM A563 heavy hex nuts manufactured by Infasco or Unytite Inc.

4. Galvanized Bolts: Where shown or noted as galvanized, bolts nuts and washers shall be hot-dip galvanized in compliance with ASTM A153. Nuts shall be lubricated in accordance with ASTM A563. Rotational capacity tests shall be performed on each assembly lot.

D. Filler Metal:

1. Electrodes: As required for matching base metal as specified in AWS “Structural Welding Code-Steel”.

2. The electrodes and flux used for submerged arc welding shall be provided by the same manufacturer. The flux shall be free of contamination from dirt, mill scale and other foreign material. Fused flux used in welding shall not be reused.

3. Filler metal for welding of new to existing steel shall be determined based on the test results conducted by a testing laboratory approved by the Structural Engineer of Record.

E. Paint for Shop Coat, except as otherwise required for compatibility with finish paints as specified in Section 099000, shall be “Azeron H.S. Primer No. 88-555” by Tnemec, or a comparable suitable product by DuPont or Glidden.

PART 3 - EXECUTION

3.1 DESIGN AND WORKMANSHIP

A. Unless otherwise specified or indicated, the design, fabrication and erection of steel work included in this Contract shall conform to the Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings, by the American Institute of Steel Construction, and the regulations of the Building Code, including all amendments made thereto, whichever is the more restrictive.

B. Existing Conditions:

1. Visit the project site and advise the Architect of any discrepancy or conflict. Field verify existing construction requirements, existing conditions, restrictions and clearances which may affect structural steel erection.

2. Examine the substrates, adjoining construction and the conditions under which the work is to be installed. Do not proceed until unsuitable conditions have been corrected. Consider all conditions which will affect satisfactory erection of the structural steel.

C. Erection:

1. Check the alignment and elevations of all column supports and location of all anchor bolts with transit and level instruments before starting erection. Notify and obtain Structural Engineer of Record's approval of methods proposed for correcting errors prior to proceeding with corrections.

2. Drift pins may be used only to align the erected parts. They shall not be used in such manner as to distort or damage the steel.

3. Make all necessary provisions for temporary shoring and bracing with connections of sufficient strength to sustain the imposed loads and for completion of erection where structural members are temporarily left out for erection at a later date.

4. Base and Bearing Plates:
   a. Clean concrete and masonry bearing surfaces of deleterious materials and roughen as necessary to provide adequate bond. Clean bottom surface of base and bearing plates immediately prior to erection.
   b. Set loose and attached base plates and bearing plates for structural members on wedges or other adjusting devices.
   c. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims. Cut off protruding parts flush with edges of base or bearing plates prior to packing with grout.
   d. Pack grout solidly between bearing surfaces and steel or plates. Ensure that no voids remain. Finish exposed surfaces, protect installed materials, and allow to cure as per manufacturer's specifications.

3.2 HIGH STRENGTH BOLTING

A. High Strength Bolts shall be installed as per "Specification for Structural Joints using ASTM A325 or A490 Bolts".

3.3 WELDING

A. Materials and Workmanship:

1. Welding shall be done in accordance with the Building Department and Fire Department Regulations and the requirements of the AWS “Structural Welding Code-Steel”, referenced herein.

2. Peening: Used only after permission for its use is obtained from the Architect.

3. Protection, storage and drying of welding electrodes shall be as specified in AWS “Structural Welding Code-Steel”.

4. Groove welds shall be complete penetration welds unless otherwise shown.

B. Welders and Welding Operators:

1. Welders and welding operators to be employed for this work must be qualified as prescribed in AWS “Structural Welding Code-Steel” and carry current certification as required by the Department of Buildings.

2. All costs for qualifying welders will be borne by the Contractor.

3.4 SURFACE PRAPARATION AND PAINTING

A. All steel shall be cleaned in accordance with SSPC SP-2 "Hand Tool Cleaning", except as specified below for "Architectural Steel”.

B. After fabrication, steel shall receive a shop coat of paint to provide 2.0 - 4.0 mils dry film thickness, except for the following:

1. Members to be encased in concrete.

2. Areas within 2" of field welds.

3. Contact surfaces of high-strength bolted connections.

4. Surfaces receiving shear studs rebar dowels, etc.

5. Milled surfaces (protect with an approved rust- inhibitive coating readily removable prior to erection, or of a type not requiring removal).

6. Members which will receive cementitious fireproofing.

7. Members to be galvanized.

C. After erection all damaged areas in the shop-coat, loosened scale, rust, exposed surfaces of bolts, nuts and washers, and all field welds and unpainted areas shall be cleaned to the same standards as for the shop coat and spot painted with the same paint used for the shop coat, at same film thickness.

D. Steel surfaces which will be inaccessible after erection and are not concrete encased shall be painted prior to erection with an additional coat of shop paint.

END OF SECTION 05 12 00

SECTION 05 31 00 – STEEL DECKING

PART 1 - GENERAL

1.1 REQUIREMENTS

A. Provide metal decking in accordance with the Contract Documents.

1.2 SCOPE

A. The extent of Steel Decking is as shown on the Contract Documents and as herein specified. The General and Supplementary Conditions and Division 1 Specification sections apply to work of this section.

B. Work included but not limited to:

1. Metal deck shown on drawings, including required shoring.

2. Steel flashing between metal deck and adjacent construction, and all other miscellaneous items and accessories required for the completion of metal deck work.

3. Cutting and reinforcing of openings in metal deck.

1.3 GENERAL PROVISIONS

A. Standard Specifications and Codes issued by professional organizations and governmental agencies are specified hereinafter by basic designations and only the latest editions and revisions thereto shall apply to the work of this Section.

B. Applicable Standard Specifications and Codes:

1. The Building Code of New York State, latest edition.

2. "Specification for the Design of Cold-Formed Steel Structural Members" issued by the American Iron and Steel Institute.

3. "Code for Welding in Building Construction" issued by the American Welding Society.

C. In case of any conflict between the referenced standards and these specifications, the one having more stringent requirements shall prevail.

D. Tests of weight of zinc coating shall conform to ASTM A90. Test panels shall be not less than 3” x 6” cut from fabricated deck units equivalent to those to be furnished. A sample of the zinc-coated accessories shall be tested by the same method. Contractor shall submit copies of test reports to Architect for approval.

E. Coordination: Carry out the work of this Section in coordination and cooperation with contiguous work of other trades and/or Contracts involved.

F. Inspection in Mill, Shop and Field: The material to be furnished shall be subject to inspection and tests in the mill, shop, and field by the Owner's inspectors, at no cost to the Contractor. However, inspection in the mill, shop or field will not relieve the Contractor of the responsibility to furnish satisfactory materials.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Metal Deck: Depths and gages are shown on the drawings. The types, design and function of metal decks shown are specified to products as manufactured by Canam USA (manufacturers of United Steel Deck products). Equivalent products meeting design requirements will be accepted if approved by the Architect prior to the award of the Contract.

B. Finish Flashing: Of not less than 18 gauge galvanized sheet steel, except as approved for a particular use, to close openings between floor units and columns, beams and girders where required.

C. Finishes: Composite metal deck shall be phosphatized / painted only on the side that will not be in contact with concrete. All other deck, closures, etc. shall be galvanized.

2.2 ACCESSORIES

A. Provide minimum 18 gauge galvanized end closures and change of direction plates, minimum 18 gauge side closure plates.

B. Include hanger tabs to be suspended from bottom of metal deck units. The hanger tabs shall be spaced 4'-0” on center, each way, designed to support maximum allowable load of 40 lbs. per hanger.

C. Surface Finishes: Accessories shall receive, before being formed, a zinc coating conforming to ASTM A525, wiped coating designation G90.

D. Where bottom of deck is above top flange of beam, provide permanent supporting seat or filler, 18 gage minimum.

PART 3 - EXECUTION

3.1 DELIVERY, STORAGE, AND HANDLING

A. Metal deck, miscellaneous items and accessories shall be delivered, stored, handled and installed, so as not to be damaged or deformed. Failure to wire brush and paint rusted areas immediately upon detection shall be cause for rejection. Decking stored at the site before erection shall be stacked on platforms or pallets and covered with tarpaulins or other suitable covering to provide weather tight enclosure while affording proper air circulation. The decking shall not be used for storage or as a working platform until the sheets have been securely fastened in position and shall not be damaged or overloaded during the entire construction period.

3.2 ERECTION

A. Metal deck shall be installed according to the manufacturer's recommendations. Deck units shall be in lengths to span over three or more supports wherever possible.

B. The deck shall be fastened to supporting steel by electric arc welding. Care shall be exercised in the selection of electrodes and amperage to provide positive welds and prevent high amperage blow holes. Welds shall be made from the top side of the deck with the welder following close behind the placement crew.

C. Puddle welds shall be at least 3/4" diameter or an elongated weld having an equal perimeter. Fillet welds, when used, shall be approximately 1" long. Weld metal shall penetrate all layers of deck material at end laps and side joints and have good fusion to the supporting members.

D. The minimum weld spacing shall be such as to hold the deck against a 30psf gross uplift and to provide lateral stability to the top flange of the supporting structural members. The weld spacing between the adjacent attachment points shall not exceed 12" on center. The adjacent sheets shall be fastened together at maximum spacing of 24” on center.

E. All portions of Metal Deck omitted due to the installation of hoists or for future installation of mechanical equipment, chutes or other requirements shall be installed or patched and be repaired by this Contractor as directed by the Contractor at no additional cost to the Owner.

F. Closures and Flashings:

1. Furnish, install and weld into position, flashings of not less than No. 18 gauge sheet steel except as approved for a particular use, to close openings between floor units and columns, beams and girders where required.

2. Provide where required, minimum 18 gauge galvanized end closure, side closure and change of direction plates. The appropriate gage shall be designed by a structural engineer in contractor’s employ and shown on the shop drawings submitted for Architect’s approval.

3.3 CUTTING AND PATCHING

A. Do all cutting and fitting as may be necessary to provide openings around columns, ducts and other penetrations required in connection with decking. All cutting and fitting shall be performed in accordance with the design drawings and approved shop drawings.

B. In addition to the above, cut out and notch for pipes, conduits, etc. which will penetrate the metal deck and which are indicated on the Heating, Ventilating, Air Conditioning, Plumbing, Drainage, and Electrical drawings.

C. Reinforce all openings to produce rigid installations in conformance with required design loads in the installed work.

3.4 HANGER TABS

A. Provide hanger tabs or tab extenders in such numbers and locations as required for ceiling suspension systems and mechanical and electrical requirements. Contractor shall carefully coordinate number and location of hanger tabs with the respective trades of the ceiling

construction. Unless otherwise directed, hanger tabs or tab extenders shall be spaced at 4'-0" on center, each way.

B. END OF SECTION 05 31 00

SECTION 05 50 00 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. The Work of this Section consists of the provision of all plant, labor, materials, equipment, testing and services necessary to complete the work of metal fabrications as shown on the schedules, keynotes, drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following (NOT ALL USED):

1. Steel framing and supports for mechanical and electrical equipment.
2. Steel framing and supports for applications where framing and supports are not specified in other Sections.
3. Prefabricated non-penetrating metal roof railings.

B. Products furnished, but not installed, under this Section include the following:

1. Loose steel lintels.
2. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
3. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

C. Related Requirements:

1. Division 03 "Cast-in-Place Concrete" for installing anchor bolts, steel pipe sleeves, slotted-channel inserts, wedge-type inserts, and other items cast into concrete.
2. Division 04 "Unit Masonry" for installing loose lintels, anchor bolts, and other items built into unit masonry.
3. Division 05 "Structural Steel Framing," "Metal Stairs" for cast and extruded treads and nosings, "Pipe and Tube Railings," "Decorative Metal," "Decorative Metal Railings."

1.3 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves,

concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.4 ACTION SUBMITTALS

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

B. Shop Drawings: Show fabrication and installation details for metal fabrications.

1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For professional engineer.

B. Mill Certificates: Signed by stainless-steel manufacturers, certifying that products furnished comply with requirements.

C. Welding certificates.

D. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

E. Research/Evaluation Reports: For post-installed anchors, from ICC-ES.

1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.7 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

B. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication and indicate measurements on Shop Drawings.
1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.
2. Provide allowance for trimming and fitting at site.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 METALS

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

C. Stainless-Steel Sheet, Strip, and Plate: ASTM A 240/A 240M or ASTM A 666, Type 304 and Type 316L (exterior).

D. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304, Type 316L (exterior).

E. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.

F. Rolled-Stainless-Steel Floor Plate: ASTM A 793.

2.3 FASTENERS

A. General: Unless otherwise indicated, provide Type 304 (interior) Type 316 (exterior) stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.

1. Provide stainless-steel fasteners for fastening aluminum.
2. Provide stainless-steel fasteners for fastening stainless steel.

B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 325, Type 3 (ASTM A 325M, Type 3); with hex nuts, ASTM A 563, Grade C3 (ASTM A 563M, Class 8S3); and, where indicated, flat washers.

C. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.

1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.

D. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.

E. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.

F. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.

1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, unless otherwise indicated.
2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 (A1) and Group 2 (A4) stainless-steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594 (ASTM F 836M).

2.4 MISCELLANEOUS MATERIALS

A. Shop Primers: Provide primers that comply with Division 09 "Painting." `

B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.

1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

C. Water-Based Primer: Emulsion type, anticorrosive primer for mildly corrosive environments that is resistant to flash rusting when applied to cleaned steel, complying with MPI#107 and compatible with topcoat.

D. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.

E. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.

F. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

G. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

H. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

I. Concrete: Comply with requirements in Section 033000 "Cast-in-Place Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa).

2.5 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Form exposed work with accurate angles and surfaces and straight edges.

E. Weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.

G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches (3.2 by 38 mm), with a minimum 6-inch (150-mm) embedment and 2-inch (50-mm) hook, not less than 8 inches (200 mm) from ends and corners of units and 24 inches (600 mm) o.c., unless otherwise indicated.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.

1. Fabricate units from slotted channel framing where indicated.
2. Furnish inserts for units installed after concrete is placed.

C. Fabricate supports for operable partitions from continuous steel beams of sizes indicated with attached bearing plates, anchors, and braces as indicated. Drill or punch bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.

D. Galvanize miscellaneous framing and supports where indicated.

E. Prime miscellaneous framing and supports with zinc-rich primer where indicated.

2.7 SHELF ANGLES

A. Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide horizontally slotted holes to receive 3/4-inch (19-mm) bolts, spaced not more than 6 inches (150 mm) from ends and 24 inches (600 mm) o.c., unless otherwise indicated.

1. Provide mitered and welded units at corners.
2. Provide open joints in shelf angles at expansion and control joints. Make open joint approximately 2 inches (50 mm) larger than expansion or control joint.

B. For cavity walls, provide vertical channel brackets to support angles from backup masonry and concrete.

C. Galvanize and prime shelf angles located in exterior walls.

D. Prime shelf angles located in exterior walls with zinc-rich primer.

E. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place concrete.

2.8 LOOSE STEEL LINTELS

A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.

B. Galvanize and prime loose steel lintels located in exterior walls.

C. Prime loose steel lintels located in exterior walls with zinc-rich primer.

D. Shop paint galvanized lintels.

2.9 FINISHES, GENERAL

A. Finish metal fabrications after assembly.

B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.10 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.

1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.

C. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.

1. Shop prime with universal shop primer unless zinc-rich primer is indicated.

D. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:

1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
3. Items Indicated to Receive Primers Specified in Section 099600 "High-Performance Coatings": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
4. Other Items: SSPC-SP 3, "Power Tool Cleaning."

E. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

2.11 PREFABRICATED NON-PENETRATING METAL ROOF RAILINGS

A. Manufacturers: Subject to compliance with requirements, provide products by on of the following:
1. Kee Safety, (Basis of Design: KeeGuard Safety Rail-Safety Guardrail)
2. Tractel Ltd
3. FIXFAST USA

B. Substitutions: Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 – Product Requirements.

C. Systems
1. Non-penetrating metal roof railing.
   a. Standards: System shall have top and mid rail in accordance with OSHA Standards - 29 CFR 1910.29 (b)(1)(2).
   b. Structural Load: 200 lb (90.7 kg), minimum, in any direction to all components in accordance with OSHA Regulation 29 CFR 1926.502.

c. Height: 42 inches (1067 mm), minimum.
d. Railings: 1-5/8 inch (41 mm) O.D. hot rolled pickled electric weld tubing, free of sharp edges and snag points.
e. Mounting Bases: Class 30 gray iron material cast with four receiver posts. Provide rubber pads on bottom of bases.
f. Receiver Posts: Shall have a positive locking system into slots that allow rails to be mounted in any direction. Friction locking systems are not allowed. Receiver posts shall have drain holes.
g. Accessories:
1) Roof Pads: Provide the following pad under each base to protect roof membrane:
a) Approved Product: BUR Pad.

D. Finishes
1. Finish: Factory finished powder coat paint.
2. Color: Black

E. Warranty
1. Warranty: Provide manufacturer's two (2) year warranty.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

F. Corrosion Protection: Coat concealed surfaces of aluminum that come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:

1. Cast Aluminum: Heavy coat of bituminous paint.
2. Extruded Aluminum: Two coats of clear lacquer.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

B. Anchor supports for operable partitions and overhead grilles securely to, and rigidly brace from, building structure.

C. Support steel girders on solid grouted masonry, concrete, or steel pipe columns. Secure girders with anchor bolts embedded in grouted masonry or concrete or with bolts through top plates of pipe columns.

1. Where grout space under bearing plates is indicated for girders supported on concrete or masonry, install as specified in "Installing Bearing and Leveling Plates" Article.

D. Install pipe columns on concrete footings with grouted baseplates. Position and grout column baseplates as specified in "Installing Bearing and Leveling Plates" Article.

1. Grout baseplates of columns supporting steel girders after girders are installed and leveled.

3.3 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.

B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Division 09.

C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780/A 780M.

3.4 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.

3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 05 50 00

SECTION 05 52 13 - PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. The Work of this Section consists of the provision of all plant, labor, materials, equipment, testing and services necessary to complete the work of pipe and tube railings at interior egress stairs and exterior areas as shown on the schedules, keynotes, drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:

1. Steel pipe and tube railings.

2. Aluminum pipe and tube railings – Aluminum handrails, guard rails

B. Related Sections:

1. Division 05 "Metal Stairs" for steel tube railings attachments associated with metal stairs,
2. Division 09 “Non-Structural Metal Framing" for metal backing for anchoring railings.

1.3 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design railings, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:

1. Steel: 72 percent of minimum yield strength.
2. Aluminum: The lesser of minimum yield strength divided by 1.65 or minimum ultimate tensile strength divided by 1.95.

C. Structural Performance: Railings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Handrails and Top Rails of Guards:

a. Uniform load of 50 lbf/ ft. (0.73 kN/m) applied in any direction.
b. Concentrated load of 200 lbf (0.89 kN) applied in any direction.
c. Uniform and concentrated loads need not be assumed to act concurrently.

2. Infill of Guards:

a. Concentrated load of 50 lbf (0.22 kN) applied horizontally on an area of 1 sq. ft. (0.093 sq. m).
b. Infill load and other loads need not be assumed to act concurrently.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

E. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.4 ACTION SUBMITTALS

A. Product Data: For the following:

1. Manufacturer's product lines of mechanically connected railings.
2. Railing brackets.
3. Grout, anchoring cement, and paint products.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

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

1. Sections of each distinctly different linear railing member, including handrails, top rails, posts, and balusters.
2. Fittings and brackets.

D. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified professional engineer and testing agency.

B. Welding certificates.

C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, according to ASTM E 894 and ASTM E 935.

1.6 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of railing from single source from single manufacturer.

B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

C. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

1.8 COORDINATION AND SCHEDULING

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

C. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Steel Pipe and Tube Railings:

a. King Architectural Metals
b. Pisor Industries, Inc.
c. Wagner, R & B, Inc.; a division of the Wagner Companies.

2. Aluminum Pipe and Tube Railings:
a. Pleasant Mount Welding, Inc.

2.2 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.

C. Adapters for mechanical attachment of aluminum pipe railing to steel metal stairs for protection of dissimilar metals.

2.3 STEEL AND IRON

A. Tubing: ASTM A 500 (cold formed) or ASTM A 513.

B. Pipe: ASTM A 53/A 53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.

C. Plates, Shapes, and Bars: ASTM A 36/A 36M.

D. Cast Iron: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.

2.4 ALUMINUM

A. Aluminum, General: Provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than the strength and durability properties of alloy and temper designated below for each aluminum form required.

B. Extruded Structural Pipe and Round Tubing: ASTM B 429, Alloy 6063-T6.
   1. Provide Standard Weight (Schedule 40) pipe, unless otherwise indicated.

C. Plate and Sheet: ASTM B 209, Alloy 6061-T6.

D. Die and Hand Forgings: ASTM B 247, Alloy 6061-T6.

E. Castings: ASTM B 26/B 26M, Alloy A356.0-T6.

2.5 FASTENERS

A. General: Provide the following:

   1. Ungalvanized-Steel Railings: Plated steel fasteners complying with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5 for zinc coating.
   2. Aluminum Railings: Type 316 stainless-steel fasteners.

B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.

C. Anchor pipe and tube railing to concrete with fascia flanges.

D. Fasteners for Interconnecting Railing Components:

1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless otherwise indicated.
2. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless exposed fasteners are unavoidable.
3. Provide tamper-resistant flat-head machine screws for exposed fasteners unless otherwise indicated.

E. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

1. Material for Exterior Locations and Where Stainless Steel is Indicated: Group 2 (A4) stainless-steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594 (ASTM F 836M).

2.6 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
1. For aluminum railings, provide type and alloy as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.

B. Etching Cleaner for Galvanized Metal: Complying with MPI#25.

C. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

D. Shop Primers: Universal Shop Paint. Note: Do not paint aluminum rails.

E. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.

1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

F. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.

G. Shop Primer for Galvanized Steel: Water based galvanized metal primer complying with MPI#134.

H. Intermediate Coats and Topcoats: Provide products that comply with Division 09.

I. Epoxy Intermediate Coat: Complying with MPI #77 and compatible with primer and topcoat.

1. Products: Subject to compliance with requirements, provide the following:

a. ICI Devoe Coatings

b. Benjamin Moore & Co.
c. PPG Architectural Finishes Inc.

J. Polyurethane Topcoat: Complying with MPI #72 and compatible with undercoat.

K. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

L. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.

1. Water-Resistant Product: At exterior locations and where indicated provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.
2. At exterior rails provide as required sealant, base plate and weep holes to address migration and discharge of water penetration.

2.7 FABRICATION

A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage**,** but not less than that required to support structural loads.

B. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

D. Form work true to line and level with accurate angles and surfaces.

E. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.

G. Connections: Fabricate railings with welded connections unless otherwise indicated.

H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove flux immediately.
4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.

I. Welded Connections for Aluminum Pipe: Fabricate railings to interconnect members with concealed internal welds that eliminate surface grinding, using manufacturer's standard system of sleeve and socket fittings.

J. Nonwelded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
   1. Fabricate splice joints for field connection using an epoxy structural adhesive if this is manufacturer's standard splicing method.

K. Form changes in direction as follows:

   1. By bending or by inserting prefabricated elbow fittings.

L. Bend members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

M. Close exposed ends of railing members with prefabricated end fittings.

N. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch (6 mm) or less.

O. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.

   1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers, or other means to transfer loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.

P. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.

Q. For railing posts set in concrete, provide stainless-steel sleeves not less than 6 inches (150 mm) long with inside dimensions not less than 1/2 inch (13 mm) greater than outside dimensions of post, with metal plate forming bottom closure.

R. For removable railing posts, fabricate slip-fit sockets from stainless-steel tube or pipe whose ID is sized for a close fit with posts; limit movement of post without lateral load, measured at top, to not more than one-fortieth of post height. Provide socket covers designed and fabricated to resist being dislodged.

   1. Provide chain with eye, snap hook, and staple across gaps formed by removable railing sections at locations indicated. Fabricate from same metal as railings.

S. Toe Boards: Where indicated, provide toe boards at railings around openings and at edge of open-sided floors and platforms. Fabricate to dimensions and details indicated.

2.8 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.

2.9 STEEL AND IRON FINISHES

A. For Interior nongalvanized steel railings, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves, except galvanize anchors to be embedded in exterior concrete or masonry.

B. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with [SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

C. Primer Application: Apply shop primer to prepared surfaces of railings unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.

1. Shop prime uncoated railings with universal shop primer unless otherwise indicated.
2. Do not apply primer to galvanized surfaces.

D. Shop-Painted Finish: Comply with Division 09 “Painting.”

1. Color: As selected by Architect from manufacturer's full range.

2.10 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 611.

C. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements have been clearly marked for Installer. Locate reinforcements and mark locations if not already done.

3.2 INSTALLATION, GENERAL

A. Fit exposed connections together to form tight, hairline joints.

B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.

1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
2. Set posts plumb within a tolerance of 1/16 inch in 3 feet (2 mm in 1 m).
3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet (5 mm in 3 m).

C. Corrosion Protection: Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

D. Adjust railings before anchoring to ensure matching alignment at abutting joints.

E. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.3 RAILING CONNECTIONS

A. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article whether welding is performed in the shop or in the field.

B. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Use wood blocks and padding to prevent damage to railing members and fittings. Seal recessed holes of exposed locking screws using plastic cement filler colored to match finish of railings.

C. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending 2 inches (50 mm) beyond joint on either side, fasten internal sleeve securely to one side, and locate joint within 6 inches (150 mm) of post.

3.4 ANCHORING POSTS

A. Use metal sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.

B. Form or core-drill holes not less than 5 inches (125 mm) deep and 3/4 inch (20 mm) larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.

C. Cover anchorage joint with flange of same metal as post, welded to post after placing anchoring material.

D. Anchor posts to metal surfaces with oval flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:

1. For aluminum pipe railings, attach posts using fittings designed and engineered for this purpose.
2. For stainless-steel pipe railings, weld flanges to post and bolt to supporting surfaces.
3. For steel pipe railings, weld flanges to post and bolt to metal supporting surfaces.

E. Install brackets and adapters to mechanically secure aluminum guardrail posts to steel stair framing to provide separation between dissimilar metals.

3.5 ATTACHING RAILINGS

A. Anchor railing ends at walls with round flanges anchored to wall construction and welded to railing ends.

B. Anchor railing ends to metal surfaces with flanges bolted to metal surfaces and welded to railing ends.

C. Attach railings to wall with wall brackets, except where end flanges are used. Provide brackets with 1-1/2-inch (38-mm) clearance from inside face of handrail and finished wall surface. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.

1. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt.
2. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.

D. Secure wall brackets and railing end flanges to building construction as follows:

1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
2. For hollow masonry anchorage, use toggle bolts.
3. For wood stud partitions, use hanger or lag bolts set into studs or wood backing between studs. Coordinate with carpentry work to locate backing members.
4. For steel-framed partitions, use self-tapping screws fastened to steel framing or to concealed steel reinforcements.

5. For steel-framed partitions, use toggle bolts installed through flanges of steel framing or through concealed steel reinforcements.

3.6 ADJUSTING AND CLEANING

A. Clean aluminum and stainless steel by washing thoroughly with clean water and soap and rinsing with clean water.

B. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.

C. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Division 09 “Painting.”

D. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

3.7 PROTECTION

A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

3.8 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 05 52 13

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SECTION 06 10 00 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. The Work of this Section consists of the provision of all plant, labor, materials, equipment, testing and services necessary to complete the work of rough carpentry as shown on the schedules, keynotes, drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:

1. Wood Preservative Treated Lumber.
2. Fire Retardant Treated Lumber.
3. Misc. Lumber.
4. Plywood backing panels.
5. Un-Treated roof related solid blocking, beveled siding, and plywood.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.
3. Data for each type of fastener and anchor.

B. Mockups:

1. Construct 4 foot long mockups of each roof blocking assembly, to show how it will fit, get fastened to, and relate to adjoining building components.

2. Obtain the Architect’s approval of each mock up before proceeding with the work. Remove and replace mockups that are rejected; approved mockups may be left in place and incorporated into the finished project.

1.3 INFORMATIONAL SUBMITTALS

A. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.

B. Evaluation Reports: For the following, from ICC-ES:

1. Wood-preservative-treated wood.
2. Fire-retardant-treated wood.
3. Powder-actuated fasteners.
4. Expansion anchors.
5. Metal framing anchors.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Certified Wood: Materials shall be produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship".

B. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece or omit grade stamp and provide certificates of grade compliance issued by grading agency.
3. Provide dressed lumber, S4S, unless otherwise indicated.

C. Maximum Moisture Content of Lumber: 15 percent for 2-inch nominal thickness or less, 19 percent for more than 2-inch nominal thickness unless otherwise indicated.

D. Roof blocking:
1. Construction grade Douglas Fir, kiln dried to 15%
2. Utility grade beveled cedar or redwood siding, or equivalent synthetic lumber products.
3. APA rated CDX plywood panels, assembled with exterior glue.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat all rough carpentry unless otherwise indicated.

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
4. Wood framing members that are less than 18 inches above the ground in crawlspaces or unexcavated areas.
5. Do not treat roof related blocking or plywood.

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.

1. Use treatment that does not promote corrosion of metal fasteners.

2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.

C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Kiln-dry plywood after treatment to a maximum moisture content of 15 percent.

D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.

E. Application: Treat all rough carpentry items indicated on Drawings, and the following:

1. Concealed blocking.
2. Plywood backing panels.

F. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, which meet or exceed those of basis-of-design products. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

2.4 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.
3. Rooftop equipment bases and support curbs.
4. Cants.
5. Furring.
6. Grounds

B. Provide miscellaneous lumber for support or attachment of other construction in the following locations **(whether indicated on the plans or not):**

1. All wall mounted counters, shelf millwork units of any kind, and items furnished by the owner requiring wood blocking.
2. Any recessed items requiring wood blocking for attachment and or leveling.
3. Any and all construction elements requiring anchoring to walls and or structure.

C. For items of dimension lumber size, provide Construction or No. 2 grade lumber of any species.

D. For concealed boards, provide lumber with 15 percent maximum moisture content and any of the following species and grades:

1. Mixed southern pine; No. 2 grade; SPIB.
2. Eastern softwoods; No. 2 Common grade; NeLMA.
3. Northern species; No. 2 Common grade; NLGA

2.5 PLYWOOD BACKING PANELS

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

2.6 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

B. Power-Driven Fasteners: NES NER-272.

C. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.

D. Fasteners for roof related blocking shall be hot dipped galvanized steel; or steel with a proprietary rust inhibiting coating. Utilize minimum #12 diameter screws where ever possible; nails if used, shall have annular ring shanks. Do not use “dry-wall” screws to assemble roof related wood blocking. Anchors bolts shall have be formed of 1/2 inch diameter steel. Drilled anchors shall have 1/4 inch diameter shanks.

2.7 METAL FRAMING ANCHORS

A. Manufacturers: Subject to compliance with requirements, provide products by the following provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Cleveland Steel Specialty Co.
2. KC Metals Products, Inc.
3. Phoenix Metal products, Inc.
4. Simpson Strong-Tie Co., Inc.
5. USP Structural Connectors.

B. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

C. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.

1. Use for interior locations unless otherwise indicated.

D. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A 653/A 653M; structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thick.

1. Use for wood-preservative-treated lumber and where indicated.

2.8 MISCELLANEOUS MATERIALS

A. Sill-Sealer Gaskets: Glass-fiber-resilient insulation, fabricated in strip form, for use as a sill sealer; 1-inch nominal thickness, compressible to 1/32 inch; selected from manufacturer's standard widths to suit width of sill members indicated.

B. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to suit width of sill members indicated.

C. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch (0.6 mm).

D. Adhesives for Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.

1. Adhesives shall have a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

B. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

C. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.

D. Install fire-retardant treated plywood backing panels with classification marking of testing agency exposed to view.

E. Metal Framing Anchors: Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

F. Do not splice structural members between supports unless otherwise indicated.

G. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

H. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

I. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. NES NER-272 for power-driven fasteners.

2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.

J. Roof Blocking:

1. Stagger joints in built up assemblies at least 2 feet to obtain maximum strength. Provide the appropriate shapes needed and adjust wood members to suit existing conditions for full bearing and secure attachment. Discard defective material, and pieces which are too small, and fabricate the work with a minimum of joints and an optimum joint arrangement.

2. Securely attach roof blocking to resist a pull of 275 pounds per lineal foot in any direction. Countersink all fasteners flush.

3. Space fasteners to achieve adequate holding power, generally as follows:
   a. Anchor bolts embedded in concrete, anchors drilled into concrete or masonry, screws into a steel deck or structural steel member, or screws into wood framing: 12 inches on center.
   b. Nails into wood: 8 inches on center.
   c. Install two rows of fasteners on blocking wider than 5 inches.
4. Install blocking neatly scribed and cut to fit within 1/4 inch of adjoining materials. Install blocking, shims and similar supports for the proper attachment of subsequent work.

3.2 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes sufficiently wet that moisture content exceeds that specified, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

C. Do not allow roof blocking to get wet while stored or during installation; remove and replace any roof related blocking that gets wet.

3.3 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 06 10 00

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SECTION 06 40 23 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. A. This Section includes the following:
   1. Custom built wood cabinets (casework).
   2. Custom built plastic-laminate-covered cabinets (plastic-covered casework).
   3. Plastic laminate countertops.

B. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Division 6 Section "Rough Carpentry" for exposed framing and for furring, blocking, shims, and miscellaneous concealed interior woodwork.
   2. Division 6 Section "Finish Carpentry" for interior carpentry exposed to view that is not specified in this Section.
   3. Division 9 Section "Painting" for field finishing of installed interior architectural woodwork.
   4. Division 12 Section “Special Casework and Laboratory Equipment” for special casework and epoxy resin countertops. (NOT USED)

1.3 DEFINITIONS

A. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items unless concealed within other construction prior to woodwork installation.

1.4 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product data for each type of product and process specified and incorporated into items of architectural woodwork during fabrication, finishing, and installation.

C. Shop drawings showing location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
   1. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcing specified in other Sections.
   2. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, and other items installed in architectural woodwork.

D. Samples for initial selection of the following in the form of manufacturer's color charts consisting of actual units or sections of units showing the full range of colors, textures, and patterns available for each type of material indicated.
   1. Shop-applied transparent finishes.
   2. Plastic laminates.

E. Samples for verification of the following:
   1. Lumber with transparent finish, 50 sq. in., for each species and cut, finished on one side and one edge.
   2. Laminate-clad panel products, 8 by 10 inches, for each type, color, pattern, and surface finish, with separate samples of unfaced panel product used for core.
   3. Solid laboratory countertop materials, 6 inches square.
   4. Exposed cabinet hardware, one unit for each type and finish.

F. Product certificates signed by woodwork fabricator certifying that products comply with specified requirements.

G. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: Firm experienced in producing architectural woodwork similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units without delaying the Work.

B. Installer Qualifications: Arrange for interior architectural woodwork installation by a firm that can demonstrate successful experience in installing architectural woodwork items similar in type and quality to those required for this Project.

C. Quality Standard: Except as otherwise indicated, comply with the following standard:
   1. AWI Quality Standard: "Architectural Woodwork Quality Standards" of the Architectural Woodwork Institute for grades of interior architectural woodwork, construction, finishes, and other requirements.

      a. Provide AWI Certification Labels or Certificates of Compliance indicating that woodwork meets requirements of grades specified.
   2. The Contract Documents contain selections chosen from options in the Quality Standard as well as additional requirements beyond those of the Quality Standard. Comply with such selections and requirements in addition to the Quality Standard.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect woodwork during transit, delivery, storage, and handling to prevent damage, soilage, and deterioration.

B. Do not deliver woodwork until painting and similar operations that could damage, soil, or deteriorate woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas whose environmental conditions meet requirements specified in "Project Conditions."

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet-work is completed, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Field Measurements: Where woodwork is indicated to be fitted to other construction, check actual dimensions of other construction by accurate field measurements before fabrication, and show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
   1. Verify locations of concealed framing, blocking, reinforcements, and furring that support woodwork by accurate field measurements before being enclosed. Record measurements on final shop drawings.
   2. Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site and coordinate construction to ensure that actual dimensions correspond to guaranteed dimensions.

1.8 COORDINATION

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

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide materials that comply with requirements of the AWI quality standard for each type of woodwork and quality grade indicated and, where the following products are part of interior woodwork, with requirements of the referenced product standards that apply to product characteristics indicated:

B. Lumber: DOC PS 20 and the following grading rules:
   1. NeLMA: Northeastern Lumber Manufacturers' Association, "Standard Grading Rules for Northeastern Lumber."
   2. NLGA: National Lumber Grades Authority, "Standard Grading Rules for Canadian Lumber."

C. Factory mark each piece of lumber with grade stamp of inspection agency indicating grade, species, moisture content at time of surfacing, and mill.
   1. For exposed lumber, mark grade stamp on end or back of each piece, or omit grade stamp and provide certificates of grade compliance issued by inspection agency.

D. Hardboard: AHA A135.4.

E. MDF: ANSI A208.2, Grade 130 made with binder containing no urea-formaldehyde resin.

F. Particleboard: ANSI A208.1, Grade M-2, made with binder containing no urea-formaldehyde resin.

G. Melamine-Faced Particleboard: Particleboard complying with ANSI A208.1, Grade M-2, finished on both faces with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD3, Grade VGL, for test methods 3.3, 3.4, 3.6, 3.8, and 3.10.
   1. Color: White.

H. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated, or if not indicated, as required by woodwork quality standard.
   1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering high-pressure decorative laminates that may be incorporated in the Work include, but are not limited to, the following:
      a. Wilsonart
      b. Formica Corporation.
      c. Laminart.
      d. Nevamar Corp.
      e. Pioneer Plastics Corp.
      f. Westinghouse Electric Corp.; Specialty Products Div.
      g. Ralph Wilson Plastics Co.

I. Adhesive for Bonding Plastic Laminate: Contact cement.

J. Adhesive for Bonding Plastic Laminate: Aliphatic resin.

2.2 CABINET HARDWARE AND ACCESSORY MATERIALS

A. General: Manufacturer's standard units complying with ANSI A156.9, of type, material, size, and finish as selected from manufacturer's standard choices.
   1. Exposed Hardware Finishes: For exposed hardware, provide manufacturer’s standard satin finished or brushed aluminum.

B. Hardware Standard: Comply with BHMA A156.9 for items indicated by reference to BHMA numbers or referenced to this standard.

C. For concealed hardware provide manufacturer's standard finish that complies with product class requirements of BHMA A156.9.

D. Clear, Tempered Float Glass for Doors: ASTM C 1048, Kind FT, Condition A, Type I, Class 1, Quality q3; manufactured by horizontal (roller hearth) process, with exposed edges seamed before tempering, 6 mm thick, unless otherwise indicated.

E. Clear, Tempered Float Glass for Shelves: ASTM C 1048, Kind FT, Condition A, Type I, Class 1, Quality q3; with exposed edges seamed before tempering, 6 mm thick, unless otherwise indicated.

2.3 INSTALLATION MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln dried to less than 15 percent moisture content.

B. Screws: Select material, type, size, and finish required for each use. Comply with ASME B18.6.1 for applicable requirements.

   1. For metal framing supports, provide screws as recommended by metal-framing manufacturer.

C. Nails: Select material, type, size, and finish required for each use. Comply with FS FF-N-105 for applicable requirements.

D. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed steel or lead expansion bolt devices for drilled-in-place anchors.

2.4 FABRICATION, GENERAL

A. Interior Woodwork Grade: Provide interior woodwork complying with the referenced quality standard and of the following grade:
1. Grade: Custom.

B. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to relative humidity conditions existing during time of fabrication and in installation areas.

C. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:

1. Corners of cabinets and edges of solid-wood (lumber) members 3/4 inch thick or less: 1/16 inch.
2. Edges of rails and similar members more than 3/4 inch thick: 1/8 inch.
3. Corners of cabinets and edges of solid-wood (lumber) members and rails: 1/16 inch.

D. Complete fabrication, including assembly, finishing, and hardware application, before shipment to Project site to maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

E. Shop-cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Smooth edges of cutouts and, where located in countertops and similar exposures, seal edges with a water-resistant coating.

F. Install glass to comply with applicable requirements of Division 8 Section "Glazing" and of FGMA "Glazing Manual." For glass in wood frames, secure glass with removable stops.

2.5 WOOD CABINETS (CASEWORK) WITH TRANSPARENT FINISH

A. Quality Standard: Comply with AWI Section 400 requirements for wood cabinets. Joints of cabinets shall be multiple doweled, glued and screwed, with full frame top and solid bottom.

1. Grade: Custom.

B. AWI Type of Cabinet Construction: Reveal overlay.

C. Wood Species for Exposed Surfaces: Red oak, rift sawn/cut, unless noted otherwise.
1. Matching of Veneer Leaves: Slip match.
2. Veneer Matching Within Panel Face: Balance match.

D. Semiexposed Surfaces: Provide surface materials indicated below:

1. Surfaces Other than Drawer Bodies: Match species and cut indicated for exposed surfaces.
2. Drawer Sides and Backs: Solid hardwood lumber, same species indicated for exposed surfaces, shop finished.
3. Drawer Bottoms: ¼ inch tempered hardboard.

2.6 PLASTIC LAMINATE FACE CASEWORK

A. Face Style: Reveal overlay.

B. Face Frame: 1-by-1-5/8-inch solid wood frame rails and stiles with glued mortise and tenon joints.

C. Concealed Surfaces: Sound and dry solid wood, plywood, or particleboard without defects affecting strength, utility, or stability.

D. Sides, Dividers, Tops, Bottoms, Shelves, and Stretchers: Plastic laminate GP 28 on 1/2-inch-thick particleboard. Provide stretchers for top of base cabinet.

E. Back Panels: 1/4-inch-thick hardboard with thermoset decorative panels on interior surfaces fastened to rear edge of end panels and to top and bottom rails.

F. Exposed Edge Treatment: Edge doors and drawer fronts with 3mm PVC edge banding. Color and finish to match plastic laminate of exposed faces.

G. Semi-Exposed Edge Treatment: Edge top of drawer body with high-impact plastic tee edging. Edge remaining casework surfaces with plastic laminate GP 28 matching adjoining plastic laminate in color, pattern, and finish.

H. Doors, Drawer Fronts, Fixed Panels, Toeboards, and Ends: Plastic laminate meeting NEMA GP 28 standard for vertical grade on 3/4-inch-thick particleboard.

I. Drawers: Fabricate with front, bottom, and back rabbeted in sides and secured with glue and mechanical fasteners as follows:
1. Subfronts, Sides, and Backs: 1/2-inch-thick particleboard.
2. Bottoms: Not less than 1/2-inch-thick particleboard.
3. Drawer Suspension: Provide for a minimum capacity of 75 lbf, with twin-track, side-mounted, drawer-glide suspension with nylon rollers. Provide self-closing feature and positive stop.

J. Joinery: Rabbet backs flush into end panels and secure with concealed mechanical fasteners. Connect tops and bottoms of wall cabinets and bottoms and stretchers of base cabinets to ends and dividers with mechanical fasteners. Rabbet tops, bottoms, and backs into end panels.

2.7 COUNTERTOPS, PLASTIC LAMINATE

A. General: Comply with ANSI A161.2.

1. Solid color plastic laminate.

B. Plastic Laminate Substrate: Comply with ASTM D 1037.

1. Particleboard: Comply with ANSI A208.1, 45-lb/cu. ft. density, not less than 3/4 inch thick.
2. Medium-Density Fiberboard: Comply with ANSI A208.2, not less than 3/4 inch thick.

C. Plastic Laminate Substrate for Countertop with Sink: Exterior grade plywood or phenolic resin particleboard complying with ASTM D 1037.

D. Backer Sheet: Provide BK 20 backer sheet wherever the unsupported countertop area exceeds 4 sq. ft. and substrate is 3/4 inch thick; 6 sq. ft. and substrate is 1 inch thick; 8 sq. ft. and substrate is 1-1/8 inch or thicker.

E. Countertop, Backsplash, and Endsplash Plastic Laminate: NEMA GP 50 standard.

F. Configuration: Provide countertops with the following front style, cove, and backsplash style:

1. Front Style: Self-edge.
2. Cove: Applied.
3. Backsplash and Endsplash Style: Square edge without scribe.

2.8 SHOP FINISHING OF WOOD CABINETS FOR TRANSPARENT FINISH

A. Quality Standard: Comply with AWI Section 1500, unless otherwise indicated.

1. Grade: Provide finishes of same grades as items to be finished.

B. General: The entire finish of wood cabinets is specified in this Section, regardless of whether shop applied or applied after installation.
1. Shop Finishing: To the greatest extent possible, finish cabinets at the fabrication shop. Defer only final touch up, cleaning, and polishing until after installation.

C. Preparations for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural woodwork, as applicable to each unit of work.

1. Backpriming: Apply one coat of sealer or primer compatible with finish coats to concealed surfaces of woodwork, including backs of trim, cabinets, paneling, and ornamental work and the underside of countertops. Apply 2 coats to back of paneling. Concealed surfaces of plastic laminate-clad woodwork do not require backpriming when surfaced with plastic laminate or thermoset decorative overlay.

D. Open Finish for Open-Grain Woods: Do not apply filler to open-grain woods.

E. Transparent Finish: Comply with requirements indicated below for grade, finish system, staining, and sheen, with sheen measured on 60-degree gloss meter per ASTM D 523.

1. Grade: Custom.
2. AWI Finish System TR-4: Conversion varnish.
3. Staining: None required.
4. Sheen: Semigloss 55-75 gloss units.

PART 3 - EXECUTION

3.1 PREPARATION

A. Condition woodwork to average prevailing humidity conditions in installation areas before installing.

B. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including back priming and removal of packing.

3.2 INSTALLATION

A. Quality Standard: Install woodwork to comply with AWI Section 1700 for the same grade specified in Part 2 of this Section for type of woodwork involved.

B. Install woodwork plumb, level, true, and straight with no distortions. Shim as required with concealed shims. Install to a tolerance of 1/8 inch in 96 inches

C. Scribe and cut woodwork to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts.

D. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails for exposed nailing, countersunk and filled flush with woodwork and matching final finish where transparent finish is indicated.

E. Cabinets: Install without distortion so that doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete the installation of hardware and accessory items as indicated.
   1. Install cabinets with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
   2. Maintain veneer sequence matching of cabinets with transparent finish.

F. Tops: Anchor securely to base units and other support systems as indicated. Calk space between backsplash and wall with specified sealant.
   1. Install countertops with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.

G. Complete the finishing work specified in this Section to the extent not completed at shop or before installation of woodwork. Fill nail holes with matching filler where exposed. Apply specified finish coats, including stains and paste fillers if any, to exposed surfaces where only sealer/prime coats were applied in the shop.

H. Refer to Division 9 Sections for final finishing of installed architectural woodwork.

3.3 ADJUSTING AND CLEANING

A. Repair damaged and defective woodwork where possible to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware.

C. Clean woodwork on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

3.4 PROTECTION

A. Provide final protection and maintain conditions in a manner acceptable to fabricator and Installer that ensures that woodwork is without damage or deterioration at the time of Substantial Completion.

3.5 WASTE MANAGEMENT

A. Coordinate with Division 01.
   1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
   2. Set aside and protect materials suitable for reuse and/or remanufacturing.
   3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

3.6 CABINET HARDWARE AND ACCESSORY SCHEDULE

A. BHMA numbers are used below to designate hardware requirements, except as otherwise indicated.

B. Butt Hinges: 2-3/4-inch, 5-knuckle steel hinges made from 0.095-inch-thick metal, and as follows:
   1. Semiconcealed Hinges for Overlay Doors: B01521.
   2. Rockford Process Control- #IH-375-26D
   3. Dull Chrome

C. Pulls: Contemporary Aluminum Edge Pull.
   1. Richelieu Hardware-Contemporary Edge Pull, 9595 -7 9/16”
   2. Stainless steel

D. Catches: As follows:
   1. Magnetic Catches: B03141.
   2. Push-in Magnetic Catches: B03131.
   3. Friction Catches: B03033.
   4. Ball Friction Catches: B03013.

E. Adjustable Shelf Standards: B04071.
   1. Shelf Rests for Standards: B04081.
   2. KV or equal -Heavy-duty stainless-steel single slotted adjustable shelf brackets and fasteners and shelf rests

F. Drawer Suspension: Epoxy coated self-closing drawer slides with nylon rollers, 2 stage positive stops, and rated for the following loads:
   1. Drawer Slides: 75 lbf.
   2. Self-closing

G. Door Locks: E07121. (ALL DOORS)

H. Drawer Locks: E07041. (ALL DRAWERS)

END OF SECTION 06 40 23

SECTION 070150.16 - MAINTENANCE CLEANING OF MEMBRANE ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Pressure washing of roof membrane including membrane flashings, with full water reclamation.

B. Related Requirements:

1. Division 07 Section “Rehabilitation of Single Ply Roofing”.

1.2 ACTION SUBMITTALS

A. Product Data: For cleaning compounds.

1.3 INFORMATIONAL SUBMITTALS

A. Work Plan: For maintenance cleaning, including description of means and methods for water reclamation.

1.4 QUALITY ASSURANCE

A. Operator Qualifications: Trained and approved by manufacturer of cleaning equipment, with a record of successful roofing membrane cleaning.

B. Regulatory Requirements: Comply with governing EPA regulations. Comply with hauling and disposal regulations of authorities having jurisdiction.

1.5 PROJECT / FIELD CONDITIONS

A. Owner will occupy portions of building immediately below roof area to be maintained. Conduct operations so Owner's operations are not disrupted. Provide Owner with not less than 72 hours' notice of activities that may affect Owner's operations.

B. Protect building to be cleaned, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from maintenance operations.

C. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.

PART 2 - PRODUCTS

2.1 CLEANING SYSTEM OPERATORS

A. Source Limitations: Engage a qualified roofing maintenance cleaning firm to perform cleaning of membrane roofing.

B. Approved Operators: RoofTec Cleaning Systems, Tremco CPG Inc., Beachwood OH, (800) 562-2728.

1. Or-Equal cleaning method as approved by Architect prior to bid.

2.2 PERFORMANCE REQUIREMENTS

A. Water Reclamation: Provide maintenance cleaning of membrane roofing that provides 100 percent reclamation of cleaning water and complies with applicable provisions of the US EPA National Pollutant Discharge Elimination System (NPDES) program and requirements of local authorities having jurisdiction.

2.3 MATERIALS

A. Pre-cleaning Treatment: Detergent-free.

1. Product: Tremco, RoofTec PREKLEEN.

B. Pressure Wash Cleaning Solution: VOC, detergent, phosphate, and surfactant free.

1. Product: Tremco, RoofTec RENEW Cleaner.

PART 3 - EXECUTION

3.1 PREPARATION

A. Comply with warranty requirements of existing roof membrane manufacturer.

B. Shut off rooftop utilities and service piping before beginning the Work.

C. Test existing roof drains to verify that they are not blocked or restricted. Immediately notify Owner of any blockages or restrictions.

D. Coordinate with Owner to shut down air-intake equipment in the vicinity of the Work. Cover air-intake louvers before proceeding with maintenance cleaning work that could affect indoor air quality or activate smoke detectors in the ductwork.

E. Maintain roof drains in functioning condition to ensure roof drainage at end of each workday. Prevent debris from entering or blocking roof drains and conductors.

3.2 MAINTENANCE CLEANING OF ROOF MEMBRANE

A. Pretreat membrane and flashings when recommended by cleaning equipment manufacturer based upon site assessment of membrane condition.

B. Apply pressure wash cleaning solution onto membrane and flashing surfaces.

C. Pressure wash membrane and flashings using equipment and methods recommended in writing by cleaning equipment manufacturer for specific application. Utilize rotating wash head equipment operated at not less than 2,000 psi (13,800 kPa). Use equipment utilizing vacuum removal of wash water and residues.

3.3

3.4 DISPOSAL

A. Collect cleaning water and associated cleaning compounds and residual material and process to meet US EPA and local environmental requirements for legal discharge.

END OF SECTION 070150.16

SECTION 070150.72 - REHABILITATION OF BUILT-UP ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Roof re-coating preparation.

2. Application of fluid-applied roof membrane and flashings over existing gravel-surfaced built-up asphalt roofing.

B. Unit Prices: Refer to Division 01 Section "Unit Prices" for description of Work in this Section affected by unit prices.

1.2 MATERIALS OWNERSHIP

A. Demolished materials shall become Contractor's property and shall be removed from Project site.

1.3 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D1079 "Standard Terminology Relating to Roofing and Waterproofing" and glossary in NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" for definition of terms related to roofing work in this Section.

B. Roofing Re-Coating Preparation: Existing roofing that is to remain and be prepared to accept restorative coating application.

C. Patching: Removal of a portion of existing membrane roofing system from deck or removal of selected components and accessories from existing membrane roofing system and replacement with similar materials.

D. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and reinstalled.

E. Existing to Remain: Existing items of construction that are not indicated to be removed.

F. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

G. Demolition Waste: Building and site improvement materials resulting from re-roofing preparation, demolition or selective demolition operations.

H. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

1.4 ROOFING CONFERENCES

A. Roofing Rehabilitation Preinstallation Conference: Conduct conference at Project site. Review methods and procedures related to roofing system.

1. Meet with Owner; Architect; roofing re-coating materials manufacturer's representative; roofing re-coating Installer including project manager and foreman; and installers whose work interfaces with or affects re-coating including installers of roof accessories and roof-mounted equipment requiring removal and replacement as part of the Work.

2. Review methods and procedures related to re-coating preparation, including rehabilitation roofing system manufacturer's written instructions.

3. Review drawings and specifications.

4. Procedures for salvaging and recycling of demolition and construction waste.

5. Review temporary protection requirements for existing roofing system that is to remain, during and after installation.

6. Review roof drainage during each stage of re-coating and review roof drain plugging and plug removal procedures.

7. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

8. Review base flashings, special roofing details, drainage, penetrations, equipment curbs, and condition of other construction that will affect re-coating.

9. Review HVAC shutdown and sealing of air intakes.

10. Review shutdown of fire-suppression, -protection, and -alarm and -detection systems.

11. Review governing regulations and requirements for insurance and certificates if applicable.

12. Review procedures for asbestos removal or unexpected discovery of asbestos-containing materials.

13. Review existing conditions that may require notification of Owner before proceeding.

1.5 ACTION SUBMITTALS

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

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and Manufacturer's Roofing Inspector.

1. Letter written for this Project indicating manufacturer approval of Installer to apply specified products and provide specified warranty.

B. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, and for dust control. Indicate proposed locations and construction of barriers.

C. Contractor's Product Certificate: Submit notarized certificate, indicating products intended for Work of this Section, including product names and numbers and manufacturers' names, with statement indicating that products to be provided meet the requirements of the Contract Documents.

1. Provide manufacturer's UL listing certificate for roofing system.

D. Warranties: Unexecuted sample copies of special warranties.

E. Existing Conditions Photographs: Show existing conditions of adjoining construction and site improvements, including exterior finish surfaces adjacent to the Work, which might be misconstrued as having been damaged by re-coating operations. Submit before Work begins.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: To include in maintenance manuals.

B. Warranties: Executed copies of approved warranty forms.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained by manufacturer, including a full-time on-site supervisor with a minimum of three years' experience installing products comparable to those specified, able to communicate verbally with Contractor, Architect, and employees, and the following:

1. Installer qualified by the manufacturer to install manufacturer's products and furnish warranty of type specified.

B. Manufacturer Qualifications: Primary product manufacturer, that is UL listed for roofing system identical to that used for this Project, with minimum five years' experience in manufacture of comparable products in successful use in similar applications, and able to furnish warranty with provisions matching specified requirements.

1. Approval of Other Manufacturers and Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for substitution review:

a. Product data, including certified independent test data indicating compliance with requirements.

b. Samples of each component.

c. Sample submittal from similar project.

d. Project references: Minimum of five installations of specified products with Owner and Architect/Owner's Consultant contact information.

e. Sample warranty.

C. Roofing Inspector Qualifications: A technical representative of manufacturer not engaged in the sale of products and experienced in the installation and maintenance of the specified roofing system, qualified to perform roofing observation and inspection specified in Field Quality Control Article, to determine Installer's compliance with the requirements of this Project, and approved by the manufacturer to issue warranty certification. The Roofing Inspector shall be one of the following:

1. An authorized full-time technical employee of the manufacturer.

2. An independent party certified as a Registered Roof Observer by the International Institute of Building Enclosure Consultants (formerly the Roof Consultants Institute) retained by the Contractor or the Manufacturer and approved by the Manufacturer.

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

1.9 PROJECT / FIELD CONDITIONS

A. Weather Limitations: Proceed with rehabilitation work only when existing and forecasted weather conditions permit Work to proceed without water entering into existing roofing system or building.

1. Store all materials prior to application at temperatures recommended by manufacturer.

2. Apply coatings within range of ambient and substrate temperatures recommended by manufacturer.

3. Do not apply roofing in snow, rain, fog, or mist.

B. Protect building to be rehabilitated, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from rehabilitation operations.

C. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.

D. Daily Protection: Coordinate installation of roofing so insulation and other components of roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.

E. Owner will occupy portions of building immediately below re-coating area. Conduct re-coating so Owner's operations will not be disrupted. Provide Owner with not less than 72 hours' notice of activities that may affect Owner's operations.

1.10 WARRANTY

A. Manufacturer's Warranty: Roof System Manufacturer's standard form in which Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within warranty period, as follows.

1. Form of Warranty: Manufacturer's standard warranty form.

2. Scope of Warranty: Work of this Section and including sheet metal details and termination details installed by the roof system Installer and approved by the Roof System Manufacturer.

3. Warranty Period: 20 years from date of completion.

B. Manufacturer Inspection Services: By manufacturer's technical representative, to report maintenance responsibilities to Owner necessary for preservation of Owner's warranty rights. The cost of manufacturer's inspections is included in the Contract Sum.

1. Inspections to occur in following years: 2, 5, 10, 15 following completion.

C. Installer Warranty: Installer's warranty signed by Installer, as follows.

1. Form of Warranty: Form acceptable to Roofing Manufacturer and Owner.

2. Scope of Warranty: Work of this Section.

3. Warranty Period: 3 years from date of completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: The roof system specified in this Section is based upon products of Tremco CPG Inc, www.tremcoroofing.com that are named in other Part 2 articles. Provide specified products or comparable products of one of the following.

1. Tremco CPG Inc., Basis-of-Design.

2. Kemper.

3. Pacific Polymers.

B. Source Limitations: Obtain components for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. General Performance: Rehabilitated roofing shall withstand exposure to weather without failure or leaks due to defective manufacture or installation.

1. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G152, ASTM G154, or ASTM G155.

B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.

C. Exterior Fire-Test Exposure: Roofing system exterior fire-test exposure performance following application of rehabilitation coating shall not be less than that of the pre-rehabilitated roof performance when tested in accordance with ASTM E108, based upon manufacturer's tests of identical applications.

D. Energy Performance: Provide rehabilitated roofing with an initial Solar Reflectance Index of not less than 78 when calculated according to ASTM E1980, based on testing identical products by a qualified testing agency.

2.3 MATERIALS

A. General: Rehabilitative materials recommended by roofing system coating manufacturer for intended use and compatible with components of existing membrane roofing system.

B. Infill Materials: Where required to replace test cores and to patch existing roofing, use infill materials matching existing membrane roofing system materials, unless otherwise indicated.

1. SBS-modified asphalt coated composite polyester/fiberglass/fiberglass mat trilaminate-reinforced high tensile strength base sheet, ASTM D4601 Type II.

a. Basis of design product: Tremco, BURmastic Composite Ply HT.

b. Tensile Strength at 77 deg. F (25 deg. C), minimum, ASTM D5147: Machine direction, 165 lbf/in (725 N); Cross machine direction, 150 lbf/in (660 N).

c. Tear Strength at 77 deg. F (25 deg. C), minimum, ASTM D5147: Machine direction, 260 lbf (1150 N); Cross machine direction, 230 lbf (1120 N).

d. Thickness, minimum, ASTM D5147: 0.060 inch (1.5 mm).

2. Cold-applied bio-based low odor urethane roofing adhesive, two-part, USDA BioPreferred, formulated for compatibility and use with specified roofing membranes and flashings.

a. Basis of design product: Tremco, POWERply Endure BIO Adhesive TF.

b. Volatile Organic Compounds (VOC), maximum, ASTM D3690: 0 g/L.

c. Low Temperature Flexibility, ASTM D2240: Pass at -30 deg F (-34 deg C).

d. Solids, by Volume, ASTM D2697: 100 percent.

e. Biobase Content, Minimum, ASTM D6866: 70 percent.

C. Temporary Roof Drainage: Design and selection of materials for temporary roof drainage are responsibilities of the Contractor.

2.4 FLUID-APPLIED LEVELING COAT

A. Polyurethane Elastomeric Fluid-Applied leveling coat formulated to be applied over gravel surfaced BUR roof systems

1. Fluid-applied roof leveling product consisting of low odor, polyurethane base coat with recycled content for roof coating over existing gravel.

a. Basis of design product: Tremco, AlphaGrade.

b. Solids, by volume, ASTM D 2697: 100 percent

c. Dynamic Puncture Resistance, ASTM D5635: 32.5 J.

d. Elongation, ASTM D412: 89 percent.

e. Low Temperature Crack Bridging, ASTM C836: Pass.

f. Static Puncture Resistance, ASTM D5602: 20 lbf (2.3 Nm).

g. Tensile Strength, ASTM D412: 122 psi (841.2 kPa).

h. Water Absorption, ASTM D95: 0.0 percent.

i. Volume Solids, ASTM D2697: 100 percent.

j. Weight Solids, ASTM D1644: 100 percent.

k. Thickness: 288 mils (7.3 mm) applied at rate of 18 gals/100 sq. ft. (7.3 L/m2); as determined by field-testing, level with top of aggregate.

2.5 FLUID-APPLIED ROOFING MEMBRANE

A. Polyurethane Elastomeric Fluid-Applied System: Two-coat fluid-applied roofing membrane formulated for application over prepared existing roofing substrate.

1. Polyurethane Roof Coating System Base Coat: Bio-based, low-odor, low VOC, two-part, for use with compatible leveling coat and top coat.

a. Basis of design product: Tremco, AlphaGrade Base Coat.

b. Combustion Characteristics, UL 790: Maintains combustion characteristics of existing roofing system.

c. Dynamic Puncture Resistance, ASTM D5635: 32.5 J.

d. Elongation, ASTM D412: 159 percent.

e. Low Temperature Crack Bridging, ASTM C836: Pass.

f. Low Temperature Flexibility, ASTM D5147: Pass at -55 deg F (-48.3 deg C).

g. Static Puncture Resistance, ASTM D5602: 20 lbf (88.9 N).

h. Tear Strength, ASTM D624: 34 lbf/in (5.9 N/mm).

i. Tensile Strength, ASTM D412: 193 psi (1330 kN/m2).

j. Water Absorption, ASTM D95: 1 percent.

k. Volatile Organic Compounds (VOC): 0 g/L.

l. Volume Solids, ASTM D2697: 100 percent.

m. Weight Solids, ASTM D1644: 100 percent.

n. Thickness, Base Coat: : 32 mils (0.8 mm), wet.

2. Polyurethane Roof Coating System Top Coat: Bio-based, low-odor, low VOC, two-part, for use with compatible base coat.

a. Basis of design product: Tremco, AlphaGrade Top Coat.

b. Combustion Characteristics, UL 790: Maintains combustion characteristics of existing roofing system.

c. Accelerated Weathering, ASTM D5147: Pass.

d. Dynamic Puncture Resistance, ASTM D5635: 32.5 J.

e. Elongation, ASTM D412: 159 percent.

f. Low Temperature Crack Bridging, ASTM C836: Pass.

g. Low Temperature Flexibility, ASTM D5147: Pass at -55 deg F (-48.3 deg C).

h. Static Puncture Resistance, ASTM D5602: 20 lbf (88.9 N).

i. Tear Strength, ASTM D624: 34 lbf/in (5.9 N/mm).

j. Tensile Strength, ASTM D412: 193 psi (1330 kN/m2).

k. Water Absorption, ASTM D95: 1 percent.

l. Volatile Organic Compounds (VOC): 0 g/L.

m. Volume Solids, ASTM D2697: 100 percent.

n. Weight Solids, ASTM D1644: 100 percent.

o. Thickness, Top Coat: 32 mils (0.8 mm), wet.

p. Thickness, Slip-resistant Walkway Top Coat: 16-24 mils (0.4-0.6 mm), wet.

B. Primers:

1. Primer for Asphaltic and Single-Ply Membranes: Water-based, polymer-modified quick-dry low odor primer.

a. Basis of design product: Tremco, AlphaGuard WB Primer.

b. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 1 g/L.

c. Solids, by weight: 70 percent.

2. Primer for Masonry Surfaces: Two-part high-solids epoxy-penetrating low-odor primer for masonry and concrete surfaces.

a. Basis of design product: Tremco, AlphaGuard C-Prime.

b. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 0 g/L.

c. Solids, by weight: 100 percent.

3. Primer for Non-Porous Surfaces: Single-part, water based primer to promote adhesion of urethanes to metals, PVC and other non-porous surfaces.

a. Basis of design product: Tremco, AlphaGuard M-Prime.

b. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 22 g/L.

c. Nonvolatile Content, minimum, ASTM D2369: 5 percent.

d. Density at 77 deg F (25 deg C): 8.3 lb./gal (1kg/L).

4. Primer for Intercoat and Substrate Adhesion: Single-part, quick-drying primer to promote adhesion of urethane products to previous urethane coats and to other approved surfaces.

a. Basis of design product: Tremco, Geogard Primer.

b. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 100 g/L.

c. Coverage Rate, 400 sq. ft/ gal. (10 m2/ L): 4 mils (0.10 mm) wet.

2.6 AUXILIARY MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with existing roofing system and fluid-applied roofing system.

B. Seam Sealer: Waterproof seam and patching material compatible with applied coating.

1. Seam Sealer: Aromatic polyurethane sealer, single-component, high solids, moisture curing, formulated for compatibility and use with a variety of roofing and flashing substrates.

a. Basis of design product: Tremco, GEOGARD Seam Sealer.

b. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 189 g/L.

c. Tensile Strength, ASTM D412: 270 psi (1860 kPa).

d. Tear Strength, ASTM D412: 35 pli (6.13 kNm).

e. Elongation, ASTM D412: 220 percent.

f. Color: Gray.

C. Flashing and Detail Reinforcing Fabric:

1. Polyester Reinforcing and Protection Fabric: 100 percent stitch-bonded mildew-resistant polyester fabric intended for reinforcement of compatible fluid-applied membranes and flashings.

a. Basis of design product: Tremco, Permafab.

b. Tensile Strength, Minimum, ASTM D5034 (2-inch): MD - 110 lbs. (49.8 kg); XMD - 60 lbs. (27.2 kg) avg.

c. Elongation, Minimum, ASTM D5034 (1-inch): MD - 25 percent; XMD - 100 percent.

d. Tear Strength, Minimum, ASTM D5587: MD - 20 lbs. (9.0 kg) avg; XMD - 20 lbs. (9.0 kg) avg.

e. Weight: 3 oz./sq. yd (102 g/sq. m).

D. Joint Sealant: Elastomeric joint sealant compatible with applied coating, with movement capability appropriate for application.

1. Joint Sealant, Polyurethane: ASTM C920, Type S, Grade NS, Class 50 single-component moisture curing sealant, formulated for compatibility and use in dynamic and static joints; paintable.

a. Basis of design product: Tremco, TremSEAL Pro.

b. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 40 g/L.

c. Hardness, Shore A, ASTM C661: 40.

d. Adhesion to Concrete, ASTM C794: 35 pli.

e. Tensile Strength, ASTM D412: 350 psi (2410 kPa).

f. Color: White.

E. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system manufacturer.

2.7 SLIP RESISTANT WALKWAY TOP COAT

A. Fluid-Applied AlphaGrade Walkway Top Coat, Slip-Resistant: Second top coat with broadcast slip-resistant aggregate.

1. Color: White.

2. Granular Roofing Surfacing: Ceramic-coated roofing granules, No. 11 screen size with 100 percent passing No. 8 (2.36-mm) sieve and 98 percent of mass retained on No. 40 (0.425-mm) sieve.

a. Aggregate application rate, average: 10 - 15 lb./100 sq ft (0.5 - 0.75 k/m2).

b. Color: As selected by Architect from manufacturer's standard colors.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine existing roofing substrates, with Installer present, for compliance with requirements and for other conditions affecting application and performance of roof coatings.

1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance.

2. Verify compatibility of approved re-coating system with and suitability of substrates.

3. Verify that substrates are visibly dry and free of moisture.

4. Verify that roofing membrane surfaces have adequately aged to enable proper bond with re-coating system base coat.

5. Verify that existing roofing membrane is free of blisters, splits, open laps, indications of shrinkage, and puncture damage or other indications of impending roof system failure.

6. Commencing application of fluid-applied re-coating membrane indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Protect existing roofing system that is indicated not to be rehabilitated, and adjacent portions of building and building equipment.

1. Mask surfaces to be protected. Seal joints subject to infiltration by coating materials.

2. Limit traffic and material storage to areas of existing roofing membrane that have been protected.

3. Maintain temporary protection and leave in place until replacement roofing has been completed.

B. Pollution Control: Comply with environmental regulations of authorities having jurisdiction. Limit spread of dust and debris.

1. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

2. Remove debris from building roof by chute, hoist, or other device that will convey debris to grade.

C. Shut down air intake equipment in the vicinity of the Work in coordination with the Owner. Cover air intake louvers before proceeding with re-coating work that could affect indoor air quality or activate smoke detectors in the ductwork.

1. Verify that rooftop utilities and service piping affected by the Work have been shut off before commencing Work.

D. Maintain roof drains in functioning condition to ensure roof drainage at end of each workday. Prevent debris from entering or blocking roof drains and conductors. Use roof-drain plugs specifically designed for this purpose. Remove roof-drain plugs at end of each workday, when no work is taking place, or when rain is forecast.

1. Do not permit water to enter into or under existing membrane roofing system components that are to remain.

3.3 ROOFING COATING PREPARATION

A. Removal of Wet Insulation: Remove portions of roofing membrane with underlying wet insulation. Remove wet insulation, fill in tear-off areas to match existing insulation and membrane, and prepare patched membrane for application of roof coating specified below.

B. Membrane Surface Preparation:

1. Remove aggregate stone ballast from roofing membrane.

2. Remove gravel surfacing from roofing membrane by means of wet vacuum.

3. Remove walkway pads, pavers and accessories from roofing membrane. Discard damaged pavers.

4. Remove blisters, ridges, buckles, roofing membrane fastener buttons projecting above the membrane, and other substrate irregularities from existing roofing membrane that would inhibit application of uniform, waterproof coating.

5. Broom clean existing substrate.

6. Substrate Cleaning: Clean substrate of contaminants such as dirt, debris, oil, and grease that can affect adhesion of coating by power washing at minimum 2,000 psi (13,800 kPa).

    a. Dispose of waste water in accordance with requirements of authorities having jurisdiction.

7. Verify that existing substrate is dry before proceeding with application of coating. Spot check substrates with an electrical capacitance moisture-detection meter.

8. Verify adhesion of new products.

C. Existing Flashing and Detail Preparation: Repair flashings, gravel stops, copings, and other roof-related sheet metal and trim elements. Reseal joints, replace loose or missing fasteners, and replace components where required to leave in a watertight condition.

1. Do not damage metal counter flashings that are to remain. Replace metal counter flashings damaged during removal with counter flashings of same metal, weight or thickness, and finish.

2. Roof Drains: Remove drain strainer and clamping ring. Grind metal surfaces down to clean, bare, metal.

D. Surface Priming: Prime surfaces to receive fluid-applied coating as recommended by manufacturer for each substrate material. Apply products at rate recommended by manufacturer.

1. Gravel surfaces do not require primer; metal and plastic surfaces must be primed.

2. Ensure primer does not puddle and substrate has complete coverage.

3. Allow to cure completely prior to application of coating.

E. Membrane Repair: Repair membrane at locations with irregularities using seam sealer mastic and reinforcing fabric.

1. Where size of repair necessitates patching, use ply sheet and adhesive materials specified in this section.

3.4 FLUID-APPLIED FLASHING APPLICATION

A. Prior to application of the leveling coat, remove embedded gravel and install fluid-applied flashings at drains, scuppers and facias. Apply fluid-applied flashings to curbs, walls and penetrations after leveling coat is applied. Ensure finished application is free of pin holes, voids or openings in the fabric reinforcement.

B. Fluid-Applied Flashing and Detail Base Coat Application: Complete base coat and fabric reinforcement at parapets, curbs, penetrations, and drains prior to application of field of fluid-applied membrane. Apply base coat in accordance with manufacturer's written instructions.

1. Apply base coat on prepared and primed surfaces and spread coating evenly. Extend coating minimum of 8 inches (200 mm) up vertical surfaces and 4 inches (100 mm) onto horizontal surfaces.

2. Back roll to achieve minimum coating thickness as follows unless additional thickness is recommended by manufacturer; verify thickness of base coat as work progresses.

3. Fabric Reinforcement: Embed fabric reinforcement into wet base coat. Lap adjacent flashing pieces of fabric minimum 3 inches (75 mm) along edges and 6 inches (150 mm) at end laps.

    a. Roll surface of fabric reinforcing to completely embed and saturate fabric. Leave finished base coat with fabric free of pin holes, voids, or openings.

4. Roof Drains: Install base coat onto surrounding membrane surface and metal drain bowl flange. Install target piece of fabric reinforcement immediately into wet base coat and roll to fully embed and saturate fabric. Reinstall clamping ring and strainer following application of top coat. Replace broken drain ring clamping bolts.

5. Following curing of base coat, sand raised or exposed edges of fabric reinforcement prior to application of subsequent coatings.

3.5 FLUID-APPLIED LEVELING COAT APPLICATION

A. Prior to application of the leveling coat, remove embedded gravel and install fluid-applied flashings at drains, scuppers and facias. Apply fluid-applied flashings to curbs, walls and penetrations after leveling coat is applied. Ensure finished application is free of pin holes, voids or openings in the fabric reinforcement.

B. Apply leveling coat to field of roof in accordance with manufacturer’s written instructions.

1. Apply to thickness indicated under Part 2 product listing unless greater thickness is recommended by manufacturer.

2. Allow leveling coat to cure before applying fluid base coat.

3.6 FLUID-APPLIED MEMBRANE APPLICATION

A. Prime leveling coat prior to application of base coat if base coat in not applied within 72 hours following the leveling coat application, using manufacturer's recommended primer.

B. Fluid-Applied Membrane Base Coat Application: Apply base coat to field of membrane in accordance with manufacturer's written instructions.

1. Apply base coat on prepared and primed surfaces and spread coating evenly.

2. Back roll to achieve minimum coating thickness as follows unless greater thickness is recommended by manufacturer; verify thickness of base coat as work progresses.

C. Top Coat Application: Apply top coat to field of membrane and flashings uniformly in a complete, continuous installation.

1. Following curing of base coat and prior to application of top coat, sand raised or exposed edges of fabric reinforcement.

2. Allow base coat to cure prior to application of top coat.

3. Prime base coat prior to application of top coat if top coat is not applied within 72 hours of the base coat application, using manufacturer's recommended primer.

4. Apply top coat extending coating up vertical surfaces and out onto horizontal surfaces. Install top coat over field base coat and spread coating evenly.

5. Apply top coat and back roll to achieve not less than minimum coating thickness indicated in Part 2 product listing unless greater thickness is recommended by manufacturer. Verify application thickness as work progresses.

6. Avoid foot traffic on new fluid-applied membrane for a minimum of 24 hours.

D. Joint Sealant: Apply joint sealant at terminations of coating application and in locations required for complete weathertight application.

3.7 SLIP RESISTANT WALKWAY TOP COAT INSTALLATION

A. Install slip resistant walkway top coat, over cured initial top coat, on entire horizontal roofing surface.

B. Slip-Resistant Walkway Top Coat: Apply walkway second top coat following application and curing of top coat.

1. Mask walkway location with tape.

2. Prime first top coat prior to application of walkway top coat if walkway top coat is not applied within 72 hours of the first top coat application, using manufacturer's recommended primer.

3. Broadcast Slip-Resistant Top Coat Aggregate in wet top coat at rate indicated in Part 2 product listing or as otherwise recommended by coating manufacturer.

   a. Back roll aggregate and top coat creating even dispersal of aggregate. Remove masking immediately.

3.8 FIELD QUALITY CONTROL

A. Roof Inspection: Engage roofing system manufacturer's technical personnel to inspect roofing installation and submit report. Notify Architect 48 hours in advance of dates and times of inspections. Inspect work as follows:

1. Upon completion of preparation of roof coating substrate, prior to application of coating materials.

2. Following application of coating to flashings and application of base coat to field of roof.

3. Upon completion of coating but prior to re-installation of other roofing components.

B. Repair fluid-applied membrane where inspections indicate that they do not comply with specified requirements.

C. Arrange for additional inspections, at Contractor's expense, to verify compliance of replaced or additional work with specified requirements.

3.9 DISPOSAL

A. Collect demolished materials and place in containers. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.

1. Storage or sale of demolished items or materials on-site is not permitted.

B. Transport and legally dispose of demolished materials off Owner's property.

3.10 PROTECTING AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period.

B. Correct deficiencies in or remove coating that does not comply with requirements, repair substrates, and reapply coating.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 070150.72

SECTION 070150.74 - REHABILITATION OF SINGLE PLY ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Roof membrane coating preparation.

2. Application of reinforced fluid-applied roof membrane and flashings over existing fully adhered PVC single ply membrane roof.

B. Related Information:

1. Division 07 Section "Maintenance Cleaning of Membrane Roofing" for reclaimed water cleaning system for preparation of existing roof substrate.

C. Unit Prices: Refer to Division 01 Section "Unit Prices" for description of Work in this Section affected by unit prices.

1.2 ROOFING CONFERENCES

A. Roofing Rehabilitation Preinstallation Conference: Conduct conference at Project site to review methods and procedures related to roofing system.

1. Meet with Owner; Architect; roofing coating materials manufacturer's representative; roofing rehabilitation Installer including project manager and foreman; and installers whose work interfaces with or affects rehabilitation including installers of roof accessories and roof-mounted equipment requiring removal and replacement as part of the Work.

2. Review temporary protection requirements for existing roofing system that is to remain uncoated, during and after installation.

3. Review methods and procedures related to re-coating preparation, including coating manufacturer's written instructions.

4. Review roof drainage during each stage of coating and review roof drain plugging and plug removal procedures.

5. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

6. Review base flashings, special roofing details, drainage, penetrations, equipment curbs, and condition of other construction that will affect coating.

7. Review HVAC shutdown and sealing of air intakes.

8. Review shutdown of fire-suppression, -protection, and -alarm and -detection systems.

9. Review procedures for asbestos removal or unexpected discovery of asbestos-containing materials.

10. Review governing regulations and requirements for insurance and certificates if applicable.

11. Review existing conditions that may require notification of Owner before proceeding.

1.3 MATERIALS OWNERSHIP

A. Demolished materials shall become Contractor's property and shall be removed from Project site.

1.4 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D1079 "Standard Terminology Relating to Roofing and Waterproofing" and glossary in NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" for definition of terms related to roofing work in this Section.

B. Roofing Coating Preparation: Existing roofing that is to remain and be prepared to accept restorative coating application.

C. Patching: Removal of a portion of existing membrane roofing system from deck or removal of selected components and accessories from existing membrane roofing system and replacement with similar materials.

D. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and reinstalled.

E. Existing to Remain: Existing items of construction that are not indicated to be removed.

1.5 ACTION SUBMITTALS

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

1.6 INFORMATIONAL SUBMITTALS

A. Contractor's Product Certificate: Submit notarized certificate, indicating products intended for Work of this Section, including product names and numbers and manufacturers' names, with statement indicating that products to be provided meet the requirements of the Contract Documents.

1. Provide manufacturer's UL listing certificate for roofing system.

B. Qualification Data: For Installer and Roofing Inspector.

1. Letter written for this Project indicating manufacturer approval of Installer to apply specified products and provide specified warranty.

C. Warranties: Unexecuted sample copies of special warranties.

D. Proposed Protection Measures: Submit report, including Drawings, which indicates the measures proposed for protecting individuals and property, for environmental protection, and for dust control. Indicate proposed locations and construction of barriers.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: To include in maintenance manuals.

B. Warranties: Executed copies of approved warranty forms.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and certified by manufacturer, including a full-time on-site supervisor with a minimum of three years' experience installing products similar to those specified, able to communicate verbally with Contractor, Architect, and employees, and the following:

1. Qualified by the manufacturer to install manufacturer's product and furnish warranty of type specified.

B. Manufacturer Qualifications: Primary product manufacturer that is UL listed for roofing system identical to that specified for this Project with minimum five years' experience in manufacture of comparable products in successful use in similar applications, and able to furnish warranty with provisions matching specified requirements.

1. Approval of Other Manufacturers and Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for substitution review:

a. Product data, including certified independent test data indicating compliance with requirements.

b. Samples of each component.

c. Sample submittal from similar project.

d. Project references: Minimum of five installations of specified products not less than five years old, with Owner and Architect/Owner's Consultant contact information.

e. Sample warranty.

C. Roofing Inspector Qualifications: A technical representative of manufacturer not engaged in the sale of products and experienced in the installation and maintenance of the specified roofing

system, qualified to perform roofing observation and inspection specified in Field Quality Control Article, to determine Installer's compliance with the requirements of this Project, and approved by the manufacturer to issue warranty certification. The Roofing Inspector shall be one of the following:

1. An authorized full-time technical employee of the manufacturer.

2. An independent party certified as a Registered Roof Observer by the International Institute of Building Enclosure Consultants (formerly the Roof Consultants Institute) retained by the Contractor or the Manufacturer and approved by the Manufacturer.

1.9 FIELD CONDITIONS

A. Weather Limitations: Proceed with rehabilitation work only when existing and forecasted weather conditions permit Work to proceed without water entering into existing roofing system or building.

1. Store all materials prior to application at temperatures recommended by manufacturer.

2. Apply coatings within range of ambient and substrate temperatures recommended by manufacturer.

3. Do not apply roofing in snow, rain, fog, or mist.

B. Protect building to be rehabilitated, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from rehabilitation operations.

C. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.

D. Daily Protection: Coordinate installation of roofing so insulation and other components of roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.

E. Owner will occupy portions of building immediately below re-coating area. Conduct re-coating so Owner's operations will not be disrupted. Provide Owner with not less than 72 hours' notice of activities that may affect Owner's operations.

1.10 WARRANTY

A. Manufacturer's Warranty: Roof System Manufacturer's standard form in which Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within warranty period, as follows.

1. Form of Warranty: Manufacturer's standard warranty form.

2. Scope of Warranty: Work of this Section and including sheet metal details and termination details installed by the roof system Installer and approved by the Roof System Manufacturer.

3. Warranty Period: 20 years from date of completion.

B. Manufacturer Inspection Services: By manufacturer's technical representative, to report maintenance responsibilities to Owner necessary for preservation of Owner's warranty rights. The cost of manufacturer's inspections is included in the Contract Sum.

1. Inspections to occur in following years: 2, 5, 10, 15 following completion.

C. Installer Warranty: Installer's warranty signed by Installer, as follows.

1. Form of Warranty: Form acceptable to Roofing Manufacturer and Owner.

2. Scope of Warranty: Work of this Section.

3. Warranty Period: 2 years from date of completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: The roof system specified in this Section is based upon products of Tremco CPG Inc, Beachwood, OH, (800) 562-2728, www.tremcoroofing.com that are named in other Part 2 articles. Provide specified products or comparable products of one of the following.

1. Tremco CPG Inc., Basis-of-Design.

2. Kemper.

3. Pacific Polymers.

B. Source Limitations: Obtain components for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. General Performance: Rehabilitated roofing shall withstand exposure to weather without failure or leaks due to defective manufacture or installation.

1. Accelerated Weathering: Roofing system shall withstand 5000 hours of exposure when tested according to ASTM G152, ASTM G154, or ASTM G155.

B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.

C. Exterior Fire-Test Exposure: Roofing system exterior fire-test exposure performance following application of rehabilitation coating shall not be less than that of the pre-rehabilitated roof performance when tested in accordance with ASTM E108, based upon manufacturer's tests of identical applications.

D. Energy Performance: Provide rehabilitated roof meeting initial solar reflectance of 75 when calculated according to ASTM E1980.

2.3 MATERIALS, GENERAL

A. General: Rehabilitation materials recommended by roofing system manufacturer for intended use and compatible with components of existing membrane roofing system.

B. Infill Materials: Where required to replace test cores and to patch existing roofing, use infill materials matching existing membrane roofing system materials, unless otherwise indicated.

C. Temporary Roof Drainage: Design and selection of materials for temporary roof drainage are responsibilities of the Contractor.

2.4 FLUID-APPLIED ROOFING MEMBRANE COATING

A. Polyurethane Elastomeric Fluid-Applied System: Two-coat fluid-applied roofing membrane formulated for application over prepared existing roofing substrate.

1. Polyurethane Roof Coating System Base Coat: Bio-based, low-odor low-VOC two-part, for use with a compatible top coat.

a. Basis of design product: Tremco, AlphaGuard BIO Base Coat.

b. Combustion Characteristics, UL 790: Maintains combustion characteristics of existing roof system.

c. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 1 g/L.

d. Accelerated Weathering, 5000 hours, ASTM G154: Pass.

e. Hardness, Shore A, minimum, ASTM D2240: 80.

f. Solids, by volume, ASTM D2697: 100 percent.

g. Bio-Based Content, Minimum: 70 percent.

h. Minimum Thickness, Base Coat reinforced over Smooth Single-Ply: 48 mils (1.22 mm) wet.

2. Polyurethane roof coating system top coat, bio-based low-odor low-VOC two-part, for application over compatible base coat.

a. Basis of design product: Tremco, AlphaGuard BIO Top Coat.

b. Combustion Characteristics, UL790: Maintains combustion characteristics of existing roof system.

c. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 6 g/L.

d. Solar Reflectance Index (SRI), ASTM E1980: For white, not less than 103.

e. Accelerated Weathering, 5000 hours, ASTM G 154: Pass.

f. Hardness, Shore A, minimum, ASTM D2240: 81.

g. Solids, by volume, ASTM D2697: 100 percent.

h. Bio-Based Content, Minimum: 60 percent.

i. Minimum Thickness, reinforced system: 32 mils (0.81 mm) wet.

j. Minimum Thickness, Slip-Resistant Coat: 24 mils (0.60 mm) wet.

k. Color: White.

B. Primers:

1. Primer for Asphaltic and Single-Ply Membranes: Water-based, polymer-modified quick-dry low odor primer.

a. Basis of design product: Tremco, AlphaGuard WB Primer.

b. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 1 g/L.

c. Solids, by weight: 70 percent.

2. Primer for Masonry Surfaces: Two-part high-solids epoxy-penetrating low-odor primer for masonry and concrete surfaces.

a. Basis of design product: Tremco, AlphaGuard C-Prime.

b. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 0 g/L.

c. Solids, by weight: 100 percent.

3. Primer for Non-Porous Surfaces: Single-part, water based primer to promote adhesion of urethanes to metals, PVC and other non-porous surfaces.

a. Basis of design product: Tremco, AlphaGuard M-Prime.

b. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 22 g/L.

c. Nonvolatile Content, minimum, ASTM D2369: 5 percent.

d. Density at 77 deg F (25 deg C): 8.3 lb./gal (1kg/L).

4. Primer for Intercoat and Substrate Adhesion: Single-part, quick-drying primer to promote adhesion of urethane products to previous urethane coats and to other approved surfaces.

a. Basis of design product: Tremco, Geogard Primer.

b. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 100 g/L.

c. Coverage Rate, 400 sq. ft/ gal. (10 m2/ L): 4 mils (0.10 mm) wet.

C. Fluid-Applied Roofing Reinforcing Fabric:

1. Polyester Reinforcing and Protection Fabric: 100 percent stitch-bonded mildew-resistant polyester fabric intended for reinforcement of compatible fluid-applied membranes and flashings.

a. Basis of design product: Tremco, Permafab.

b. Tensile Strength, Minimum, ASTM D5034 (2-inch): MD - 110 lbs. (49.8 kg); XMD - 60 lbs. (27.2 kg) avg.

c. Elongation, Minimum, ASTM D5034 (1-inch): MD - 25 percent; XMD - 100 percent.

d. Tear Strength, Minimum, ASTM D5587: MD - 20 lbs. (9.0 kg) avg; XMD - 20 lbs. (9.0 kg) avg.

e. Weight: 3 oz./sq. yd (102 g/sq. m).

2.5 AUXILIARY ROOFING REHABILITATION MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with existing roofing system and roofing coating system.

B. Seam Sealer: Waterproof seam and patching material compatible with applied coating.

1. Seam Sealer: Aromatic polyurethane sealer, single-component, high solids, moisture curing, formulated for compatibility and use with a variety of roofing and flashing substrates.

a. Basis of design product: Tremco, GEOGARD Seam Sealer.

b. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 189 g/L.

c. Tensile Strength, ASTM D412: 270 psi (1860 kPa).

d. Tear Strength, ASTM D412: 35 pli (6.13 kNm).

e. Elongation, ASTM D412: 220 percent.

f. Color: Gray.

C. Joint Sealant: Elastomeric joint sealant compatible with applied coating, with movement capability appropriate for application.

1. Joint Sealant, Polyurethane: ASTM C920, Type S, Grade NS, Class 50 single-component moisture curing sealant, formulated for compatibility and use in dynamic and static joints; paintable.

a. Basis of design product: Tremco, TremSEAL Pro.

b. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 40 g/L.

c. Hardness, Shore A, ASTM C661: 40.

d. Adhesion to Concrete, ASTM C794: 35 pli.

e. Tensile Strength, ASTM D412: 350 psi (2410 kPa).

f. Color: White.

D. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system manufacturer.

2.6 WALKWAYS

A. Slip Resistant Product for Fluid-Applied Walkways:

1. Granular Roofing Surfacing: Ceramic-coated roofing granules, No. 11 screen size with 100 percent passing No. 8 (2.36-mm) sieve and 98 percent of mass retained on No. 40 (0.425-mm) sieve.

a. Basis of design product: Granular Roofing Surfacing, Colored.

b. Aggregate application rate, average: 10 - 15 lb./100 sq ft (0.5 - 0.75 k/m2).

c. Color: As selected by Architect from manufacturer's standard colors.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine existing roofing substrates, with Installer present, for compliance with requirements and for other conditions affecting application and performance of roof coatings

1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance.

2. Verify compatibility with and suitability of substrates.

3. Verify that substrates are visibly dry and free of moisture.

4. Verify that roofing membrane surfaces have adequately aged to enable proper bond with base coat.

5. Verify that roofing membrane is free of blisters, splits, open laps, indications of shrinkage, and puncture damage or other indications of impending roof system failure.

6. Commencing application of coatings indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Protect existing roofing system that is indicated not to be rehabilitated, and adjacent portions of building and building equipment.

1. Mask surfaces to be protected. Seal joints subject to infiltration by coating materials.

2. Limit traffic and material storage to areas of existing roofing membrane that have been protected.

3. Maintain temporary protection and leave in place until replacement roofing has been completed.

B. Shut down air intake equipment in the vicinity of the Work in coordination with the Owner. Cover air intake louvers before proceeding with coating work that could affect indoor air quality or activate smoke detectors in the ductwork.

1. Verify that rooftop utilities and service piping affected by the Work have been shut off before commencing Work.

C. Maintain roof drains in functioning condition to ensure roof drainage at end of each workday. Prevent debris from entering or blocking roof drains and conductors. Use roof-drain plugs specifically designed for this purpose. Remove roof-drain plugs at end of each workday, when no work is taking place, or when rain is forecast.

1. Do not permit water to enter into or under existing membrane roofing system components that are to remain.

3.3 ROOFING COATING PREPARATION

A. Removal of Wet Insulation: Remove portions of roofing membrane with underlying wet insulation. Remove wet insulation, fill in tear-off areas to match existing insulation and membrane, and prepare patched membrane for application of roof coating as specified below.

B. Repair of Ponding Areas: Repair areas indicated as ponding areas or areas of inadequate drainage by removing roof membrane, adding additional insulation as required to provide minimum slopes to drain required by roofing rehabilitation coating manufacturer, and replace membrane with material matching existing. Submit photographic report indicating compliance.

C. Membrane Surface Preparation:

1. Remove walkway pads and pavers from roofing membrane. Discard damaged pavers.

2. Remove blisters, ridges, buckles, roofing membrane fastener buttons projecting above the membrane, and other substrate irregularities from existing roofing membrane that would inhibit application of uniform, waterproof coating.

3. Broom clean existing substrate.

4. Substrate Cleaning: Clean substrate in accordance with requirements of Division 07 Section "Maintenance Cleaning of Membrane Roofing."

5. Verify that existing substrate is dry before proceeding with application of coating. Spot check substrates with an electrical capacitance moisture-detection meter.

6. Verify adhesion of new products.

D. Existing Flashing and Detail Preparation: Repair flashings, gravel stops, copings, and other roof-related sheet metal and trim elements. Reseal joints, replace loose or missing fasteners, and replace components where required to leave in a watertight condition.

1. Do not damage metal counter flashings that are to remain. Replace metal counter flashings damaged during removal with counter flashings of same metal, weight or thickness, and finish.

2. Roof Drains: Remove drain strainer and clamping ring. Grind metal surfaces down to clean, bare, metal.

E. Surface Priming: Prime surfaces to receive fluid-applied coating using coating manufacturer's recommended product for surface material. Apply at application rate recommended by manufacturer.

1. Ensure primer does not puddle and substrate has complete coverage.

2. Allow to cure completely prior to application of coating.

3.4 FLUID-APPLIED FLASHING APPLICATION

A. Fluid-Applied Flashing and Detail Base Coat Application: Complete base coat and fabric reinforcement at parapets, curbs, penetrations, and drains prior to application of field of fluid-applied membrane. Apply base coat in accordance with manufacturer's written instructions.

1. Apply base coat on prepared and primed surfaces and spread coating evenly. Extend coating minimum of 8 inches (200 mm) up vertical surfaces and 4 inches (100 mm) onto horizontal surfaces.

2. Back roll to achieve minimum coating thickness indicated on Part 2 product listing unless greater thickness is recommended by manufacturer; verify thickness of base coat as work progresses.

3. Reinforcing Fabric: Embed fabric reinforcement into wet base coat. Lap adjacent flashing pieces of fabric minimum 3 inches (75 mm) along edges and 6 inches (150 mm) at end laps.

    a. Roll surface of fabric reinforcing to completely embed and saturate fabric. Leave finished base coat with fabric free of pin holes, voids, or openings.

4. Roof Drains: Install base coat onto surrounding membrane surface and metal drain bowl flange. Install target piece of fabric reinforcement immediately into wet base coat and roll to fully embed and saturate fabric. Reinstall clamping ring and strainer following application of top coat. Replace broken drain ring clamping bolts.

3.5 FLUID-APPLIED MEMBRANE APPLICATION

A. Fluid-Applied Membrane Base Coat: Apply base coat to field of membrane in accordance with manufacturer's written instructions.

1. Apply base coat on prepared and primed surfaces and spread coating evenly.

2. Back roll to achieve minimum coating thickness indicated on Part 2 product listing unless greater thickness is recommended by manufacturer; verify thickness of base coat as work progresses.

3. Fabric Reinforcement: Embed fabric reinforcement into wet base coat. Lap adjacent pieces of fabric minimum 3 inches (75 mm) along edges and 6 inches (150 mm) at end laps.

    a. Roll surface of fabric reinforcing to completely embed and saturate fabric. Leave finished base coat with fabric free of pin holes, voids, or openings.

B. Fluid-Applied Membrane Top Coat: Apply top coat to field of membrane and flashings uniformly in a complete, continuous installation.

1. Allow base coat to cure prior to application of top coat.

2. Following curing of base coat and prior to application of top coat, sand raised or exposed edges of fabric reinforcement.

3. Prime base coat prior to application of top coat if top coat is not applied within 72 hours of the base coat application, using manufacturer's recommended primer.

4. Apply top coat extending coating up vertical surfaces and out onto horizontal surfaces. Install top coat over field base coat and spread coating evenly.

5. Back roll to achieve minimum coating thickness indicated on Part 2 product listing unless greater thickness is recommended by manufacturer; verify thickness of base coat as work progresses.

6. Avoid foot traffic on new fluid-applied membrane for a minimum of 24 hours.

3.6 SLIP RESISTANT WALKWAY TOP COAT INSTALLATION

A. Install slip resistant walkway top coat, over cured initial top coat, on entire horizontal roofing surface.

B. Slip-Resistant Walkway Topcoat: Apply walkway second topcoat following application and curing of top coat.

1. Mask walkway location with tape.

2. Prime first top coat prior to application of walkway top coat if walkway top coat is not applied within 72 hours of the first top coat application, using manufacturer's recommended primer.

3. Apply walkway topcoat and back roll to achieve minimum coating thickness indicated on Part 2 product listing unless greater thickness is recommended by manufacturer; verify thickness of base coat as work progresses.

4. Broadcast Slip-Resistant Top Coat Aggregate in wet top coat at rate indicated in Part 2 product listing or as otherwise recommended by coating manufacturer.

a. Back roll aggregate and top coat creating even dispersal of aggregate. Remove masking immediately.

3.7 FIELD QUALITY CONTROL

A. Roof Inspection: Contractor shall engage roofing system manufacturer's technical personnel to inspect roofing installation and submit report. Notify Architect 48 hours in advance of dates and times of inspections. Inspect work as follows:

1. Upon completion of preparation of first component of work, prior to application of re-coating materials.

2. Following application of re-coating to flashings and application of base coat to field of roof.

3. Upon completion of re-coating but prior to re-installation of other roofing components.

B. Repair fluid-applied membrane where test inspections indicate that they do not comply with specified requirements.

C. Arrange for additional inspections, at Contractor's expense, to verify compliance of replaced or additional work with specified requirements.

3.8 PROTECTING AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period.

B. Correct deficiencies in or remove coating that does not comply with requirements, repair substrates, and reapply coating.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 070150.74

SECTION 07 13 26 SELF-ADHERING SHEET WATERPROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. The work performed under this Section includes the performance criteria, materials, production, and erection of Self-Adhering Sheet Waterproofing for the project and consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all Self-Adhering Sheet Waterproofing as required by schedules, keynotes and drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction including, but not limited to the following:

1. Modified bituminous sheet (below grade at outside face of foundations walls),
2. Bonded HDPE sheet for vertical applications.
3. Synthetic plastic hydrophilic expanding concrete water-stop.

B. Related Requirements:
1. Division 03 Concrete
2. Division 04 Masonry
3. Division 07 Thermal and Moisture Protection
4. Division 08 Openings

1.3 PREINSTALLATION MEETINGS

A. Pre-installation Conference: Conduct conference at Project site.

1. Review weather barrier requirements including surface preparation, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, testing and inspection procedures, and protection and repairs.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, and tested physical and performance properties.
2. Include manufacturer's written instructions for evaluating, preparing, and treating substrate.

B. Shop Drawings: Show locations and extent of sheet waterproofing and details of substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.

C. Samples: For each exposed product and for each color and texture specified, including the following products:

1. Mockup for each type of sheet waterproofing.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Field quality-control reports.

C. Sample Warranties: For special warranties.

1.6 QUALITY ASSURANCE

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

B. Mockups: Build mockups to verify selections made under Sample submittals and to set quality standards for installation.

1. Build for each typical waterproofing installation including accessories to demonstrate surface preparation, crack and joint treatment, corner treatment, and protection.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.

1. Do not apply waterproofing in snow, rain, fog, or mist.

B. Maintain adequate ventilation during preparation and application of waterproofing materials.

1.8 WARRANTY

A. Manufacturer's Warranty: Manufacturer's standard materials-only warranty in which manufacturer agrees to furnish replacement waterproofing material for waterproofing that does not comply with requirements or that fails to remain watertight within specified warranty period.

1. Warranty Period: Fifteen years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Source Limitations for Waterproofing System: Obtain waterproofing materials an protection course, and molded-sheet drainage panels from single source from single manufacturer.

2.2 MANUFACTURERS

A. Basis of Design: CCW MiraDRI 860/861 Sheet Membrane Waterproofing as manufactured by Carlisle Coatings and Waterproofing Incorporated, 900 Hensley Lane, Wylie, Texas 75098, Phone: (800) 527-7092 Fax: (972) 442-0076.

B. Other products, as approved by Architect

1. CETCO Building Materials Group, a subsidiary of AMCOL International Corp;

2. Envirosheet., Meadows, W.R.,Inc; SealTight Mel-Rol.

2.3 PRODUCTS

A. Self-Adhesive Sheet Membrane Waterproofing: Shall be CCW MiraDRI 860/861consisting of a 56 mil rubberized asphalt membrane laminated to 4 mil cross-laminated polyethylene film, and shall meet or exceed the following requirements:

1. Tensile Strength: 325 psi minimum, ASTM D 412
2. Ultimate Elongation: 350% minimum, ASTM D 412
3. Puncture Resistance: 60 lbs. minimum, ASTM E 154
4. Permeance: 0.05 Perm maximum, ASTM E 96 (B)
5. Low Temperature Flexibility: Unaffected at -45^{O}F, ASTM D 1970, 1" mandrel
6. Tensile to Film: 5000 psi, ASTM D 882
7. Thickness: 60 mils, ASTM D 3767
8. Hydrostatic Head: 230 ft., ASTM D 751
9. Water Absorption: 0.1% by wt., ASTM D 570

B. For application temperatures between 25 and 65^{O}F, use CCW-861 Sheet Membrane and CCW-
702. For application temperatures above 40°F use CCW MiraDRI 860 sheet membrane and
CCW-702, CCW-714 primer, or CCW-AWP.

2.4 ACCESSORY PRODUCTS

A. Surface Primer: Shall be CCW-702LV Solvent-Based Contact Adhesive, 702WB or Cav-Grip. B.

B. Mastic: Shall be CCW-704 Mastic.

C. Sealants: Shall be CCW-703 Vertical Grade Liquiseal[7] Membrane, one component approved sealant by CCW, CCW-201 two-component Polyurethane Sealant or CCW LM-800XL

D. Backing Rod: Shall be closed-cell polyethylene foam rod.

E. Protection Course: Shall be CCW Protection Board-H or CCW 300H for horizontal surfaces or CCW Protection Board-V or CCW 200V for vertical surfaces.

F. Drainage Composite: Shall be CCW MiraDRAIN 6200 as recommended by the manufacturer for each condition.

G. Perimeter Drainage System: Where required shall be CCW QuickDRAIN™.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Before any waterproofing work is started the waterproofing applicator shall thoroughly examine all surfaces for any deficiencies. Should any deficiencies exist, the architect, owner, or general contractor shall be notified in writing and corrections made.

B. Condition of Concrete Surfaces:
1. The concrete surfaces shall be of sound structural grade and shall have a smooth finish, free of fins, ridges, protrusions, rough spalled areas, loose aggregate, exposed course aggregate, voids or entrained air holes. Rough surfaces shall receive a well-adhered parget coat.
2. Concrete shall be cured by water curing method. Any curing compounds must be of the pure sodium silicate type and be approved by the Carlisle representative.
3. Concrete shall be cured at least 7 days and shall be sloped for proper drainage.
4. Voids, rock pockets and excessively rough surfaces shall be repaired with approved non- shrink grout or ground to match the unrepaired areas.
5. Two-stage drains shall have a minimum 3 inch flange and be installed with the flange flush and level with the concrete surface.
6. Surfaces at cold joints shall be on the same plane.

3.2 SURFACE PREPARATION

A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application. The concrete surface must be thoroughly clean, dry and free from any surface contaminates or cleaning residue that may harmfully affect the adhesion of the membrane.

B. Install a 3/4" face, 45 degree cant of CCW-201 Polyurethane Sealant or CCW LM-800XL at all angle changes and inside corners including penetrations through the deck, walls, curbs, etc.

C. All cracks over 1/16" in width and all moving cracks under 1/16" in width shall be routed out to 1/4" minimum in width and depth and filled flush with an approved sealant by CCW or CCW-201 polyurethane sealant.

D. All expansion joints less than 1" wide shall be cleaned, primed, fitted with a backing rod and caulked with CCW-201 Polyurethane Sealant. For larger joints, contact Carlisle representative.

E. Allow all sealant to cure at least overnight.

F. Stir Primer. Apply a thin film of primer 10" wide, centered over sealed cracks and joints, hairline cracks, and cold joints. Apply primer 8" on each side of all corners. Prime concrete around drain flanges. Allow primer to dry per manufacturer=s recommendations.

G. Install an 8" wide strip of CCW MiraDRI 860/861centered over joints and cracks. Install a 12" wide strip of CCW MiraDRI 860/861centered over the axis of all corners.

H. Terminate membrane around drains per CCW MiraDRI 860 series details. Terminate the membrane under the clamping ring. Seal all edges with CCW-704 Mastic. Do not interfere with weep holes.

3.3 MODIFIED BITUMINOUS SHEET-WATERPROOFING APPLICATION

A. Priming: Clean surfaces to remove residual dust before priming. Stir primer. Apply by spray or roller at a rate recommended by manufacturer. Allow to dry per manufacturer=s recommendation.

B. Horizontal surfaces: Install sheet membrane from low to high point, so that laps will shed water. Overlap edge seams 2½”, end laps 5". Stagger end seams. Roll in place with an 18 to 24" wide, 100 lb. (min.) resilient roller. Ensure that all laps are firmly adhered and that there are no gaps or fishmouths.

C. Vertical Surfaces: Apply in lengths of 8' or less. Overlap edge seams 2½”. On walls over 8' high, apply in 8' sections, starting at the lowest point with the higher section overlapping the lower section 5". Roll in place using firm pressure with a hand roller.

D. Terminations: Consult Carlisle 860-9 Details for proper terminations. Roll terminating edges firmly. Apply CCW-704 mastic to all terminations and >T=joints. Apply CCW-704 Mastic or CCW-703-V Liquiseal to laps at angle changes, extending 9" in each direction.

3.4 INTEGRITY TESTING

A. Test is required for all expanded warranties beyond the standard material warranty of horizontal applications.

B. The test can be done with Electronic Vector Mapping or flood testing. Flood testing requires 2” minimum head of water for a period of 24 hours

3.5 PROTECTION COURSE

A. VERTICAL APPLICATION: Install CCW QuickDRAIN Perimeter Drainage System as the first course of drainage composite immediately after membrane has been installed on vertical surfaces. Install CCW MiraDRAIN Drainage Composite (consult CCW for recommendation), CCW Protection Board-V Protection Course or CCW 200V on remainder. Stop drainage composite 6" below final grade level.

B. HORIZONTAL APPLICATION: Install CCW MiraDRAIN Drainage Composite (consult CCW for recommendation) or CCW Protection Board-H Protection Course or CCW 300HV immediately after flood testing on horizontal surfaces. If flood testing is delayed, install a temporary covering to protect the CCW MiraDRI 860/861membrane from damage by other trades.

3.6 PROTECTION, REPAIR, AND CLEANING

A. Do not permit foot or vehicular traffic on unprotected membrane.

B. Protect waterproofing from damage and wear during remainder of construction period from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

C. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.

D. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.7 WASTE MANAGEMENT

A. Coordinate with Division 01.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 07 13 26

SECTION 07 21 00 - THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This section includes the performance criteria, materials, production, and erection of Thermal Insulation for the project. The work performed under this Section consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all Thermal Insulation as required by the this section, schedules, keynotes and drawings including, but not limited to the following:

1. Foam-plastic board insulation.
2. Mineral-wool blanket insulation.
3. Glass fiber blanket insulation.
4. Sprayed polyurethane foam insulation

B. Related Requirements:

1. Division 04 “Masonry”
2. Division 07 “Thermal and Moisture Protection”
3. Division 09 “Finishes”

1.3 ACTION SUBMITTALS

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

1.4 INFORMATIONAL SUBMITTALS

A. Product test reports.

B. Research/evaluation reports.

PART 2 - PRODUCTS

2.1 MATERIAL, GENERAL

A. Source Limitations: Obtain insulation materials from single source from single manufacturer.

B. Must meet NYS Energy Code requirements.

2.2 FOAM-PLASTIC BOARD INSULATION – ABOVE GRADE

A. **FOR USE ON ABOVE GRADE CAVITY WALLS**: Exterior Insulation: Glass-fiber-reinforced enhanced polyisocyanurate foam core sheathing faced with nominal 4 mil embossed blue acrylic-coated aluminum on one side and 1.25 mil embossed aluminum on the other side, complying with ASTM C1289 and meeting the following physical properties:
1. ASTM C1289 Type 1, Class 2
2. Compressive Strength (ASTM D1621): 25 psi, minimum.
3. Aged Thermal Resistance (ASTM C518, measured at Mean Temp of 75F): [R-6.5 at 1 inch] [RSI 1.06 per 25 mm] of thickness [with 15 year thermal warranty]
4. Flexural Strength (ASTM C203): Minimum 55 psi.
5. Water Absorption (ASTM C209): Maximum.0.1 percent by volume.
6. Water Vapor Permeance (ASTM E96): <0.03 perms.
7. Maximum Use Temperature: 250 degrees F.
8. Panel Size: 4'-0" wide x 8'-0" long, square edge, shiplap
9. Thickness and Stabilized R-Value: Nominal 2 inch thickness, R-13.0
10. Wall assembly must comply with NFPA 285 - 2012

B. Manufacturers subject to compliance with requirements, provide products by one of the following:
1. Basis of Design: Dow Chemical Company "THERMAX ci Exterior Insulation.
2. Other comparable products as approved by Architect

C. Accessories:
1. Fasteners: Provide insulated sheathing manufacturer's recommended polymer or other corrosion protective coated steel screw fasteners for anchoring sheathing to metal wall framing. Fastener length and size based on wall sheathing thickness.
a. Basis of Design: Rodenhouse, Inc. 2 inch diameter "Thermal-Grip" CI prong washer with "Grip-Deck" ceramic- coated, self-drilling screw.
b.Use the Grip-Lok auto-feed fastening system for high speed application

D. Flashing: Provide insulation manufacturer's recommended board treatment for sealing joints, seams, and veneer tie penetrations through the insulation layer.
a. Acceptable Products:
1) Dow Chemical Company LIQUIDARMOR-CM commercial liquid flashing and sealant.
2) Dow Chemical Company "WEATHERMATE Straight Flashing 4 inch"width with butyl rubber adhesive

E. Wall Opening Flashing: Provide insulated sheathing manufacturer's recommended flashing sealing window and door wall openings.
a. Acceptable Products:
1) Dow Chemical Company LIQUIDARMOR-CM commercial liquid flashing and sealant
2) Dow Chemical Company "WEATHERMATE Straight Flashing 6 inch and 9 inch", with butyl rubber adhesive, at straight opening heads, jambs and sills
3) When greater widths are required for through wall flashings butyl rubber adhesive is recommended.

F. Penetration Filler: Provide insulated sheathing manufacturer's recommended polyurethane foam for sealing penetrations of insulated sheathing.
a. Acceptable Products:
1) Dow Chemical Company "GREAT STUFF PRO Gaps & Cracks" single Component polyurethane insulating foam sealant.
2) Dow Chemical Company "GREAT STUFF PRO Window & Door" single-component polyurethane low-pressure foam sealant

G. Gap Air Infiltration Filler: Two Component, Quick Cure Polyurethane Foam:
1. Acceptable Products:
a) Dow Chemical Company FROTH-PAK Foam Insulation two component, quick-cure polyurethane foam
i) NFPA 286 Approval for Exposed use to the interior of the building without the need for a15-min thermal barrier
ii) ASTM E-84 Class A

H. Flexible polyethylene foam gasket strip to reduce air infiltration between a concrete foundation and sill plate.
a. Acceptable Products: The Dow Chemical Company "STYROFOAM Sill Seal Foam Gasket

2.3 FOAM -PLASTIC BOARD INSULATION – BELOW GRADE

A. **FOR USE BELOW GRADE AND UNDER SLAB:** Rigid closed-cell Extruded-Polystyrene Board Insulation for Perimeter Foundation Wall Installations

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Basis of Design: Dow Chemical Company Perimate Square Edge
   b. DiversiFoam Products.
   c. Owens Corning.
   d. Pactiv Building Products.
2. Wall assembly must comply with NFPA 285 - 2012.
3. ASTM C578-92 Type IV, 25 psi (ASTM D 1621-73)
4. Density 1.6 lb/cu. Ft. min
5. Thickness 2" unless otherwise indicated
6. UL classification: D369.
7. Thermal resistance: 5-year aged R-values of 5.4 and 5.0 min., $^{o}F\text{-}ft^2\text{-}h/Btu^2/inch$ at $40^{o}F$ and $75^{o}F$ respectively (ASTM C 518-91).
8. Water absorption: Max. 0.3% by volume (ASTM C 272-91).

2.4 MINERAL-WOOL BOARD INSULATION

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Fibrex Insulations Inc.
2. Isolatek International.
3. Owens Corning.
4. Roxul Inc.

5. Thermafiber.

B. Unfaced, Mineral-Wool Board Insulation (at cavity wall edge of slab, fire-safing conditions): ASTM C 612; with maximum flame-spread and smoke-developed indexes of 15 and zero, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

C. Foil-faced, Mineral-Wool Board Insulation (at storefront wall edge of slab and spandrel panel locations): ASTM C612; faced on one side with foil-scrim or foil-scrim-polyethylene vapor retarder; with maximum flame-spread and smoke – developed indexes of 25 and 5, respectively, per ASTM E84.

2.5 GLASS-FIBER BLANKET INSULATION

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. CertainTeed Corporation.
2. Guardian Building Products, Inc.
3. Johns Manville.
4. Knauf Insulation.
5. Owens Corning.

B. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

2.6 MINERAL-WOOL BLANKET INSULATION

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Fibrex Insulations Inc.
2. Owens Corning.
3. Roxul Inc.
4. Thermafiber.

B. Unfaced, Mineral-Wool Blanket Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

2.7 SPRAYED POLYURETHANE FOAM INSULATION

A. Spray Polyurethane Foam Installer shall be certified by spray foam manufacturer.

B. Pre-Installation Meeting to review spray polyurethane foam methods and procedures related to application, including manufacturer’s installation guidelines.

C. Mock-up illustrating typical conditions. Conduct the following tests on the mockup panel:
1. Core density

2. Adhesion between transition sheet membrane and substrate
3. Cohesion or adhesion between sprayed insulation and substrate

D. Ventilate area to receive insulation by introducing fresh air and exhausting air continuously during any 24 hours after application to maintain non-toxic, unpolluted, safe working condition.

E. Protect workers as recommended by insulation manufacturer.

F. Protect adjacent surfaces and equipment from damage by overspray, fall-out and dusting of insulation materials.

G. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Basis of Design: Dow Chemical Styrofoam Spray Polyurethane Foam Insulation (MX Series)
2. Certa Spray Closed Cell Foam Insulation by CertainTeed
3. Icynene ProSeal MD-C-200v3
4. Substitutions: Approved equal

H. Spray Polyurethane Foam: Two-component spray polyurethane cellular plastic foam, complying with the following methods and meeting the following physical properties:

1. Core Density (ASTM D1622): Minimum 2pcf
2. Thermal Resistance (ASTM C518): 140degreeF/90day Aged R-Value, measured at 75F mean Temp: Minimum R6.0/inch.
3. Flame Spread (ASTM E84, Class A): 25 or less.
4. Smoke Developed (ASTM E84, Class A): 450 or less.
5. Compressive Strength minimum (ASTM D1621, 10% parallel to rise): (20 psi)(182 kPa).
6. Closed Cell Content (ASTM D2856): minimum 95 percent.
7. Water Absorption by Volume maximum. (ASTM D2842): 2.5 percent.
8. Wall assembly must comply with NFPA 285 - 2012

I. For oily steel surface like Z-bar, roof deck, curtain wall pan, aluminum tube or PVC pipes cleaning, etching or a primer may be needed before spraying polyurethane foam. Water Vapor Permeability maximum. (ASTM E96): [2.5 perm-inches] [3.6 ng/(Pa.s.m)].

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.2 INSTALLATION OF BELOW-GRADE INSULATION

A. On vertical surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.

1. If not otherwise indicated, extend insulation a minimum of 36 inches (915 mm**)** below exterior grade line.

B. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

1. If not otherwise indicated, extend insulation a minimum of 36 inches (915 mm**)** in from exterior walls.

C. Cut insulation to fit snugly around pilasters, projections, curves and irregularities on the wall surface. Fill voids with insulation.

3.3 INSTALLATION OF CAVITY-WALL INSULATION

A. Foam-Plastic Board Insulation: Install 2” diameter daubs of adhesive spaced approximately 12 inches (610 mm) o.c. both ways on inside face, and as recommended by manufacturer. Fit courses of insulation between wall ties and other obstructions, with edges butted tightly in both directions. Press units firmly against inside substrates.

1. Supplement adhesive attachment of insulation by securing boards with two-piece wall ties designed for this purpose and specified in Section 042000 "Unit Masonry."

2. Wedge insulation from outside wythe of construction with small fragments of masonry materials spaced 24" o.c. both ways.

3. Make insulation continuous. Fill all voids

3.4 INSTALLATION OF INSULATION FOR FRAMED CONSTRUCTION

A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

B. Foam-Plastic Board Insulation: Seal joints between units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.

C. Glass-Fiber or Mineral-Wool Blanket Insulation: Install in cavities formed by framing members according to the following requirements:

1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
3. Maintain 3-inch (76-mm) clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
4. For metal-framed wall cavities where cavity heights exceed 96 inches (2438 mm), support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
5. Vapor-Retarder-Faced Blankets: Tape joints and ruptures in vapor-retarder facings, and seal each continuous area of insulation to ensure airtight installation.

    a. Exterior Walls: Set units with facing placed toward as indicated on Drawings.
    b. Interior Walls: Set units with facing placed as indicated on Drawings.

D. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:

1. Loose-Fill Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft. (40 kg/cu. m).
2. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

3.5 INSTALLATION OF INSULATION FOR CONCRETE SUBSTRATES

A. Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors as follows:

1. Fasten insulation anchors to concrete substrates with insulation anchor adhesive according to anchor manufacturer's written instructions. Space anchors according to insulation manufacturer's written instructions for insulation type, thickness, and application indicated.
2. Apply insulation standoffs to each spindle to create cavity width indicated between concrete substrate and insulation.
3. After adhesive has dried, install board insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation below indicated thickness.
4. Where insulation will not be covered by other building materials, apply capped washers to tips of spindles.

3.6 INSTALLATION OF STOREFRONT-WALL INSULATION

A. Install board insulation in storefront-wall construction where indicated on Drawings according to curtain-wall manufacturer's written instructions.

1. Hold insulation in place by securing metal clips and straps or integral pockets within window frames, spaced at intervals recommended in writing by insulation manufacturer to

hold insulation securely in place without touching spandrel glass. Maintain cavity width of dimension indicated between insulation and glass.

2. Install insulation where it contacts perimeter fire-containment system to prevent insulation from bowing under pressure from perimeter fire-containment system.

3.7 INSTALLATION OF VAPOR RETARDERS

A. Place vapor retarders on side of construction indicated on Drawings. Extend vapor retarders to extremities of areas to protect from vapor transmission. Secure vapor retarders in place with adhesives or other anchorage system as indicated. Extend vapor retarders to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.

B. Seal vertical joints in vapor retarders over framing by lapping no fewer than two studs.

1. Fasten vapor retarders to wood framing at top, end, and bottom edges; at perimeter of wall openings; and at lap joints. Space fasteners 16 inches (406 mm) o.c.
2. Before installing vapor retarders, apply urethane sealant to flanges of metal framing including runner tracks, metal studs, and framing around door and window openings. Seal overlapping joints in vapor retarders with vapor-retarder tape according to vapor-retarder manufacturer's written instructions. Seal butt joints with vapor-retarder tape. Locate all joints over framing members or other solid substrates.
3. Firmly attach vapor retarders to metal framing and solid substrates with vapor-retarder fasteners as recommended by vapor-retarder manufacturer.

C. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarders.

D. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarders.

3.8 INSTALLATION OF FOAM INSULATION

A. Verify existing conditions are ready to receive work.

B. Ensure surfaces are free of frost, oil, grease, oxidation, dirt, loose paint, loose scale, or other deleterious material that would impair bond.

C. Ensure that items required to penetrate sprayed insulation are installed prior to installation of sprayed insulation.

D. Clean area of work prior to application of sprayed insulation. Beginning of application implies acceptance of existing conditions.

E. Mask and cover adjacent areas to protect from overspray.

F. Apply any required primers for special conditions as recommended by manufacturer. Prepare surfaces within the exterior soffit at the pool to receive sprayed foam insulation where indicated.

G. Cover wide joints with transition sheet membrane as specified in Section 07 27 50.

H. Seal any voids between the existing precast concrete T's and adjoining building components.

I. Must be installed by manufacturer's Approved Applicator at time of bidding.

J. Apply SPF in accordance with ASTM C1029 and manufacturer's installation guidelines: complying with preparation methods.

K. Apply sprayed foam insulation in consecutive layers of not less than ½ inch and not more than 2 inch thick each to achieve total thickness required (total thickness as indicated per application) for a minimum R value of 25. For light gage steel and extruded polystyrene board first layer should be a skim coat of (12 mm) (½ inch) before adding extra layers. Ensure the substrate is well supported.

L. Avoid formation of sub-layer air pockets.

M. Apply product in overlapping layers, so as to obtain a smooth, uniform surface.

N. Maintain 3 inch clearance around chimneys, heating vents, steam pipes, recessed lighting fixtures and other heat sources.

O. Do not apply Product to inside of exit openings or electrical junction boxes.

P. Conduct field inspection and testing in accordance with manufacturers and general contractors instructions.

Q. Test completed application daily for core density and cohesion/adhesion to substrate. Record results daily in daily work records.

R. Site Tolerances: Maximum Variation in Applied Thickness: minus 1/4 inch, plus 5/8 inch.

S. Remove overspray from non-prescribed surfaces without causing damage to surfaces.

T. Remove protective covers from adjacent surfaces.

U. Protect completed installation from damage Repair as required.

V. Any open flame or welding shall not be in contact with the Spray Polyurethane Foam.

W. All plastic insulation must be protected from interior occupancy space by an approved thermal barrier to meet the requirements of local Building Codes.

3.9 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.
   1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
   2. Set aside and protect materials suitable for reuse and/or remanufacturing.
   3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 07 21 00

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SECTION 075600.13 - FLUID-APPLIED MEMBRANE ROOFING, INSULATED FOR NEW ROOFS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes fluid-applied roof membrane system on insulated concrete deck, consisting of the following:

1. Vapor retarder.

2. Roof insulation and cover board.

3. Base-ply sheet.

4. Application of reinforced fluid-applied polyurethane roof membrane and membrane flashings.

B. Related Information:

1. Division 06 Section "Miscellaneous Rough Carpentry" for wood blocking and nailers.

2. Division 07 Section "Sheet Metal Flashing and Trim" for manufactured reglets, formed metal roof flashings, expansion joints and roof edge metal.

1.2 ROOFING CONFERENCES

A. Roofing Preinstallation Conference: Conduct conference at Project site. Review methods and procedures related to roofing system.

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative if applicable, roofing materials manufacturer's representative, roofing Installer including project manager and foreman, and installers whose work interfaces with or affects roofing including installers of roof accessories and roof-mounted equipment requiring removal and replacement as part of the Work.

2. Review methods and procedures related to preparation, including membrane roofing system manufacturer's written instructions.

3. Review drawings and specifications.

4. Review temporary protection requirements for existing roofing system that is to remain, during and after installation.

5. Review roof drainage during each stage of roofing and review roof drain plugging and plug removal procedures.

6. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

7. Review base flashings, special roofing details, drainage, penetrations, equipment curbs, and condition of other construction that will affect re-coating.

8. Review HVAC shutdown and sealing of air intakes.

9. Review shutdown of fire-suppression, -protection, and -alarm and -detection systems.

10. Review procedures for asbestos removal or unexpected discovery of asbestos-containing materials.

11. Review governing regulations and requirements for insurance and certificates if applicable.

12. Review existing conditions that may require notification of Owner before proceeding.

1.3 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D1079 "Standard Terminology Relating to Roofing and Waterproofing" and glossary in applicable edition of NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" for definition of terms related to roofing work in this Section.

1.4 ACTION SUBMITTALS

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

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work. Provide roof plan showing orientation and types of roof deck and orientation of membrane roofing and fastening spacings and patterns for mechanically fastened components.

1. Base flashings and terminations.

2. Tapered insulation, including slopes.

3. Crickets, saddles, and tapered edge strips, including slopes.

C. Samples for Verification: For the following products:

1. 1-by-3-inch sample of reinforced fluid-applied membrane, and sheet materials.

2. 3-by-5-inch sample of vapor retarder ply and trilaminate roofing base ply.

3. 4-by-4-inch sample of roof insulation and cover board.

1.5 INFORMATIONAL SUBMITTALS

A. Contractor's Product Certificate: Submit notarized certificate, indicating products intended for Work of this Section, including product names and numbers and manufacturers' names, with statement indicating that products to be provided meet the requirements of the Contract Documents.

B. Qualification Data: For Installer, Manufacturer, and Roofing Inspector.

1. Letter written for this Project indicating manufacturer approval of Installer to apply specified products and provide specified warranty.

2. Certificate indicating Installer is qualified in Project jurisdiction to perform asbestos abatement.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of roofing system.

D. Warranties: Unexecuted sample copies of special warranties.

E. Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including exterior and interior finish surfaces, which might be misconstrued as having been damaged by re-coating operations. Submit before Work begins.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: To include in maintenance manuals.

B. Warranties: Executed copies of approved warranty forms.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and certified by manufacturer, including a full-time on-site supervisor with a minimum of five years' experience installing products comparable to those specified, able to communicate verbally with Contractor, Architect, and employees, and the following:

1. Qualified by the manufacturer to install manufacturer's product and furnish warranty of type specified.

B. Manufacturer Qualifications: Approved manufacturer listed in this Section, with minimum five years' experience in manufacture of specified products in successful use in similar applications.

1. Approval of Other Manufacturers and Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for substitution review:

    a. Product data, including certified independent test data indicating compliance with requirements.

    b. Samples of each component.

    c. Sample submittal from similar project.

    d. Project references: Minimum of five installations of specified products not less than five years old, with Owner and Architect contact information.

    e. Sample warranty.

C. Roofing Inspector Qualifications: A technical representative of manufacturer not engaged in the sale of products and experienced in the installation and maintenance of the specified roofing system, qualified to perform roofing observation and inspection specified in Field Quality Control Article, to determine Installer's compliance with the requirements of this Project, and approved by the manufacturer to issue warranty certification. The Roofing Inspector shall be one of the following:

    1. An authorized full-time technical employee of the manufacturer.

    2. An independent party certified as a Registered Roof Observer by the International Institute of Building Enclosure Consultants (formerly the Roof Consultants Institute) retained by the Contractor or the Manufacturer and approved by the Manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

B. Handle and store roofing materials, and place equipment in a manner to avoid significant or permanent damage to deck or structural supporting members.

C. Protect materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting.

1.9 PROJECT / FIELD CONDITIONS

A. Protect building, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from roofing operations.

B. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.

C. Weather Limitations: Proceed with roofing work only when existing and forecasted weather conditions permit Work to proceed without water entering into existing roofing system or building.

1. Store all materials prior to application at temperatures between 60 and 90 deg. F (16 and 32 deg C).

2. Apply coatings within range of ambient and substrate temperatures recommended by manufacturer. Do not apply materials when air temperature is below 50 or above 110 deg. F (10 or above 43 deg C).

3. Do not apply roofing in snow, rain, fog, or mist.

D. Daily Protection: Coordinate installation of roofing so insulation and other components of roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.

E. Owner will occupy portions of building immediately below roofing area. Conduct roofing so Owner's operations will not be disrupted. Provide Owner with not less than 72 hours' notice of activities that may affect Owner's operations.

1.10 WARRANTY

A. Manufacturer's Warranty: Roof System Manufacturer's standard form in which Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within warranty period, as follows.

1. Form of Warranty: Manufacturer's standard warranty form.

2. Scope of Warranty: Work of this Section and including sheet metal details and termination details installed by the roof system Installer and approved by the Roof System Manufacturer.

3. Warranty Period: 20 years from date of completion.

B. Manufacturer Inspection Services: By manufacturer's technical representative, to report maintenance responsibilities to Owner necessary for preservation of Owner's warranty rights. The cost of manufacturer's inspections is included in the Contract Sum.

1. Inspections to occur in following years: 2, 5, 10, 15 following completion.

C. Installer Warranty: Installer's warranty signed by Installer, as follows.

1. Form of Warranty: Form acceptable to Roofing Manufacturer and Owner.

2. Scope of Warranty: Work of this Section.

3. Warranty Period: 2 years from date of completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: The roof system specified in this Section is based upon products of Tremco CPG Inc, www.tremcoroofing.com that are named in other Part 2 articles. Provide specified products or comparable products of one of the following.

1. Tremco CPG Inc., Basis-of-Design.

2. Kemper.

3. Pacific Polymers.

B. Source Limitations: Obtain components for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. General: Provide roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.

1. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G152, ASTM G154, or ASTM G155.

2. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D3746/D3746M, ASTM D4272/D4272M, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.

B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.

C. Roofing System Design: Provide roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency in accordance with ANSI/FM 4474, UL 580, or UL 1897, and to resist uplift pressures.

1. Zone 1 (Field-of-Roof) Uplift Pressure: 58.1 psf.

2. Zone 2 (Perimeter) Uplift Pressure: 76.7 psf, located within 6 ft. of roof perimeter.

3. Zone 3 (Corner) Uplift Pressure: 104.5 psf, located within 18 ft. of outside corners.

D. SPRI Wind Design Standard: Manufacture and install copings and roof edge flashings tested according to ANSI/SPRI ES-1.

1. Design Pressure: 104.5 psf.

E. Flashings: Comply with requirements of Division 07 Sections "Sheet Metal Flashing and Trim" and "Manufactured Roof Specialties." Provide base flashings, perimeter flashings, detail flashings and component materials that comply with requirements and recommendations of the following:

1. FMG 1-49 Loss Prevention Data Sheet for Perimeter Flashings.

2. NRCA Roofing Manual (Sixth Edition) for construction details and recommendations.

3. SMACNA Architectural Sheet Metal Manual (Seventh Edition) for construction details.

F. Solar Reflectance Index: Not less than 78 when calculated according to ASTM E1980, based on testing identical products by a qualified testing agency.

G. Exterior Fire-Test Exposure: ASTM E108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.

2.3 MATERIALS

A. General: Roofing materials recommended by roofing system manufacturer for intended use and compatible with components of existing membrane roofing system.

B. General: Provide adhesive and sealant materials recommended by roofing manufacturer for intended use and compatible with built-up roofing.

1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.

2.4 SHEET MATERIALS

A. Base-Ply Sheet:

1. SBS-modified asphalt coated composite polyester / fiberglass/fiberglass mat reinforced high tensile strength base sheet, ASTM D4601 Type II.

a. Basis of design product: Tremco, BURmastic Composite Ply HT.

b. Tensile Strength at 77 deg. F (25 deg. C), minimum, ASTM D5147: Machine direction, 165 lbf/in (725 N); Cross machine direction, 150 lbf/in (660 N).

c. Tear Strength at 77 deg. F (25 deg. C), minimum, ASTM D5147: Machine direction, 260 lbf (1150 N); Cross machine direction, 230 lbf (1120 N).

d. Thickness, minimum, ASTM D5147: 0.060 inch (1.5 mm).

2.5 FLUID-APPLIED ROOFING MEMBRANE

A. Polyurethane Elastomeric Fluid-Applied System: Two-coat reinforced fluid-applied roofing membrane formulated for application over prepared existing roofing substrate.

1. Base Coat:

a. Polyurethane Roof Coating System Base Coat: Bio-based, low-odor low-VOC two-part, for use with a compatible top coat.

1) Basis of design product: Tremco, AlphaGuard BIO Base Coat.

2) Volatile Organic Compounds (VOC), maximum, ASTM D3960: 1 g/L.

3) Accelerated Weathering, 5000 hours, ASTM G154: Pass.

4) Hardness, Shore A, minimum, ASTM D2240: 80.

5) Solids, by volume, ASTM D2697: 100 percent.

6) Bio-Based Content, Minimum: 70 percent.

7) Minimum Thickness, Base Coat reinforced over Smooth BUR, MB, Concrete, Single-Ply: 48 mils (1.22 mm) wet.

2. Top Coat:

a. Polyurethane roof coating system top coat, bio-based low-odor low-VOC two-part, for application over compatible base coat.

1) Basis of design product: Tremco, AlphaGuard BIO Top Coat.

2) Volatile Organic Compounds (VOC), maximum, ASTM D3960: 6 g/L.

3) Solar Reflectance Index (SRI), ASTM E1980: For white, not less than 103.

4) Accelerated Weathering, 5000 hours, ASTM G 154: Pass.

5) Hardness, Shore A, minimum, ASTM D2240: 81.

6) Solids, by volume, ASTM D2697: 100 percent.

7) Bio-Based Content, Minimum: 60 percent.

8) Minimum Thickness, reinforced system: 32 mils (0.81 mm) wet.

9) Minimum Thickness, Slip-Resistant Coat: 24 mils (0.60 mm) wet.

10) Color: White.

3. Reinforcing Fabric:

a. Polyester Reinforcing and Protection Fabric: 100 percent stitch-bonded mildew-resistant polyester fabric intended for reinforcement of compatible fluid-applied membranes and flashings and as a protection layer under pavers or stone aggregates.

1) Basis of design product: Tremco, Permafab.

2) Tensile Strength, Minimum, ASTM D5034 (2-inch): MD - 110 lbs. (49.8 kg); XMD - 60 lbs. (27.2 kg) avg.

3) Elongation, Minimum, ASTM D5034 (1-inch): MD - 25 percent; XMD - 100 percent.

4) Tear Strength, Minimum, ASTM D5587: MD - 20 lbs. (9.0 kg) avg; XMD - 20 lbs. (9.0 kg) avg.

5) Weight: 3 oz./sq. yd (102 g/sq. m).

4. Primers:

a. Primer for Asphaltic and Single-Ply Membranes: Water-based, polymer-modified quick-dry low odor primer.

1) Basis of design product: Tremco, AlphaGuard WB Primer.

2) Volatile Organic Compounds (VOC), maximum, ASTM D3960: 1 g/L.

3) Solids, by weight: 70 percent.

b. Primer for Masonry Surfaces: Two-part high-solids epoxy-penetrating low-odor primer for masonry and concrete surfaces.

1) Basis of design product: Tremco, AlphaGuard C-Prime.

2) Volatile Organic Compounds (VOC), maximum, ASTM D3960: 0 g/L.

3) Solids, by weight: 100 percent.

c. Primer for Non-Porous Surfaces: Single-part, water based primer to promote adhesion of urethanes to metals, PVC and other non-porous surfaces.

1) Basis of design product: Tremco, AlphaGuard M-Prime.

2) Volatile Organic Compounds (VOC), maximum, ASTM D3960: 22 g/L.

3) Nonvolatile Content, minimum, ASTM D2369: 5 percent.

4) Density at 77 deg F (25 deg C): 8.3 lb./gal (1kg/L).

d. Primer for Intercoat and Substrate Adhesion: Single-part, quick-drying primer to promote adhesion of urethane products to previous urethane coats and to other approved surfaces.

1) Basis of design product: Tremco, Geogard Primer.

2) Volatile Organic Compounds (VOC), maximum, ASTM D3960: 100 g/L.

3) Coverage Rate, 400 sq. ft/ gal. (10 m2/ L): 4 mils (0.10 mm) wet.

2.6 ADHESIVE MATERIALS

A. Base-Ply Sheet Adhesive:

1. Cold-applied bio-based low odor urethane roofing adhesive, two-part, USDA BioPreferred, formulated for compatibility and use with specified roofing membranes and flashings.

a. Basis of design product: Tremco, POWERply Endure BIO Adhesive TF.

b. Volatile Organic Compounds (VOC), maximum, ASTM D3690: 0 g/L.

c. Low Temperature Flexibility, ASTM D2240: Pass at -30 deg F (-34 deg C).

d. Solids, by Volume, ASTM D2697: 100 percent.

e. Biobase Content, Minimum, ASTM D6866: 70 percent.

2.7 AUXILIARY ROOFING MEMBRANE MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with existing roofing system and fluid-applied roofing system.

B. Joint Sealant: Elastomeric joint sealant compatible with applied coating, with movement capability appropriate for application.

1. Joint Sealant, Polyurethane: ASTM C920, Type S, Grade NS, Class 50 single-component moisture curing sealant, formulated for compatibility and use in dynamic and static joints; paintable.

a. Basis of design product: Tremco, TremSEAL Pro.

b. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 40 g/L.

c. Hardness, Shore A, ASTM C661: 40.

d. Adhesion to Concrete, ASTM C794: 35 pli.

e. Tensile Strength, ASTM D412: 350 psi (2410 kPa).

f. Color: Closest match to substrate.

C. Stripping Adhesive / Sealer:

1. Seam Sealer: Aromatic polyurethane sealer, single-component, high solids, moisture curing, formulated for compatibility and use with a variety of roofing and flashing substrates.

a. Basis of design product: Tremco, GEOGARD Seam Sealer.

b. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 189 g/L.

c. Tensile Strength, ASTM D412: 270 psi (1860 kPa).

d. Tear Strength, ASTM D412: 35 pli (6.13 kNm).

e. Elongation, ASTM D412: 220 percent.

f. Color: Gray.

D. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system manufacturer.

2.8 VAPOR RETARDER/AIR BARRIER

A. Vapor Retarder Sheet:

1. SBS/SIS/SEBS-modified asphalt-coated glass-fiber reinforced sheet, smooth surfaced, designed for heat-welded applications, ASTM D6163 Type I Grade S.

a. Basis of design product: Tremco, POWERply Standard Smooth HW (Heat Weld).

b. Tensile Strength at 77 deg. F (25 deg. C), minimum, ASTM D5147: 70 lbf/in (12 kN/m) machine direction; 50 lbf/in (8 kN/m) cross-machine direction.

c. Tear Strength at 77 deg. F (25 deg. C), minimum, ASTM D5147: 100 lbf (445 N) machine direction; 80 lbf (400 N) machine direction.

d. Elongation at 77 deg. F (25 deg. C), minimum, ASTM D5147: 4 percent machine direction; 4 percent cross-machine direction.

e. Low Temperature Flex, ASTM D5147: -30 deg. F (-23 deg. C).

f. Thickness, ASTM D5147: 0.118 inch (3.0 mm).

B. Vapor Retarder Primer:

1. Asphalt primer, water-based, polymer modified.

a. Basis of design product: Tremco, TREMprime WB.

b. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 2 g/L.

c. Color: Brown/black.

2.9 ROOF INSULATION

A. General: Preformed roof insulation boards manufactured or approved by roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.

1. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches (1:48) unless otherwise indicated.

2. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated, not less than two times the roof slope.

B. Roof Insulation:

1. Board Insulation, Polyisocyanurate: CFC- and HCFC- free, with recycled content glass-fiber mat facer on both major surfaces, ASTM C1289 Type II Class 1.

a. Compressive Strength, ASTM D1621: Grade 2: 20 psi (138 kPa).

2.10 INSULATION ACCESSORIES

A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with built-up roofing.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FM Global 4470, designed for fastening roof insulation to substrate and acceptable to roofing manufacturer.

C. Roof Insulation Adhesive:

1. Urethane adhesive, bead-applied, low-rise two-component solvent-free low odor, formulated to adhere roof insulation to substrate.

    a. Basis of design product: Tremco, Low Rise Foam Insulation Adhesive.

    b. Flame Spread Index, ASTM E84: 10.

    c. Smoke Developed Index, ASTM E84: 30.

    d. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 0 g/L.

    e. Tensile Strength, minimum, ASTM D412: 250 psi (1720 kPa).

    f. Peel Adhesion, minimum, ASTM D903: 17 lbf/in (2.50 kN/m).

    g. Flexibility, 70 deg. F (39 deg. C), ASTM D816: Pass.

D. Tapered Edge Strips: ASTM C208, Type II, Grade 1, cellulosic-fiber insulation board.

E. Cover Board (Choose from one of the following):

1. Gypsum panel, glass-mat-faced, primed, ASTM C1177/C1177M.

    a. Basis of design product: GP Gypsum DensDeck Prime.

    b. Thickness: 1/2 inch (12 mm).

2. Gypsum panel, cellulosic fiber reinforced, water-resistant, ASTM C1278/C1278M.

    a. Basis of design product: USG Securock Gypsum Fiber Roof Board.

    b. Thickness: 1/2 inch (13 mm).

2.11 WALKWAYS

A. Walkway Materials:

1. Polyurethane Top Coat, Slip-Resistant: Second top coat with broadcast slip-resistant aggregate.

    a. Basis of design product: Tremco, AlphaGuard BIO Top Coat Slip-Resistant.

    b. Minimum Thickness: As indicated in Part 2 product listing; over cured top coat.

    c. Ceramic granules: 10 to 15 lb./100 sq. ft.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:

1. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.

2. Concrete Deck:

a. Verify that minimum concrete drying period recommended by roofing manufacturer has passed.

b. Verify that concrete substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D4263.

B. Proceed with installation once unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove existing roofing and protect existing building in accordance with requirements of Division 07 Section "Preparation for Re-Roofing."

B. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing manufacturer's written instructions. Remove sharp projections.

C. Protect existing roofing system that is indicated to remain, and adjacent portions of building and building equipment.

1. Mask surfaces to be protected. Seal joints subject to infiltration by coating materials.

2. Limit traffic and material storage to areas of existing roofing membrane that have been protected.

3. Maintain temporary protection and leave in place until replacement roofing has been completed.

D. Shut down air intake equipment in the vicinity of the Work in coordination with the Owner. Cover air intake louvers before proceeding with re-coating work that could affect indoor air quality or activate smoke detectors in the ductwork.

1. Verify that rooftop utilities and service piping affected by the Work have been shut off before commencing Work.

E. Maintain roof drains in functioning condition to ensure roof drainage at end of each workday. Prevent debris from entering or blocking roof drains and conductors. Use roof-drain plugs specifically designed for this purpose. Remove roof-drain plugs at end of each workday, when no work is taking place, or when rain is forecast.

1. Do not permit water to enter into or under existing membrane roofing system components that are to remain.

3.3 MEMBRANE ROOFING INSTALLATION, GENERAL

A. Install roofing membrane according to roofing manufacturer's written instructions.

1. Commence installation of roofing in presence of manufacturer's technical personnel.

B. Coordinate installation of roofing so insulation and other components of roofing not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.

1. Provide tie-offs at end of each day's work to cover exposed roofing sheets and insulation with a course of coated felt set in roofing cement with joints and edges sealed.

2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing.

3. Remove and discard temporary seals before beginning work on adjoining roofing.

C. Substrate-Joint Penetrations: Prevent fluid-applied materials and adhesives from penetrating substrate joints, entering building, or damaging built-up roofing components or adjacent building construction.

3.4 VAPOR-RETARDER INSTALLATION

A. Vapor Retarder Sheet, General: Completely seal vapor retarder/air barrier at terminations, obstructions, and penetrations to prevent air movement into roofing system. Seal vapor retarder/air barrier to air barrier in adjacent construction at perimeter of roofing system.

B. Torch-Applied SBS Modified Sheet Vapor Retarder: Install one lapped vapor retarder course and torch-apply to substrate, according to roofing system manufacturer's written instructions.

C. Contractor to follow all CERTA guidelines and requirements for torch-applied roofing applications.

3.5 INSULATION INSTALLATION

A. Comply with roofing manufacturer's written instructions for installing roof insulation.

B. Coordinate installing membrane roofing system components, so insulation is not exposed to precipitation or left exposed at the end of the workday.

C. Tapered Insulation and Crickets: Install tapered insulation under area of roofing to conform to slopes indicated.

1. Where saddles or crickets are indicated or required to provide positive slope to drain, make slope of crickets minimum of two times the roof slope.

D. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch (6 mm) with insulation.

1. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.

E. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches (70 mm) or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches (150 mm) in each direction.

1. Tapered Insulation System for Flat Roof Deck: Install insulation as follows:

a. Minimum Continuous Insulation R-value: Not less than R-30.

2. Insulation Drain Sumps: Tapered insulation sumps, not less than 2 by 2 ft (600 by 600 mm), sloped to roof drain; sump to maximum depth of not more than 1 inch (25 mm) less than the Project-stipulated continuous insulation thickness based upon code requirements.

F. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

G. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.

H. Adhered Insulation: Install each layer of insulation and adhere to substrate as follows:

1. Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.

I. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches (150 mm) in each direction. Loosely butt cover boards together.

1. Set cover board in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining cover in place.

3.6 BASE-PLY SHEET INSTALLATION

A. Install base sheet starting at low point of roofing. Align base sheet without stretching. Shingle side laps of base a minimum of 4 inches (100 mm). Shingle in direction to shed water. Extend base sheets over edges and terminate above cants.

1. Embed base sheet in cold-applied membrane adhesive applied at rate required by roofing manufacturer.

B. Install stripping according to roofing manufacturer's written instructions where metal flanges and edgings are set on roofing.

1. Flashing Sheet Stripping: Install flashing sheet stripping in specified cold adhesive and extend onto roofing membrane.

C. Roof Drains: Install base-ply sheet in cold adhesive around drain bowl. Base sheet must be installed so that it will be under compression from the clamping ring. Install base coat, fabric reinforcement, and top coat over base sheet. Install drain clamping ring and strainer.

3.7 FLUID-APPLIED FLASHING APPLICATION

A. Fluid-Applied Flashing and Detail Base Coat Application: Complete base coat and fabric reinforcement at parapets, curbs, penetrations, and drains prior to application of field of fluid-applied membrane. Apply base coat in accordance with manufacturer's written instructions.

1. Extend coating minimum of 8 inches (200 mm) up vertical surfaces and 4 inches onto horizontal surfaces.

2. Back roll to achieve minimum coating thickness indicated on Part 2 product listing unless greater thickness is recommended by manufacturer; verify thickness of base coat as work progresses.

3. Reinforcing Fabric: Embed fabric reinforcement into wet base coat. Lap adjacent flashing pieces of fabric minimum 3 inches (75 mm) along edges and 6 inches (150 mm) at end laps.

a. Roll surface of fabric reinforcing to completely embed and saturate fabric. Leave finished base coat with fabric free of pin holes, voids, or openings.

4. Roll surface of fabric reinforcing to completely embed and saturate fabric. Leave finished base coat with fabric free of pin holes, voids, or openings.

5. Roof Drains: Set 30 by 30 inch (760 by 760 mm) square metal flashing in bed of compatible mastic/adhesive sealer on roofing base-ply sheet. Cover metal flashing with stripping ply and extend a minimum of 6 inches (150 mm) beyond edge of metal flashing. Allow to cure.

a. Apply base coat and immediately install target piece of fabric reinforcement into wet base coat, extend into drain bowl and roll to fully embed and saturate fabric. Apply top coat after base coat has cured.

b. Following application and curing of fluid-applied roofing membrane, install clamping ring and strainer. Replace broken drain ring clamping bolts.

6. Allow base coat to cure prior to application of top coat.

3.8 FLUID-APPLIED MEMBRANE APPLICATION

A. Base Coat: Apply base coat to field of membrane in accordance with manufacturer's written instructions.

1. Apply base coat on prepared and primed surfaces and spread coating evenly.

2. Back roll to achieve minimum coating thickness indicated on Part 2 product listing unless greater thickness is recommended by manufacturer; verify thickness of base coat as work progresses.

3. Reinforcing Fabric: Embed fabric reinforcement into wet base coat. Lap adjacent flashing pieces of fabric minimum 3 inches (75 mm) along edges and 6 inches (150 mm) at end laps.

a. Roll surface of fabric reinforcing to completely embed and saturate fabric. Leave finished base coat with fabric free of pin holes, voids, or openings.

4. Roll surface of fabric reinforcing to completely embed and saturate fabric. Leave finished base coat with fabric free of pin holes, voids, or openings.

5. Allow base coat to cure prior to application of top coat.

B. Top Coat: Apply top coat to field of membrane and flashings uniformly in a complete, continuous installation.

1. Prime base coat prior to application of top coat if top coat is not applied within 72 hours of the base coat application, using manufacturer's recommended primer.

2. Apply top coat extending coating up vertical surfaces and out onto horizontal surfaces. Install top coat over field base coat and spread coating evenly.

3. Back roll to achieve minimum coating thickness indicated on Part 2 product listing unless greater thickness is recommended by manufacturer; verify thickness of base coat as work progresses.

4. Avoid foot traffic on new fluid-applied membrane for a minimum of 24 hours.

3.9 WALKWAY INSTALLATION

A. Walkways, General: Install walkways according to roofing manufacturer's written instructions.

1. Install walkways at following locations:

a. Where indicated on Drawings.

B. Slip-Resistant Walkway Topcoat: Apply walkway second topcoat following application and curing of top coat. Locate as indicated on Drawings.

1. Mask walkway location with tape.

2. Prime first top coat prior to application of walkway top coat if walkway top coat is not applied within 72 hours of the first top coat application, using manufacturer's recommended primer.

3. Apply walkway topcoat and back roll to achieve minimum coating thickness indicated on Part 2 product listing unless greater thickness is recommended by manufacturer; verify thickness of base coat as work progresses.

4. Broadcast Slip-Resistant Top Coat Aggregate in wet top coat at rate indicated in Part 2 product listing or as otherwise recommended by coating manufacturer.

a. Back roll aggregate and top coat creating even dispersal of aggregate.

5. Remove masking immediately.

3.10 FIELD QUALITY CONTROL

A. Roof Inspection: Contractor shall engage roofing system manufacturer's technical personnel to inspect roofing installation and submit report to the Architect. Notify Architect 24 hours in advance of dates and times of inspections. Inspect work as follows:

1. Upon completion of preparation of first component of work, prior to application of re-coating materials.

2. Following application of re-coating to flashings and application of base coat to field of roof.

3. Upon completion of re-coating but prior to re-installation of other roofing components.

B. Repair fluid-applied membrane where test inspections indicate that they do not comply with specified requirements.

C. Arrange for additional inspections, at Contractor's expense, to verify compliance of replaced or additional work with specified requirements.

3.11 PROTECTING AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period.

B. Correct deficiencies in or remove coating that does not comply with requirements, repair substrates, and reapply coating.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 075600.13

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Roof drainage sheet metal fabrications.

2. Low-slope roof sheet metal fabrications.

3. Miscellaneous sheet metal flashing and trim.

B. Related Requirements:

1. Division 07 Section "Fluid-Applied Membrane Roofing, Insulated" for installing sheet metal flashing and trim integral with roofing and for related warranty requirements.

2. Division 07 Section "Roof Specialties" for manufactured copings and roof edge flashings incorporated in roof system.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

B. Shop Drawings: For sheet metal flashing and trim.

1. Include plans, elevations, sections, and attachment details.

2. Include identification of material, thickness, weight, and finish for each item and location in Project.

C. Samples for Verification: For each type of exposed finish.

1.3 CLOSEOUT SUBMITTALS

A. Warranties: Manufacturer's executed warranty documents. Submit prior to acceptance of Work.

1.4 QUALITY ASSURANCE

A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

1.6 WARRANTY

A. Refer to warranty requirements of Division 07 Section "Fluid-Applied Membrane Roofing, Insulated" for terms and conditions of warranties covering work of this Section.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

C. Flashings and Fastening: Comply with requirements of Division 07 roofing sections. Provide base flashings, perimeter flashings, detail flashings and component materials and installation techniques that comply with requirements and recommendations of the following:

1. FM Global 1-49: "Property Loss Prevention Data Sheet for Perimeter Flashings."

2. NRCA: "The NRCA Roofing Manual" for construction details and recommendations.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects.

2.2 SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.

B. Aluminum Sheet: ASTM B209/B209M, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; with smooth, flat surface., alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; with

1. Basis of Design Product: Tremco, Inc., TremLock Sheet, or Architect-approved equal.

2. Exposed Coil-Coated Finish:

a. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

b. Color: As selected from manufacturer's full range.

3. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil (0.013 mm).

C. Stainless-Steel Sheet: ASTM A240/A240M or ASTM A666, Type 316, dead soft, fully annealed; with smooth, flat surface.

1. Finish: ASTM A480/A480M, No. 2B (bright, cold rolled).

D. Copper Sheet: ASTM B370, cold-rolled copper sheet, H00 or H01 temper.

1. Non-patinated, Exposed Finish: Mill.

E. Lead Sheet: ASTM B749 lead sheet.

F. Exterior mounted leaders and straps: .027 inch thick rectangular corrugated aluminum leaders factory finished with baked acrylic enamel. Fasten each leader with 1/16 inch thick by 1 inch wide straps spaced 7 feet on center.

G.

2.3 UNDERLAYMENT MATERIALS

A. Self-Adhering, High-Temperature Sheet: Minimum 30 mils (0.76 mm) thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer according to written recommendations of underlayment manufacturer.

1. Low-Temperature Flexibility: ASTM D1970; passes after testing at minus 20 deg F (29 deg C) or lower.

2.4 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.

1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.

    a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.

    b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.

2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.

3. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.

4. Fasteners for Copper Sheet: Copper, hardware bronze or passivated Series 300 stainless steel.

C. Solder:

1. For Stainless Steel: ASTM B32, Grade Sn60 or Grade Sn96, with acid flux of type recommended by stainless steel sheet manufacturer.

2. For Copper: ASTM B32, Grade Sn50, 50 percent tin and 50 percent lead.

D. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.

E. Elastomeric Sealant: ASTM C920, elastomeric polyurethane at concealed joints and silicone at exposed joints; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

F. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

2.5 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.

1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.

2. Obtain field measurements for accurate fit before shop fabrication.

3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.

4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines indicated on Drawings and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.

2. Use lapped expansion joints only where indicated on Drawings.

D. Sealant Joints: Where movable, non-expansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.

E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

F. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.

G. Seams, Soldered: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.

H. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.

I. Seams for Uncoated Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints where necessary for strength.

J. Do not use graphite pencils to mark metal surfaces.

2.6 ROOF-DRAINAGE SHEET METAL FABRICATIONS

A. Fabricate to cross section required, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 96-inch- (2.4-m-) long sections. Furnish flat-stock gutter brackets and gutter spacers and straps fabricated from same metal as gutters, of size recommended by cited sheet metal standard, but with thickness not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, and gutter accessories from same metal as gutters. Shop fabricate interior and exterior corners.

1. Gutter Profile: As indicated on Drawings, or if not indicated, as selected from SMACNA Manual profiles.

2. Expansion Joints: Butt type with concealed splice plate.

3. Accessories: Wire-ball downspout strainer.

4. Gutters with Girth 21 to 25 Inches (530 to 640 mm): Fabricate from the following materials:

   a. Aluminum: 0.050 inch (1.27 mm) thick.

5. Gutters with Girth 26 to 30 Inches (660 to 760 mm): Fabricate from the following materials:

   a. Aluminum: 0.063 inch (1.60 mm) thick.

B. Downspouts: Fabricate rectangular downspouts to dimensions indicated, complete with mitered elbows. Furnish with metal hangers from same material as downspouts and anchors. Shop fabricate elbows.

1. Fabricated Hanger Style: As selected from SMACNA Manual styles.

2. Fabricate from the following materials: Matching downspout.

C. Parapet Scuppers: Fabricate scuppers to dimensions required, with closure flange trim to exterior, 4-inch- (100-mm-) wide wall flanges to interior, and base extending 4 inches (100 mm) beyond cant or tapered strip into field of roof. Fasten gravel guard angles, if applicable, to base of scupper. Fabricate from the following materials:

1. Aluminum: 0.032 inch (0.81 mm) thick.

2. Stainless Steel: 0.019 inch/26 ga. (0.48 mm) thick.

D. Conductor Heads: Fabricate conductor heads with flanged back and stiffened top edge and of dimensions and shape required, complete with outlet tubes, exterior flange trim, and built-in overflows. Fabricate from the following materials:

1. Aluminum: 0.032 inch (0.81 mm) thick.

2. Stainless Steel: 0.019 inch/26 ga. (0.48 mm) thick.

2.7 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

A. Expansion Joint Cover: Fabricate from the following materials:

1. Aluminum: 0.050 inch (1.27 mm) thick.

B. Counterflashing: Shop fabricate interior and exterior corners. Fabricate from the following materials:

1. Aluminum: 0.032 inch (0.81 mm) thick.

C. Flashing Receivers: Fabricate from the following materials:

1. Aluminum: 0.032 inch (0.81 mm) thick.

D. Roof-Penetration Flashing: Fabricate from the following materials:

1. Stainless Steel: 0.019 inch/26 ga. (0.48 mm) thick.

2. Copper: 16 oz./sq. ft. (4.8 kg/m2); 0.22 inch/24 ga. (0.55 mm) thick.

3. Lead: (19.53 kg/m2) 4 lb./sq. ft.; (1.6 mm) 0.0625 inch thick.

E. Roof-Drain Flashing: Fabricate from the following materials:

1. Lead: (19.53 kg/m2) 4 lb./sq. ft.; (1.6 mm) 0.0625 inch thick.

PART 3 - EXECUTION

3.1 UNDERLAYMENT INSTALLATION

A. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Prime substrate if recommended by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps and edges with roller. Cover underlayment within 14 days.

3.2 INSTALLATION, GENERAL

A. Install sheet metal flashing and trim to comply with details indicated and recommendations of cited sheet metal standard that apply to installation characteristics required unless otherwise indicated on Drawings.

1. Space cleats not more than 12 inches (300 mm) apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.

2. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.

1. Coat concealed side of uncoated-aluminum and stainless steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.

2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet (3 m) with no joints within 24 inches (600 mm) of corner or intersection.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with sealant concealed within joints.

2. Use lapped expansion joints only where indicated on Drawings.

D. Fasteners: Use fastener sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws.

E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

F. Seal joints as required for watertight construction.

1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch (25 mm) into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F (4 deg C).

2. Prepare joints and apply sealants to comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions

G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets with solder to width of 1-1/2 inches (38 mm); however, reduce pre-tinning where pre-tinned surface would show in completed Work.

1. Do not solder metallic-coated steel and aluminum sheet.

2. Do not use torches for soldering.

3.3 ROOF-DRAINAGE SYSTEM INSTALLATION

A. General: Install sheet metal roof-drainage items to produce complete roof-drainage system according to cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.

B. Flanged Gutters: Join sections with joints sealed with sealant. Provide for thermal expansion. Attach gutters at flange into wood blocking to firmly anchor them in position. Provide end closures and seal watertight with sealant. Slope to downspouts.

C. Downspouts: Join sections with 1-1/2-inch (38-mm) telescoping joints.

1. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately 60 inches (1500 mm) o.c.

2. Provide elbows at base of downspout to direct water away from building.

3. Connect downspouts to underground drainage system.

D. Parapet Scuppers: Continuously support scupper, set to correct elevation, and seal flanges to interior wall face, over cants or tapered edge strips, and under roofing membrane.

1. Anchor scupper closure trim flange to exterior wall and solder or seal with elastomeric sealant to scupper.

2. Loosely lock front edge of scupper with conductor head.

3. Solder or seal with elastomeric sealant exterior wall scupper flanges into back of conductor head.

E. Conductor Heads: Anchor securely to wall, with elevation of conductor head rim at minimum of 1 inch (25 mm) below scupper or gutter discharge.

F. Expansion-Joint Covers: Install expansion-joint covers at locations and of configuration indicated. Lap joints minimum of 4 inches (100 mm) in direction of water flow.

3.4 ROOF FLASHING INSTALLATION

A. Install sheet metal flashing and trim to comply with performance requirements and cited sheet metal standard.

1. Provide concealed fasteners where possible, and set units true to line, levels, and slopes.

2. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

B. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches (100 mm) over base flashing. Install stainless-steel draw band and tighten.

C. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing.

1. Insert counterflashing in reglets or receivers and fit tightly to base flashing.

2. Extend counterflashing 4 inches (100 mm) over base flashing.

3. Lap counterflashing joints minimum of 4 inches (100 mm).

D. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with sealant and clamp flashing to pipes that penetrate roof.

3.5 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines indicated on Drawings and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

3.6 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder.

C. Clean off excess sealants.

D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.

E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 076200

SECTION 077100 - ROOF SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Manufactured copings.

2. Manufactured roof-edge specialties (fasciae, drip edges and gravel stops).

B. Related Information:

1. Division 06 Section "Miscellaneous Rough Carpentry" for wood nailers, curbs, and blocking.

2. Division 07 Section "Sheet Metal Flashing and Trim" for custom- and site-fabricated sheet metal flashing and trim.

3. Division 07 Section "Joint Sealants" for field-applied sealants between roof specialties and adjacent materials.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site, in conjunction with roofing preinstallation conference specified in Division 07 roofing section.

1. Meet with Owner, Architect, Owner's insurer if applicable, Installer, and installers whose work interfaces with or affects roof specialties including installers of roofing materials and accessories.

2. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.

3. Review special roof details, roof drainage, and condition of other construction that will affect roof specialties.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: For roof specialties.

1. Include plans, elevations, expansion-joint locations, keyed details, and attachments to other work. Distinguish between plant- and field-assembled work.

2. Include details for expansion and contraction; locations of expansion joints, including direction of expansion and contraction.

3. Indicate profile and pattern of seams and layout of fasteners, cleats, clips, and other attachments.

4. Detail termination points and assemblies, including fixed points.

5. Include details of special conditions.

C. Samples for Initial Selection: Color charts from manufacturer showing available color finishes.

D. Samples for Verification: Color chips from manufacturer for final selection.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for copings and roof-edge flashings.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer.

B. Product Certificates: Provide manufacturer’s certificates for copings and roof-edge specialties indicating compliance with performance requirements including the following:

1. ANSI/SPRI/FM 4435/ES-1 compliance.

C. Sample Warranty: For manufacturer's special warranty.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer offering products meeting requirements that are ANSI/SPRI ES-1 tested to specified design pressure.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not store roof specialties in contact with other materials that might cause staining, denting, or other surface damage. Store roof specialties away from uncured concrete and masonry.

B. Protect strippable protective covering on roof specialties from exposure to sunlight and high humidity, except to extent necessary for the period of roof specialties installation.

1.7 PROJECT / FIELD CONDITIONS

A. Field Measurements: Verify profiles and tolerances of roof-specialty substrates by field measurements before fabrication and indicate measurements on Shop Drawings.

B. Coordination: Coordinate roof specialties with flashing, trim, and construction of parapets, roof deck, roof and wall panels, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.8 WARRANTY

A. Roofing-System Warranty: Roof specialties are included in warranty provisions in Division 07 roofing Section "Fluid-Applied Membrane Roofing, Insulated".

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Roof specialties shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction

B. SPRI Wind Design Standard: Manufacture and install copings and roof-edge specialties tested according to ANSI/SPRI ES-1.

1. Design Pressure: As indicated on Drawings.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 MANUFACTURERS

A. Basis of Design: The roof system specified in this Section is based upon products of Tremco CPG Inc, Beachwood, OH, (800) 562-2728, www.tremcoroofing.com that are named in other Part 2 articles. Provide specified products or comparable products of one of the following.

1. Manufacturers of comparable products: Approved by Architect, prior to bid.

B. Source Limitations: Obtain roof specialties approved by manufacturer providing roofing-system warranty specified in Division 07 roofing Section.

2.3 EXPOSED METALS

A. Aluminum Sheet: ASTM B209/B209M, alloy as standard with manufacturer for finish required, with temper to suit forming operations and performance required.

1. Surface: Smooth, flat finish as indicated.

2.4 CONCEALED METALS

A. Aluminum Sheet: ASTM B209/B209M, alloy and temper recommended by manufacturer for type of use and structural performance indicated, mill finished.

B. Aluminum Extrusions: ASTM B221/B221M, alloy and temper recommended by manufacturer for type of use and structural performance indicated, mill finished.

C. Zinc-Coated (Galvanized) Steel Sheet: ASTM A653/A653M, G90 (Z275) coating designation.

2.5 UNDERLAYMENT MATERIALS

A. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils (0.76 to 1.0 mm) thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.

1. Thermal Stability: ASTM D1970/D1970M; stable after testing at 240 deg F (116 deg C).

2. Low-Temperature Flexibility: ASTM D1970/D1970M; passes after testing at minus 20 deg F (29 deg C).

2.6 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.

B. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to meet performance requirements. Furnish the following unless otherwise indicated:

1. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.

2. Fasteners for Aluminum: Aluminum or Series 300 stainless steel.

3. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip zinc-coated steel according to ASTM A153/A153M or ASTM F2329.

C. Elastomeric Sealant: ASTM C920, elastomeric silicone polymer sealant of type, grade, class, and use classifications required by roofing-specialty manufacturer for each application.

2.7 MANUFACTURED COPINGS

A. Copings: Manufactured coping system consisting of formed-metal coping cap in section lengths not exceeding 12 feet (3.6 m), concealed anchorage; corner units, end cap units, and concealed splice plates with same finish as coping caps.

1. Coping Profile: As indicated on Drawings.

a. Unit Face Height: Accommodate existing height plus additional insulation and blocking indicated.

2. Basis-of-Design Product: Subject to compliance with requirements, provide Tremco, TremLock Infinity Coping.

3. Coping-Cap Material: Formed aluminum sheet, nominal 0.050-inch (1.27-mm) thick.

a. Finish: High-performance organic (PVDF) coating.

b. Color: As selected by Architect from manufacturer's full range.

4. Corners: Factory mitered and continuously welded.

5. Coping-Cap Attachment Method: Snap-on, fabricated from coping-cap material.

6. Snap-on-Coping Anchor Plates: Concealed, galvanized-steel sheet, 12 inches (300 mm) wide, with integral cleats.

2.8 MANUFACTURED ROOF-EDGE SPECIALTIES

A. Roof-Edge Fascia: Snap-on type fascia with vertical profile.

1. Description: Manufactured two-piece roof-edge fasciae systems consisting of formed-metal fascia covers in section lengths not exceeding 12 feet (3.6 m), with an extruded anchor bar to engage and secure fascia cover, and concealed splice plates. Provide matching prefabricated continuously welded corner units.

a. Roof-Edge Fasciae Profile: As indicated on Drawings.

1) Unit Face Height: Accommodate existing height plus additional insulation and blocking indicated.

b. Splice Plates: Of same material and finish as roof edge flashing units, 8 inches (203 mm) long with factory-installed dual non-curling butyl sealant strips.

2. Basis-of-Design Product: Tremco, TremLock 215 HD Fascia.

3. Fascia Cover Securement: Snap-on, over continuous extruded aluminum anchor bar.

4. Roofing System: Built-up.

5. Fascia Cover Material: Formed aluminum sheet, nominal 0.050-inch (1.27-mm) thick.

a. Finish: High-performance organic (PVDF) coating.

b. Color: As selected by Architect from manufacturer's full range.

B. Fascia Accessories: Provide accessories fabricated from the same materials and for compatibility with roof edge system; provide the following accessories:

1. Fascia extenders.

2. Wall cap.

3. Overflow scuppers.

4. Spill-out scuppers.

5. Downspout scuppers with integral conductor head and downspout adapters.

2.9 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. High-Performance Organic (PVDF) Coating: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with ASTM A755/A755M and coating and resin manufacturers' written instructions.

1. Aluminum Coil Coating Finishes: Two-Coat Fluoropolymer: AAMA 2605 and as additionally required to meet specified finish performance and warranty requirements. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

E. Concealed Surface Finish: Apply pretreatment and manufacturer's standard acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.

B. Examine walls, roof edges, and parapets for suitable conditions for roof specialties.

C. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF UNDERLAYMENT

A. Self-Adhering Sheet Underlayment: Install wrinkle free to cover wood blocking. Apply primer if required by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply in shingle fashion to shed water. Overlap edges not less than 3-1/2 inches (90 mm). Roll laps with roller. Cover underlayment within 14 days.

3.3 INSTALLATION, GENERAL

A. General: Install roof specialties according to manufacturer's written instructions. Anchor roof specialties securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete roof-specialty systems.

1. Install roof specialties level, plumb, true to line and elevation; with limited oil-canning and without warping, jogs in alignment, buckling, or tool marks.

2. Provide uniform, neat seams with minimum exposure of solder and sealant.

3. Install roof specialties to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.

4. Torch cutting of roof specialties is not permitted.

5. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.

1. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of self-adhering, high-temperature sheet underlayment.

C. Expansion Provisions: Allow for thermal expansion of exposed roof specialties.

1. Space movement joints at a maximum of 12 feet (3.6 m) with no joints within 18 inches (450 mm) of corners or intersections unless otherwise shown on Drawings.

2. When ambient temperature at time of installation is between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures.

D. Fastener Sizes:

1. Wood Blocking or Sheathing: Use fasteners of sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws.

2. Other Substrates: Use fasteners of sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

E. Seal joints with elastomeric sealant as required by roofing-specialty manufacturer.

F. Seal joints as required for watertight construction. Place sealant to be completely concealed in joint. Do not install sealants at temperatures below 40 deg F (4 deg C).

3.4 INSTALLATION OF COPINGS

A. Install clips, cleats, anchor plates, and other anchoring and attachment accessories and devices with concealed fasteners.

B. Anchor copings with manufacturer's required devices, fasteners, and fastener spacing to meet performance requirements.

1. Interlock face and back leg drip edges of snap-on coping cap into cleated anchor plates anchored to substrate at manufacturer's required spacing that meets performance requirements.

3.5 INSTALLATION OF ROOF-EDGE SPECIALTIES

A. Install clips, cleats, cants, and other anchoring and attachment accessories and devices with concealed fasteners.

B. Anchor roof edgings with manufacturer's required devices, fasteners, and fastener spacing to meet performance requirements.

3.6 CLEANING AND PROTECTION

A. Clean exposed metal surfaces.

B. Clean off excess sealants.

C. Remove temporary protective coverings and strippable films as roof specialties are installed. On completion of installation, clean finished surfaces including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain roof specialties in a clean condition during construction.

D. Replace roof specialties that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 077100

SECTION 07 84 13 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This section includes the performance criteria, materials, production, and erection of penetration firestopping for the project. The work performed under this Section consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all penetration firestopping as required by the this section, schedules.

1. Penetrations in fire-resistance-rated walls.
2. Penetrations in horizontal assemblies.
3. Penetrations in smoke barriers.

1.3 ACTION SUBMITTALS

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

B. Product Schedule: For each penetration firestopping system. Include location and design designation of qualified testing and inspecting agency.

1. Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping condition, submit illustration, with modifications marked, approved by penetration firestopping manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Installer Certificates: From Installer indicating penetration firestopping has been installed in compliance with requirements and manufacturer's written recommendations.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for penetration firestopping.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements."

B. Installer Qualifications: A firm experienced in installing penetration firestopping similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its penetration firestopping products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.

C. Fire-Test-Response Characteristics: Penetration firestopping shall comply with the following requirements:

1. Penetration firestopping tests are performed by a qualified testing agency acceptable to authorities having jurisdiction.
2. Penetration firestopping is identical to those tested per testing standard referenced in "Penetration Firestopping" Article. Provide rated systems complying with the following requirements:

    a. Penetration firestopping products bear classification marking of qualified testing and inspecting agency.
    b. Classification markings on penetration firestopping correspond to designations listed by the following:

        1) UL in its "Fire Resistance Directory."

D. Preinstallation Conference: Conduct conference at Project site.

1.6 REFERENCED STANDARDS

A. American Society for Testing and Materials (ASTM).

1. E 814 – Standard Method of fire Tests of Through Penetration Fire Stops.
2. E 119 – Methods of Fire Tests of Building Construction and Materials.
3. E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
4. E 136 – Test Method for Behavior of Materials in a Vertical Tube Furnace at 750F.
5. E 1399 – Cyclic Movement and Measuring Minimum and Maximum Joint Widths.
6. E 1966 – Test method for Resistance of Building Joint.
7. E 2174 – Standard practice for On-Site Inspection of Installed Firestops.
8. E 05.11.14 – Standard Test method for Determining the fire endurance of Perimeter Fire Barrier Systems Using the Intermediate-Scale, Multi Story Test Apparatus (ISMA): ASTM number pending draft approval.

B. Underwriters Laboratories, Inc. (UL).

1. UL 1479 – Fire Tests of Through Penetration fire Stops.
2. UL 263 – Fire Test of Building Construction and Materials.
3. UL 723 – Surface Burning Characteristics of Building Materials.
4. UL 2079 – Tests for Fire Resistance of Building Joint Systems.

5. UL “Fire Resistance Directory”, current year, including but not limited to the following:

   a. For penetrations by uninsulated, non-combustible items including steel pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT):
      1) UL System: CAJ-1235, CAJ-1404, WL-1152.
   b. For penetrations by insulated, non-combustible items including steel pipe, cooper pipe, rigid steel conduit and electrical metallic tubing (EMT):
      1) UL Systems: CAJ-5222, CAJ-5250, CAJ-5251, WL-5171.
   c. For penetrations of PVC jacketed, flexible cable or cable bundles and plastic pipe (closed piping systems):
      1) UL Systems: CAJ-2401, CAJ-3185, CAJ-3199, CAJ-3234, WL-3118, WL-3179, WL-3199.
   d. For penetrations of combustible plastic pipe (open piping system):
      1) UL Systems: CAJ-2174, CAJ-2330, CAJ-2351, CAJ-2432, WL-2168, WL-2170, WL-2185, WL-2259.
   e. For penetrations by multiple combustible and/or non-combustible items:
      1) UL Systems: CAJ-8101, CAJ-8133, WL-8007.
   f. For large size / complex penetrations made to accommodate cable trays, multiple steel and cooper pipes, electrical busways in raceways:
      1) UL Systems: CAJ-1406, CAJ-1502, CAJ-4053, CAJ-6027, WJ6004, WL-1207, WL-2343, WL-4030, WL-6018.
   g. For penetrations by steel ducts:
      1) UL Systems: CAJ-7075, CAJ-7082, WJ-7045, WJ-7046, WL-7006, WL-7046, WL-7081, WL-7082.
   h. For fire-rated construction joints and other gaps:
      1) UL Systems: CEJ-296P, CEJ-302P.
   i. For openings between structurally separate sections of wall and floors:
      1) At the top of walls: UL systems: HWD-0107, HWD-0110, HWD-0257, HWD-0267, HWD-0299, HWD-0327, HWD-0266, HWD-0333, HWD-0334.

C. Factory Mutual (FM) Approval guide, current year.

D. National Fire Protection Association.

E. FICA “Manual of Practice”.

F. International Firestop Council (IFC).

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not install penetration firestopping when ambient or substrate temperatures are outside limits permitted by penetration firestopping manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.

B. Install and cure penetration firestopping per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.8 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping is installed according to specified requirements.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping.

C. Notify Owner's testing agency at least seven days in advance of penetration firestopping installations; confirm dates and times on day preceding each series of installations.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or approved equal:

1. Grace Construction Products.
2. Hilti, Inc.
3. Johns Manville.
4. NUCO Inc.
5. Passive Fire Protection Partners.
6. Specified Technologies Inc.
7. 3M Fire Protection Products.
8. Tremco, Inc.; Tremco Fire Protection Systems Group.
9. USG Corporation.

2.2 PENETRATION FIRESTOPPING

A. Provide penetration firestopping that is produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.

B. Penetrations in Fire-Resistance-Rated Walls: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).

1. Fire-resistance-rated walls include fire walls, fire-barrier walls, smoke-barrier walls and fire partitions.
2. F-Rating: Not less than the fire-resistance rating of constructions penetrated.

C. Penetrations in Horizontal Assemblies: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).

1. Horizontal assemblies include floors, floor/ceiling assemblies and ceiling membranes of roof/ceiling assemblies.
2. F-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated.
3. T-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.

D. Penetrations in Smoke Barriers: Provide penetration firestopping with ratings determined per UL 1479.

1. L-Rating: Not exceeding 5.0 cfm/sq. ft. (0.025 cu. m/s per sq. m) of penetration opening at 0.30-inch wg (74.7 Pa) at both ambient and elevated temperatures.

E. W-Rating: Provide penetration firestopping showing no evidence of water leakage when tested according to UL 1479.

F. Exposed Penetration Firestopping: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

G. VOC Content: Penetration firestopping sealants and sealant primers shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Sealants: 250 g/L.
2. Sealant Primers for Nonporous Substrates: 250 g/L.
3. Sealant Primers for Porous Substrates: 775 g/L.

H. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping manufacturer and approved by qualified testing and inspecting agency for firestopping indicated.

1. Permanent forming/damming/backing materials, including the following:

a. Slag-wool-fiber or rock-wool-fiber insulation.
b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
c. Fire-rated form board.
d. Fillers for sealants.

2. Temporary forming materials.
3. Substrate primers.
4. Collars.
5. Steel sleeves.

2.3 FILL MATERIALS

A. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.

B. Flexible Firestop Sealant (For use where roof joists penetrate fire-rated walls): Acrylic based firestop sealant that provides movement capability in fire rated joint applications. Basis of Design: Hilti CP 606.

C. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.

D. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

E. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized-steel sheet.

F. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.

G. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.

H. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.

I. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.

J. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

K. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:

1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and nonsag formulation for openings in vertical and sloped surfaces, unless indicated firestopping limits use of nonsag grade for both opening conditions.

2.4 MIXING

A. For those products requiring mixing before application, comply with penetration firestopping manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning: Clean out openings immediately before installing penetration firestopping to comply with manufacturer's written instructions and with the following requirements:

1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping.
2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping. Remove loose particles remaining from cleaning operation.
3. Remove laitance and form-release agents from concrete.

B. Priming: Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

C. Masking Tape: Use masking tape to prevent penetration firestopping from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing firestopping's seal with substrates.

3.3 INSTALLATION

A. General: Install penetration firestopping to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.

B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestopping.

C. Install fill materials for firestopping by proven techniques to produce the following results:

1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.

3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

A. Identify penetration firestopping with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of firestopping edge so labels will be visible to anyone seeking to remove penetrating items or firestopping. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:

1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Designation of applicable testing and inspecting agency.
4. Date of installation.
5. Manufacturer's name.
6. Installer's name.

3.5 FIELD QUALITY CONTROL

A. Owner will engage a qualified testing agency to perform tests and inspections.

B. Where deficiencies are found or penetration firestopping is damaged or removed because of testing, repair or replace penetration firestopping to comply with requirements.

C. Proceed with enclosing penetration firestopping with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping manufacturers and that do not damage materials in which openings occur.

B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping is without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping and install new materials to produce systems complying with specified requirements.

3.7 PENETRATION FIRESTOPPING SCHEDULE

A. The following schedules shall be completed by the Contractor and reviewed prior to submission to the Architect. The Table included shall be completed with each of the following categories of penetrating items:

1. Single uninsulated metallic piping and conduit.

2. Multiple uninsulated metallic piping and conduit.
3. Uninsulatted plastic piping and conduit.
4. Insulated metallic piping.
5. Insulated high temperature flues and exhaust pipes (boiler flues, generator exhausts insulated with calcium silicate or on the non-combustible insulation, etc.)
6. Cable tray.
7. Electric / telephone cable.
8. Bus duct.
9. Miscellaneous penetrations.

B. Complete the additional Tables for the following, using the format provided.

1. Blanks, voids, holes (including edge of slab).
2. Engineering judgments.
3. Ductwork engineering judgments.

3.3 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 07 84 13

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SECTION 07 92 00 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. The Work of this Section consists of the provision of all plant, labor, materials, equipment, testing and services necessary to complete the work for joint sealants as shown on the schedules, keynotes, drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:

1. Architectural Sealants.
2. Sealant Primers for Nonporous Substrates.
3. Sealant Primers for Porous Substrates.

B. Related Sections:

1. Division 04 "Unit Masonry" for masonry control and expansion joint fillers and gaskets.
2. Division 07 "Expansion Control" for building expansion joints, "Fire-Resistive Joint Systems" for sealing joints in fire-resistance-rated construction.
3. Division 08 "Glazing" for glazing sealants.
4. Division 09 "Gypsum Board" for sealing perimeter joints, "Tiling" for sealing tile joints,
5. "Acoustical Tile Ceilings**"** for sealing edge moldings at perimeters with acoustical sealant.

1.3 PRECONSTRUCTION TESTING

A. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.

1. Use ASTM C 1087 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
2. Submit not fewer than eight pieces of each kind of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.
3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
4. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures including use of specially formulated primers.
5. Testing will not be required if joint-sealant manufacturers submit joint preparation data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.

B. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:

1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.
2. Conduct field tests for each application indicated below:

    a. Each kind of sealant and joint substrate indicated.

3. Notify Architect seven days in advance of dates and times when test joints will be erected.
4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.

    a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

        1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

5. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.4 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

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

C. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- (13-mm-) wide joints formed between two 6-inch- (150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

D. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer and testing agency.

B. Product Certificates: For each kind of joint sealant and accessory, from manufacturer.

C. Sealant, Waterproofing, and Restoration Institute (SWRI) Validation Certificate: For each sealant specified to be validated by SWRI's Sealant Validation Program.

D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.

E. Preconstruction Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

F. Preconstruction Field-Adhesion Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.

G. Field-Adhesion Test Reports: For each sealant application tested.

H. Warranties: Sample of special warranties.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.

C. Product Testing: Test joint sealants using a qualified testing agency.

1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.
2. Test according to SWRI's Sealant Validation Program for compliance with requirements specified by reference to ASTM C 920 for adhesion and cohesion under cyclic movement, adhesion-in-peel, and indentation hardness.

D. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

E. Preinstallation Conference: Conduct conference at Project site.

1.7 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F (5 deg C).
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.8 WARRANTY

A. Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:

1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
2. Disintegration of joint substrates from natural causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. VOC Content of Interior Sealants: Sealants and sealant primers used inside the weatherproofing system shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Architectural Sealants: 250 g/L.
2. Sealant Primers for Nonporous Substrates: 250 g/L.
3. Sealant Primers for Porous Substrates: 775 g/L.

C. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

1. Suitability for Immersion in Liquids. Where sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247. Liquid used for testing sealants is deionized water, unless otherwise indicated.

D. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

E. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.

F. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

G. Suitability for Contact with Food: Comply with 21 CFR 177.2600, where applicable.

2.2 SILICONE JOINT SEALANTS

A. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Dow Corning Corporation; 790
b. GE Advanced Materials - Silicones; SilPruf LM SCS2700.
c. May National Associates, Inc.; [Bondaflex Sil 290] [Bondaflex Sil 728 NS].
d. Pecora Corporation; [301 NS] [311 NS] [890] [890FTS].
e. Sika Corporation, Construction Products Division; SikaSil-C990.
f. Tremco Incorporated; [Spectrem 1] [Spectrem 800].

B. Single-Component, Nonsag, Urethane Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Sika Corporation, Construction Products Division; Sikaflex - 15LM.
b. Tremco Incorporated; [Vulkem 921] [Dymonic FC].

2.3 ACOUSTICAL JOINT SEALANTS

A. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

1. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:

    a. Pecora Corporation; [AC-20 FTR] [AIS-919].
    b. USG Corporation; SHEETROCK Acoustical Sealant.

2.4 JOINT SEALANT BACKING

A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), Type O (open-cell material), Type B (bicellular material with a surface skin), or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.5 MISCELLANEOUS MATERIALS

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

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

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.

B. Examine joints for suitable conditions.

C. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

    a. Concrete.
    b. Masonry.
    c. Unglazed surfaces of ceramic tile.

3. Remove laitance and form-release agents from concrete.
4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

    a. Metal.
    b. Glass.
    c. Porcelain enamel.
    d. Glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
4. Provide flush joint profile where indicated per Figure 8B in ASTM C 1193.
5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 8C in ASTM C 1193.

    a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

G. Installation of Preformed Silicone-Sealant System: Comply with the following requirements:

1. Apply masking tape to each side of joint, outside of area to be covered by sealant system.
2. Apply silicone sealant to each side of joint to produce a bead of size complying with preformed silicone-sealant system manufacturer's written instructions and covering a bonding area of not less than 3/8 inch (10 mm). Hold edge of sealant bead 1/4 inch inside masking tape.
3. Within 10 minutes of sealant application, press silicone extrusion into sealant to wet extrusion and substrate. Use a roller to apply consistent pressure and ensure uniform contact between sealant and both extrusion and substrate.
4. Complete installation of sealant system in horizontal joints before installing in vertical joints. Lap vertical joints over horizontal joints. At ends of joints, cut silicone extrusion with a razor knife.

H. Acoustical Sealant Installation: At sound-rated assemblies and elsewhere as indicated, seal construction at perimeters, behind control joints, and at openings and penetrations with a

continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations.

3.4 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed and cured sealant joints as follows:

   a. Perform 10 tests for the first 1000 feet (300 m) of joint length for each kind of sealant and joint substrate.
   b. Perform 1 test for each 1000 feet (300 m) of joint length thereafter or 1 test per each floor per elevation.

2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

   a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

3. Inspect tested joints and report on the following:

   a. Whether sealants filled joint cavities and are free of voids.
   b. Whether sealant dimensions and configurations comply with specified requirements.
   c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.

4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

B. Evaluation of Field-Adhesion Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

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

3.6 PROTECTION

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

3.7 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:

    a. Construction joints in cast-in-place concrete.
    b. Joints between plant-precast architectural concrete units.
    c. Control and expansion joints in unit masonry.
    d. Joints in dimension cast stone cladding.
    e. Joints in glass unit masonry assemblies.
    f. Joints between metal panels.
    g. Joints between different materials listed above.
    h. Perimeter joints between materials listed above and frames of doors, windows and louvers.
    i. Control and expansion joints in ceilings and other overhead surfaces.

2. Silicone Joint Sealant: Single component, nonsag, neutral curing, Class 100/50.
3. Urethane Joint Sealant: Single component, nonsag, Class 100/50.
4. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

B. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:

    a. Control and expansion joints on exposed interior surfaces of exterior walls.
    b. Perimeter joints of exterior openings where indicated.
    c. Tile control and expansion joints.
    d. Vertical joints on exposed surfaces of interior unit masonry, concrete walls and] partitions.
    e. Joints on underside of plant-precast structural concrete planks.
    f. Perimeter joints between interior wall surfaces and frames of interior doors, windows and elevator entrances.
    g. Other joints as indicated.
2. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

C. Joint-Sealant Application: Interior acoustical joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Location:

a. Acoustical joints where indicated.
b. Other joints as indicated.

2. Joint Sealant: Acoustical.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

3.8 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other scrap for recycling.

END OF SECTION 07 92 00

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SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. The work performed under this Section includes the performance criteria, materials, production, and erection of hollow-metal work for the project and consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all hollow-metal work as required by schedules, keynotes and drawings, as specified herein, and as may be required by conditions and authorities.

B. Related Requirements:

1. Division 08 **"**Door Hardware" for door hardware for hollow-metal doors.

1.3 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.4 COORDINATION

A. Coordinate anchorage installation for hollow-metal frames with wall types in which they are installed. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

B. Coordinate installation of hollow-metal doors with existing hollow-metal door frames or existing wood frames. Contractor to verify existing frames are UL approved for fire-rated openings. Provide survey of existing hollow-metal frame showing existing conditions including squareness and plumbness. All fire-rated doors to fit with maximum of 1/8” gap. Fabricate doors to fit existing opening. Door openings not meeting these requirements may require and engineering judgement for each varying condition. Furnish setting drawings, templates, and directions for installing hinges, locksets, panic hardware, closers, etc. Deliver such items to Project site in time for installation.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

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

B. Shop Drawings: Include the following:

1. Elevations of each door type.
2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of anchorages, joints, field splices, and connections.
7. Details of accessories.
8. Details of moldings, removable stops, and glazing.
9. Details of conduit and preparations for power, signal, and control systems.

C. Samples for Initial Selection: For units with factory-applied color finishes.

D. Samples for Verification:

1. For each type of exposed finish required, prepared on Samples of not less than 3 by 5 inches (75 by 127 mm).
2. For "Doors" and "Frames" subparagraphs below, prepare Samples approximately 8 by 10 inches (203 by 254 mm) to demonstrate compliance with requirements for quality of materials and construction:

a. Doors: Show vertical-edge, top, and bottom construction; core construction; and hinge and other applied hardware reinforcement. Include separate section showing glazing if applicable.
b. Frames: Show profile, corner joint, floor and wall anchors, and silencers. Include separate section showing fixed hollow-metal panels and glazing if applicable.

E. Schedule: Provide a schedule of hollow-metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final Door Hardware Schedule.

1.7 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each type of hollow-metal door and frame assembly, for tests performed by a qualified testing agency.

B. Oversize Construction Certification: For assemblies required to be fire rated and exceeding limitations of labeled assemblies.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

1. Provide additional protection to prevent damage to factory-finished units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow-metal work vertically under cover at Project site with head up. Place on minimum 4-inch- (102-mm-) high wood blocking. Provide minimum 1/4-inch (6-mm) space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Ceco Door Products; an Assa Abloy Group company.
2. Curries Company; an Assa Abloy Group company.
3. Custom Metal Products.
4. Hollow Metal Inc.
5. National Custom Hollow Metal.
6. North American Door Corp.
7. Pioneer Industries, Inc.
8. Republic Doors and Frames.
9. Steelcraft; an Ingersoll-Rand company.

B. Source Limitations: Obtain hollow-metal work from single source from single manufacturer.

2.2 REGULATORY REQUIREMENTS

A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings and temperature-rise limits indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

1. Smoke- and Draft-Control Assemblies: Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.

B. Fire-Rated, Borrowed-Light Assemblies: Complying with NFPA 80 and listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.

2.3 INTERIOR DOORS AND FRAMES

A. Construct interior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Commercial Doors and Frames: NAAMM-HMMA 861. Provide 18 gauge doors, 16 gauge frames at openings 4'-0" or less in width; 14 gauge frames at openings larger than 4'-0" in width; 14 gauge frames at openings larger than 4'-0" in width. **No knock-down type frames are allowed** except where explicitly indicated as acceptable.

1. Physical Performance: Level A according to SDI A250.4.
2. Doors:

    a. Type: As indicated in the Door and Frame Schedule.
    b. Thickness: 1-3/4 inches (44.5 mm.)
    c. Face: Uncoated, cold-rolled steel sheet, minimum thickness of 0.042 inch (1.0 mm).
    d. Edge Construction: Continuously welded with no visible seam.
    e. Core: Steel stiffened.

3. Frames:

    a. Materials: Uncoated steel sheet, minimum thickness of 0.053 inch (1.3 mm) for door openings 48 inches (1219 mm) or less, or window frames; minimum thickness of 0.067 inch (1.7 mm)for door openings greater than 48 inches (1219 mm).
    b. Construction: Full profile welded.
    c. KD frames are not acceptable.

4. Exposed Finish: Prime.

2.4 EXTERIOR HOLLOW-METAL DOORS AND FRAMES

A. Construct exterior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Commercial Doors and Frames: NAAMM-HMMA 861. Provide 16 gauge doors, 14 gauge frames. **No knock-down type frames are allowed** except where explicitly indicated as acceptable.

1. Physical Performance: Level A according to SDI A250.4.
2. Doors:

    a. Type: As indicated in the Door and Frame Schedule.
    b. Thickness: 1-3/4 inches (44.5 mm.)
    c. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch (1.30 mm), with minimum G60 (Z180 or)A60 (ZF180) coating.
    d. Edge Construction: Continuously welded with no visible seam.
    e. Core: Steel stiffened.

1) Thermal-Rated Doors: Provide doors fabricated with thermal-resistance value (R-value) of not less than 2.1 deg F x h x sq. ft./Btu (0.370 K x sq. m/W) when tested according to ASTM C 1363.

3. Frames:

a. Materials: Metallic-coated steel sheet, minimum thickness of 0.067 inch (1.7 mm), with minimum G60 (Z180 or)A60 (ZF180) coating.
b. Construction: Full profile welded.
c. KD frames are not acceptable.

4. Exposed Finish: Prime (Galvanized – zinc coating applied by hot dip process).

2.5 HOLLOW-METAL PANELS

A. Provide hollow-metal panels of same materials, construction, and finish as adjacent door assemblies.

2.6 FRAME ANCHORS

A. Jamb Anchors:

1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch (1.0 mm) thick, with corrugated or perforated straps not less than 2 inches (51 mm) wide by 10 inches (254 mm) long; or wire anchors not less than 0.177 inch (4.5 mm) thick.
2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch (1.0 mm) thick.
3. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch- (9.5-mm-) diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch (1.0 mm), and as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch (51-mm) height adjustment. Terminate bottom of frames at finish floor surface.

2.7 MATERIALS

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

C. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

D. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.

E. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z (12G) coating designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.

F. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

G. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.

H. Grout: ASTM C 476, except with a maximum slump of 4 inches (102 mm), as measured according to ASTM C 143/C 143M.

I. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

J. Glazing: Comply with requirements in Section 088000 "Glazing."

K. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.8 FABRICATION

A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Hollow-Metal Doors:

1. Steel-Stiffened Door Cores: Provide minimum thickness 0.026 inch (0.66 mm), steel vertical stiffeners of same material as face sheets extending full-door height, with vertical webs spaced not more than 6 inches (152 mm) apart. Spot weld to face sheets no more than 5 inches (127 mm) o.c. Fill spaces between stiffeners with glass- or mineral-fiber insulation.
2. Fire Door Cores: As required to provide fire-protection and temperature-rise ratings indicated.
3. Vertical Edges for Single-Acting Doors: Bevel edges 1/8 inch in 2 inches (3.2 mm in 51 mm).

4. Top Edge Closures: Close top edges of doors with inverted closures, except provide flush closures at exterior doors of same material as face sheets.
5. Bottom Edge Closures: Close bottom edges of doors where required for attachment of weather stripping with end closures or channels of same material as face sheets.
6. Exterior Doors: Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
7. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch (19 mm) beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.

C. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

1. Sidelight Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
3. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
4. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.
5. Jamb Anchors: Provide number and spacing of anchors as follows:

    a. Masonry Type: Locate anchors not more than 16 inches (406 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c., to match coursing, and as follows:

        1) Two anchors per jamb up to 60 inches (1524 mm) high.
        2) Three anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
        3) Four anchors per jamb from 90 to 120 inches (2286 to 3048 mm) high.
        4) Four anchors per jamb plus one additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 120 inches (3048 mm) high.

    b. Stud-Wall Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:

        1) Three anchors per jamb up to 60 inches (1524 mm) high.
        2) Four anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
        3) Five anchors per jamb from 90 to 96 inches (2286 to 2438 mm) high.
        4) Five anchors per jamb plus one additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 96 inches (2438 mm) high.
6. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.

    a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
    b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

7. Terminated Stops: Terminate stops 6 inches (152 mm) above finish floor with a 45 degree angle cut, and close open end of stop with steel sheet closure. Cover opening in extension of frame with welded-steel filler plate, with welds ground smooth and flush with frame.

D. Fabricate concealed stiffeners and edge channels from either cold- or hot-rolled steel sheet.

E. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.

1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.

F. Stops and Moldings: Provide stops and moldings around glazed lites and louvers where indicated. Form corners of stops and moldings with mitered hairline joints.

1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow-metal work.
2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

2.9 STEEL FINISHES

A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.

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

B. Factory Finish: Clean, pretreat, and apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat, complying with SDI A250.3.

1. Color and Gloss: As selected by Architect from manufacturer's full range.

2.10 ACCESSORIES

A. Louvers: Provide louvers for interior doors, where indicated, which comply with SDI 111C, with blades or baffles formed of 0.020-inch- (0.5-mm-) thick, cold-rolled steel sheet set into 0.032-inch- (0.8-mm-) thick steel frame.

1. Sightproof Louver: Stationary louvers constructed with inverted-V or inverted-Y blades.
2. Lightproof Louver: Stationary louvers constructed with baffles to prevent light from passing from one side to the other.

3. Fire-Rated Automatic Louvers: Louvers constructed with movable blades closed by actuating fusible link, and listed and labeled for use in fire-rated door assemblies of type and fire-resistance rating indicated by same qualified testing and inspecting agency that established fire-resistance rating of door assembly.

B. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

C. Grout Guards: Formed from same material as frames, not less than 0.016 inch (0.4 mm) thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.

C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

A. General: Install hollow-metal work plumb, rigid, properly aligned, and securely fastened in place. Comply with Drawings and manufacturer's written instructions.

B. Hollow-Metal Frames: Install hollow-metal frames of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.

a. At fire-rated openings, install frames according to NFPA 80.

b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
c. Install frames with removable stops located on secure side of opening.
d. Install door silencers in frames before grouting.
e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
f. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
g. Field apply bituminous coating to backs of frames that will be filled with grout containing antifreezing agents.

2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.

a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.

3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.
4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
5. Concrete Walls: Solidly fill space between frames and concrete with mineral-fiber insulation.
6. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
7. In-Place Metal or Wood-Stud Partitions: Secure slip-on drywall frames in place according to manufacturer's written instructions.
8. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:

a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.

C. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.

1. Non-Fire-Rated Steel Doors:

a. Between Door and Frame Jambs and Head: 1/8 inch (3.2 mm) plus or minus 1/32 inch (0.8 mm).
b. Between Edges of Pairs of Doors: 1/8 inch (3.2 mm) to 1/4 inch (6.3 mm) plus or minus 1/32 inch (0.8 mm).
c. At Bottom of Door: 3/4 inch (19.1 mm) plus or minus 1/32 inch (0.8 mm).
d. Between Door Face and Stop: 1/16 inch (1.6 mm) to 1/8 inch (3.2 mm) plus or minus 1/32 inch (0.8 mm).

2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
3. Smoke-Control Doors: Install doors and gaskets according to NFPA 105.

D. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.

1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (51 mm) o.c. from each corner.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow-metal work immediately after installation.

C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

D. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

E. Factory-Finish Touchup: Clean abraded areas and repair with same material used for factory finish according to manufacturer's written instructions.

F. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

3.5 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 08 11 13

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SECTION 08 11 16 – FIRE-RATED ALUMINUM FULL VISION DOORS AND FRAMES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Fire-rated aluminum full vision Aluflam door system including pre-finished door, frame, glazing, and hardware.

1.02 RELATED SECTIONS

A. Section 08710 (08 71 00): Door Hardware.
B. Section 08817 (08 88 17): Fire-Rated Glass & Framing.

1.03 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. ASTM E119 Standard Test Methods for Fire Tests of Building Construction and Materials.
   2. ASTM E2074 Standard Test Method for Fire Tests of Door Assemblies, Including Positive Pressure Testing of Side-Hinged and Pivoted Swinging Door Assemblies.

B. National Fire Protection Association (NFPA):
   1. NFPA 80: Standard for Fire Doors and Fire Windows.
   2. NFPA 251: Standard Methods of Tests of Fire Endurance of Building Construction and Materials.
   3. NFPA 252: Standard Methods of Fire Tests of Door Assemblies.

C. Uniform Building Code (UBC):
   1. UBC-7-2: Methods for Fire Tests of Door Assemblies.

D. Underwriters Laboratories, Inc. (UL):
   1. UL 10C: Positive Pressure Fire Tests of Door Assemblies.

E. Standard Council of Canada:
   1. ULC Standard CAN4-S104: Fire Tests of Door Assemblies.

F. American National Standards Institute (ANSI):
   1. ANSI Z97.1 Safety Glazing Materials Used in Buildings – Safety Performance Specifications and Methods of Test.

G. Consumer Product Safety Commission (CPSC):
   1. CPSC 16 CFR 1201 Categories I and II: Safety Standard for Glazing Materials.

1.04 SYSTEM DESCRIPTION

A. Performance Requirements:

   1. Fire Rating: 60 minutes.
   2. Certification: Doors and frames shall be tested in accordance with ASTM E 2074, NFPA 252, UBC 7-2, UL 10C, CAN4-S104.
   3. Testing Laboratory: Fire tests shall be conducted by an approved independent testing laboratory, similar to Underwriter's Laboratories, Inc.

1.05 SUBMITTALS

A. Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedure Section.
   1. Shop Drawings: Submit shop drawings showing layouts, profiles and product components.
   2. Samples: Submit samples for finishes, colors and textures.
   3. Technical Information: Submit latest edition of manufacturer's product data providing product description, technical data and installation instructions.

1.06 QUALITY ASSURANCE

A. Listings and Labels:
   Fire rated framing and glazing shall be under current follow-up services by an approved independent agency and maintain a current listing or certification. Assemblies shall be labeled in accordance with limits of listings.

1.07 DELIVERY, STORAGE AND HANDLING

A. Ordering: Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.

B. Delivery: Deliver materials to specified destination in manufacturer's packaging undamaged, complete with installation instructions.

C. Storage and Protection: Store off ground, under cover, protected from weather, direct sunlight, construction activities and at temperature conditions recommended by manufacturer, +10°F to +110°F.

D. Handling: Protect materials and finish during handling and installation to prevent damage.

1.08 PROJECT CONDITIONS

A. Field Measurements: Verify actual measurements for openings by field measurements before fabrication. Show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

PART 2 - PRODUCTS

2.01 FIRE-RATED ALUMINUM FULL VISION DOORS AND FRAMES

A. Manufacturer: Aluflam North America
   1. Contact: 16604 Edwards Road, Cerritos, CA 90703: Telephone 562.926.9520 Fax 562.404.1394. E-mail info@aluflam-usa.com Website www.aluflam-usa.com, or local representative (www.aluflam-usa.com/contact/representatives.php).

2.02 MATERIALS – ALUMINUM FRAMING

A. Frame construction: Integral structure and glazing stops from extruded and thermally broken aluminum profiles. Filled internally with cement composite material.

B. Dimensions:
   1. Door framing face dimension: 2-½ inch

2. Depth of door framing: 3-7/16 inch (3-5/8 for 90 Min Door)
3. Door stile face dimension: 3-9/16 inch (3-3/4 for (90 Min Door)
4. Door cross rail (if applicable): 3-9/16 inch (N/A for 90 Min Door)

C. Assembly: Frame corners assembled by means of crimped and bonded miter joints.

D. Sealing: Framing system shall insulate against effects of fire, smoke, and heat transfer from either side. Perimeter of the framing system to the rough opening shall be firmly packed with mineral wool insulation.

2.03 MATERIALS – FIRE RESISTANT GLAZING

A. Assemblies shall be glazed with 60 minute rated 1 inch thick SGG Contraflam 60 fire resistant glazing material as manufactured by Vetrotech Saint-Gobain (www.vetrotechusa.com).
   1. Individual lites shall be permanently identified with a listing mark.
   2. Glazing material installed in “Hazardous Locations” (subject to human impact) shall be certified to meet the applicable requirements for fire rated assemblies referenced in ANSI Z97.1 Standard for Safety Glazing Materials Used In Buildings and/or CPSC 16 CFR 1201 Safety Standard for Architectural Glazing Materials.
   3. Visible daylight transmission shall be a minimum of 81%. Glazing material shall be optically clear, colorless and free from unusual distortion.

2.04 MATERIALS – GLAZING AND ASSEMBLY ACCESSORIES

A. Fasteners: All fasteners, setting pads, and glazing clips, shall be stainless or zinc-plated steel.

B. Glazing Accessories: The glazing material perimeter shall be separated from the perimeter framing system with approved flame retardant intumescent glazing tape. Ceramic setting blocks shall be placed between the metal setting pads and the glazing material. Setting pads and blocks provided by manufacturer.

2.05 FABRICATION

A. Door frames and door leaves shall be furnished pre-assembled. Door assemblies shall be field glazed.

B. Door assemblies shall be factory prepared for field mounting of hardware.

C. Fabrication Dimensions: Fabricate to approved dimensions. The general contractor shall guarantee dimensions within required tolerance (+ - 1/8”). Obtain approved shop drawings prior to fabrication.

2.06 FINISHES

A. Framing shall be chemically cleaned and pretreated, then finished on all exposed areas with: Anodized – Dark Bronze

B. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Slight variations in appearance of abutting or adjacent pieces are acceptable. Noticeable variations in the same piece are not acceptable.

2.07 DOOR HARDWARE

A. Hardware shall be supplied from door manufacturer's standard recommended hardware groups as specified.

B. Operating hardware for single doors. Each to have the following:

Quantity	Description	Manufacturer/Model	Finish
1	Surface applied door closer	Dorma TS93 series	Aluminum
3	Surface applied hinges (Qty 4 on 90 min door)	Dr Hahn A901/951 series	Aluminum
2	Lever handles	FSB 1080 series	Stainless
1	Narrow stile mortise lock	Accurate 8600 series	Stainless (front)
1	Cylinder lock	Schlage compatible	Satin chrome
1	*) Rim based exit device – (Standard on 90 min door)	Dorma 9700	Stainless
1	*) 10" bottom kickplate	Aluflam	Match door finish
1	*) Automatic floor seal	Planet MF	Aluminum

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine area to receive doors. Openings shall be plumb, square and within allowable tolerances. Notify Architect of conditions that would adversely affect installation or subsequent use. Do not proceed with installation until unsatisfactory conditions are corrected.

3.02 INSTALLATION

A. Door installation shall be by a specialty contractor with appropriate experience qualifications; and in strict accordance with the approved shop drawings.

3.03 CLEANING

A. Cleaning: Remove temporary coverings and protection of adjacent work areas. Glass and frame should be cleaned using soft clean cloth, chamois leathers, sponges or soft paper. Use clean warm water with a mild detergent. Do not use detergent that contains either alkaline, acids or fluoride! Abrasive cleaning methods can damage surfaces! Clean prior to owner's acceptance. Remove construction debris from project site and legally dispose of debris.

END OF SECTION

SECTION 08 1416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including the General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
   1. Division 6 Section "Finish Carpentry"
   2. Division 8 Section “Hollow Metal Doors and Frames”

1.2 SUMMARY

A. This Section includes the following:
   1. Solid core doors with wood veneer faces.
   2. Factory finishing of flush wood doors.
   3. Factory fitting flush wood doors to frames and factory machining for hardware.
   4. Louvers for flush wood doors.

1.3 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product data for each type of door, including details of core and edge construction, trim for openings, and factory-finishing specifications.

C. Shop drawings indicating location and size of each door, elevation of each kind of door, details of construction, location and extent of hardware blocking, fire ratings, requirements for veneer matching and factory finishing and other pertinent data.
   1. For factory-machined doors, indicate dimensions and locations of cutouts for locksets and other cutouts adjacent to light openings.

D. Samples for initial selection in the form of color charts consisting of actual materials in small sections for the following:
   1. Faces of factory-finished doors with transparent finish. Show the full range of colors available for stained finishes.

E. Samples for verification in the form and size indicated below:
   1. Corner sections of doors approximately 12 inches square with door faces and edgings representing the typical range of color and grain for each species of veneer and solid lumber required. Finish sample with same materials proposed for factory-finished doors.
   2. Frames for light openings, 6 inches long, for each material, type, and finish required.

1.4 QUALITY ASSURANCE

A. Quality Standard: Comply with the following standard:
   1. AWI Quality Standard: "Architectural Woodwork Quality Standards" of the Architectural Woodwork Institute for grade of door, core, construction, finish, and other requirements.

B. Fire-Rated Wood Doors: Provide wood doors that comply with NFPA 80; are identical in materials and construction to units tested in door and frame assemblies per ASTM E 152; and are labeled and listed by UL, Warnock Hersey, or another testing and inspection agency acceptable to authorities having jurisdiction.

C. Single-Source Responsibility: Obtain doors from one source and by a single manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect doors during transit, storage, and handling to prevent damage, soiling, and deterioration. Comply with requirements of referenced standard and manufacturer's instructions.

B. Identify each door with individual opening numbers as designated on shop drawings, using temporary, removable, or concealed markings.

1.6 PROJECT CONDITIONS

A. Conditioning: Do not deliver or install doors until conditions for temperature and relative humidity have been stabilized and will be maintained in storage and installation areas during the remainder of the construction period to comply with the following requirements applicable to Project's geographical location:
   1. AWI quality standard Section 100-S-11 "Relative Humidity and Moisture Content."

1.7 WARRANTY

A. General Warranty: Door manufacturer's warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Door Manufacturer's Warranty: Submit written agreement on door manufacturer's standard form signed by manufacturer, Installer, and Contractor, agreeing to repair or replace defective doors that have warped (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section or that show telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span, or do not conform to tolerance limitations of referenced quality standards.

   1. Warranty shall be in effect during the following period of time after date of Substantial Completion.
      a. Solid Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering doors that may be incorporated in the Work include, but are not limited to, the following:
   1. Solid Core Doors:
      a. Algoma Hardwoods Inc.
      b. Buell Door Co.
      c. Eggers Industries, Architectural Door Division.
      d. Graham Manufacturing Corp.
      e. Haley Brothers, Inc.
      f. Ideal Wood Products, Inc.
      g. IPIK Door Co., Inc.
      h. Mohawk Flush Doors, Inc.
      i. Ragland Manufacturing Co., Inc.
      j. V-T Industries Inc.
      k. Weyerhauser Co.

2.2 INTERIOR FLUSH WOOD DOORS

A. Solid Core Doors for transparent stained Finish: Comply with the following requirements:
   1. Faces: Rotary Natural Birch.
   2. Grade: Premium.
   3. Construction: 5 plies.
   4. Core: Particleboard ANSI A208.1, GRADE LD-2 – PC-5 ME. Provide wood blocking in particleboard core doors as needed to eliminate through-bolting hardware. 5” toprail on doors and closers..
   5. Bonding: Stiles and rails bonded to core, then entire unit abrasive planed before veneering.

2.3 VENEER MATCHING

A. Within Door Faces: Provide doors with the following veneer matching:
   1. Book matching.

B. Pairs and Sets: Provide pair matching and set matching for pairs of doors and for doors hung in adjacent sets.

C. Doors with Transoms (if any): Provide the following matching:
   1. Continuous matching.

2.4 FABRICATION

A. Fabricate flush wood doors to comply with following requirements:
   1. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels:

a. Comply with clearance requirements of referenced quality standard for fitting. Comply with requirements of NFPA 80 for fire-resistance-rated doors.

2. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame shop drawings, DHI A115-W series standards, and hardware templates.
   a. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before proceeding with factory machining.
   b. Metal Astragals: Premachine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

B. Transom and Side Panels (if any): Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors.
   1. Fixed Transom Panels (if any): Fabricate fixed panels with solid lumber transom bottom rail and door top rail, both rabbeted as indicated. Provide factory-installed spring bolts for concealed attachment into jambs of metal door frames.

C. Openings (if any): Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of door(s) required.
   1. Light Openings: Trim openings with moldings of material and profile indicated.

2.5 FACTORY FINISHING

A. General: Comply with referenced quality standard's requirements for factory finishing.

B. Finish wood doors at factory.

C. Transparent Finish: Comply with requirements indicated for grade, finish system, staining effect, and sheen.
   1. Grade: Premium.
   2. Finish: Manufacturer's standard finish with performance requirements comparable to either AWI System TR-6 catalyzed polyurethane.
   3. Staining: As selected from manufacturer’s full line of standard stain colors.
   4. Effect: Filled finish.
   5. Sheen: Satin.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine installed door frames prior to hanging door:
   1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with plumb jambs and level heads.
   2. Reject doors with defects.

B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Hardware: For installation see Division 8 Section "Door Hardware."

B. Manufacturer's Instructions: Install wood doors to comply with manufacturer's instructions and referenced quality standard and as indicated.
   1. Install fire-rated doors in corresponding fire-rated frames according to requirements of NFPA 80.
   2. Fitting Clearances for Non-Fire-Rated Doors: Provide 1/8 inch at jambs and heads, 1/16 inch per leaf at meeting stiles for pairs of doors, and 1/8 inch from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4-inch clearance from bottom of door to top of threshold.
   3. Fitting Clearances for Fire-Rated Doors: Comply with NFPA 80.
   4. Bevel non-fire-rated doors 1/8 inch in 2 inches at lock and hinge edges.
   5. Bevel fire-rated doors 1/8 inch in 2 inches on lock edge; trim stiles and rails only to extent permitted by labeling agency.

C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

D. Factory-Finished Doors: Restore finish before installation, if fitting or machining is required at the job site.

3.3 ADJUSTING AND PROTECTION

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Refinish or replace doors damaged during installation.

C. Protect doors as recommended by door manufacturer to ensure that wood doors will be without damage or deterioration at the time of Substantial Completion.

END OF SECTION 08 14 16

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SECTION 08 31 13 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. The work performed under this Section includes the performance criteria, materials, production, and erection of access doors and frames for the project and consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all access door work as required by schedules, keynotes and drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction including, but not limited to the following:

1. Access doors and frames for walls and ceilings.
2. Floor access doors and frames.

B. Related Requirements:
1. Division 22 “Plumbing” for plumbing devices that require access.
2. Division 23 “Mechanical” for HVAC devices that require access.
3. Division 26 “Electrical” for Electrical devices that require access.
4. Division 28 “Electronic Safety and Security” for safety and security devices that require access.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, fire ratings, materials, individual components and profiles, and finishes.

B. Shop Drawings:

1. Include plans, elevations, sections, details, substrates and attachments to other work.
2. Detail fabrication and installation of access doors and frames for each type of substrate.

C. Samples: For each door face material, at least 3 by 5 inches (75 by 125 mm) in size, in specified finish.

D. Access Door and Frame Schedule: Provide complete access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

E. Ceiling Coordination Drawings: Reflected ceiling plans, drawn to scale, on which ceiling mounted items including access doors and frames, lighting fixtures, diffusers, grilles, speakers, sprinklers, and special trim are shown and coordinated with each other.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Rated Access Doors and Frames: Units complying with NFPA 80 that are identical to access door and frame assemblies tested for fire-test-response characteristics according to the following test method and that are listed and labeled by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:

1. NFPA 252 or UL 10B for fire-rated access door assemblies installed vertically.
2. NFPA 288 for fire-rated access door assemblies installed horizontally.

2.2 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

A. Basis-of-Design Product: Subject to compliance with requirements, provide access panels as fabricated by FF Systems Access Panels, Inc. or comparable product by one of the following:

1. Access Panel Solutions.
2. Acudor Products, Inc.
3. Babcock-Davis.
4. J. L. Industries, Elmdor/Stoneman Manufacturing Co.; Div. of Acorn Engineering Co.
5. Larsen's Manufacturing Company.
6. Metropolitan Door Industries Corp.
7. Milcor Inc.

B. Source Limitations: Obtain each type of access door and frame from single source from single manufacturer.

C. Aluminum Access Doors with Drywall Inserts **(at all public, occupied spaces)**

1. Basis-of-Design Product: FF Systems Access Panels, Inc., System F2AKL.
2. Assembly Description: Welded aluminum frame with both outer and inner frame of high grade aluminum, with drywall inlay.
3. Locations: Wall and ceiling.
4. Door Size: As indicated
5. Frame Material: Aluminum.
6. Hinges: Manufacturer's standard.
7. Seal: Air/dust seal.
8. Hardware: Cylinder-lock.

D. Hardware:

1. Lock: Cylinder.

2.3 FLOOR ACCESS DOORS AND FRAMES

A. Manufacturers: Subject to compliance with requirements, provide access panels as fabricated by Babcock Davis or comparable product by one of the following:

1. Acudor Products, Inc.
2. Metropolitan Door Industries Corp.
3. Milcor Inc.

B. Floor Doors, General: Equip each door with adjustable counterbalancing springs, heavy-duty hold-open arm that automatically locks door open at 90 degrees, release handle with red vinyl grip that allows for one-handed closure, and recessed lift handle.

C. Aluminum Floor Door: Coordinate with equipment. Extruded-aluminum angle frame with 1/4-inch- (6.4-mm-) thick, 1/8-inch pan recess for carpet or tile; nonwatertight; loading capacity to support 300-lbf/sq. ft. (14.4-kN/sq. m) pedestrian live load.

D. Hardware: Provide the following:

1. Hinges: Heavy-duty, stainless-steel butt hinges with stainless-steel pins.
2. Lock: Manufacturer’s standard.
3. Hardware Material: Manufacturer's standard.

E. Fire-Rating: Provide 2-hour fire rated doors in rated floors.

2.4 MATERIALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.

C. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879/A 879M, with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.

D. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

E. Rolled-Stainless-Steel Floor Plate: ASTM A 793, manufacturer's standard finish.

F. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 316. Remove tool and die marks and stretch lines or blend into finish.

G. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063-T6.

H. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.

I. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than strength and durability properties of Alloy 5005-H15; with minimum sheet thickness according to ANSI H35.2 (ANSI H35.2M).

J. Frame Anchors: Same type as door face.

K. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

2.5 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access doors to types of supports indicated.

1. For concealed flanges with drywall bead, provide edge trim for gypsum board securely attached to perimeter of frames.
2. For concealed flanges with plaster bead for full-bed plaster applications, provide zinc-coated expanded metal lath and exposed casing bead welded to perimeter of frames.
3. Provide mounting holes in frames for attachment of units to metal or wood framing.
4. Provide mounting holes in frame for attachment of masonry anchors.

D. Recessed Access Doors: Form face of panel to provide recess for application of applied finish. Reinforce panel as required to prevent buckling.

1. For recessed doors with plaster infill, provide self-furring expanded metal lath attached to door panel.

E. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.

1. For cylinder locks, furnish two keys per lock and key all locks alike.
2. For recessed panel doors, provide access sleeves for each locking device. Furnish plastic grommets and install in holes cut through finish.

F. Extruded Aluminum: After fabrication, apply manufacturer's standard protective coating on aluminum that will come in contact with concrete.

2.6 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Steel and Metallic-Coated-Steel Finishes:

1. Factory Prime: Apply manufacturer's standard, fast-curing, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.
2. Factory Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat, with a minimum dry-film thickness of 1 mil (0.025 mm) for topcoat.

E. Stainless-Steel Finishes:

1. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
2. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

a. Run grain of directional finishes with long dimension of each piece.
b. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
c. Directional Satin Finish: No. 4.

3. Bright, Cold-Rolled, Unpolished Finish: No. 2B.

F. Aluminum Finishes:

1. Mill finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

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

B. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.3 ADJUSTING

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

B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

3.4 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 08 31 13

SECTION 08 41 13 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This section includes the performance criteria, materials, production, and erection of aluminum framed entrances and storefronts for the project. The work performed under this Section consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all aluminum framed entrances and storefronts as required by the this section, schedules, keynotes and drawings, including, but not limited to the following:

1. Exterior storefront framing.
2. Storefront framing for window walls.
3. Storefront framing for punched openings.
4. Exterior and interior manual-swing entrance doors and door-frame units.

1.3 PREINSTALLATION MEETINGS

A. Pre-installation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: For aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.

1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
2. Include full-size isometric details of each vertical-to-horizontal intersection of aluminum-framed entrances and storefronts, showing the following:

a. Joinery, including concealed welds.
b. Anchorage.
c. Expansion provisions.
d. Glazing.

e. Flashing and drainage.

3. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.

C. Samples for Initial Selection: For units with factory-applied color finishes.

D. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

E. Fabrication Sample: Of each vertical-to-horizontal intersection of assemblies, made from 12-inch (300-mm) lengths of full-size components and showing details of the following:

1. Joinery, including concealed welds.
2. Anchorage.
3. Expansion provisions.
4. Glazing.
5. Flashing and drainage.

F. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

G. Delegated-Design Submittal: For aluminum-framed entrances and storefronts indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

A. Preconstruction Laboratory Mockup Testing Submittals:

1. Testing Program: Developed specifically for Project.
2. Test Reports: Prepared by a qualified preconstruction testing agency for each mockup test.
3. Record Drawings: As-built drawings of preconstruction laboratory mockups showing changes made during preconstruction laboratory mockup testing.

B. Qualification Data: For Installer and field testing agency.

C. Energy Performance Certificates: For aluminum-framed entrances and storefronts, accessories, and components, from manufacturer.

1. Basis for Certification: NFRC-certified energy performance values for each aluminum-framed entrance and storefront.

D. Product Test Reports: For aluminum-framed entrances and storefronts, for tests performed by manufacturer and witnessed by a qualified testing agency.

E. Quality-Control Program: Developed specifically for Project, including fabrication and installation, according to recommendations in ASTM C 1401. Include periodic quality-control reports.

F. Source quality-control reports.

G. Field quality-control reports.

H. Sample Warranties: For special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For aluminum-framed entrances and storefronts to include in maintenance manuals.

B. Maintenance Data for Structural Sealant: For structural-sealant-glazed storefront to include in maintenance manuals. Include ASTM C 1401 recommendations for post-installation-phase quality-control program.

1.7 QUALITY ASSURANCE

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

B. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated.

C. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

D. Structural-Sealant Glazing: Comply with ASTM C 1401 for design and installation of storefront systems.

E. Quality-control program for structural-sealant-glazed system.

F. Preconstruction sealant testing.

1.8 MOCKUPS

A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mockup of typical wall area as shown on Drawings.
2. Mockups for each form of construction and finish.

3. Testing shall be performed on mockups according to requirements in "Field Quality Control" Article.
4. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
5. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 WARRANTY

A. Special Warranty: Manufacturer and Installer agrees to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including, but not limited to, excessive deflection.
b. Noise or vibration created by wind and thermal and structural movements.
c. Deterioration of metals**,** metal finishes, and other materials beyond normal weathering.
d. Water penetration through fixed glazing and framing areas.
e. Failure of operating components.

2. Warranty Period: 10 years from date of Substantial Completion.

B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design aluminum-framed entrances and storefronts.

B. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.

1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
2. Failure also includes the following:

    a. Thermal stresses transferring to building structure.
    b. Glass breakage.
    c. Noise or vibration created by wind and thermal and structural movements.
    d. Loosening or weakening of fasteners, attachments, and other components.
    e. Failure of operating units.

C. Structural Loads:

1. Wind Loads: 118 mph, and in compliance with NYS Building Code Section 2404 “Wind, Snow, Seismic, and Dead loads on Glass.”
2. Other Design Loads: As indicated on Drawings.

D. Deflection of Framing Members: At design wind pressure, as follows:

1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans up to 13 feet 6 inches (4.1 m) and to 1/240 of clear span plus 1/4 inch (6.35 mm) for spans greater than 13 feet 6 inches (4.1 m) or an amount that restricts edge deflection of individual glazing lites to 3/4 inch (19.1 mm), whichever is less.
2. Deflection Parallel to Glazing Plane: Limited to 1/360 of clear span or 1/8 inch (3.2 mm), whichever is smaller.

    a. Operable Units: Provide a minimum 1/16-inch (1.6-mm) clearance between framing members and operable units.

3. Cantilever Deflection: Where framing members overhang an anchor point, as follows:

    a. Perpendicular to Plane of Wall: No greater than 1/240 of clear span plus 1/4 inch (6.35 mm) for spans greater than 11 feet 8-1/4 inches (3.6 m) or 1/175 times span, for spans less than 11 feet 8-1/4 inches (3.6 m).

E. Structural: Test according to ASTM E 330 as follows:

1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
3. Test Durations: As required by design wind velocity, but not less than 10 seconds.

F. Air Infiltration: Test according to ASTM E 283 for infiltration as follows:

1. Fixed Framing and Glass Area:

    a. Maximum air leakage of 0.06 cfm/sq. ft. (0.30 L/s per sq. m) at a static-air-pressure differential of 6.24 lbf/sq. ft. (300 Pa).

2. Entrance Doors:

a. Pair of Doors: Maximum air leakage of 1.0 cfm/sq. ft. (5.08 L/s per sq. m) at a static-air-pressure differential of 6.24 lbf/sq. ft. (300 Pa).
b. Single Doors: Maximum air leakage of 0.5 cfm/sq. ft. (2.54 L/s per sq. m) at a static-air-pressure differential of 6.24 lbf/sq. ft. (300 Pa).

G. Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:

1. No evidence of water penetration through fixed glazing and framing areas when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft. (300 Pa).

H. Water Penetration under Dynamic Pressure: Test according to AAMA 501.1 as follows:

1. No evidence of water penetration through fixed glazing and framing areas when tested at dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft. (300 Pa).
2. Maximum Water Leakage: According to AAMA 501.1. Water leakage does not include water controlled by flashing and gutters, or water that is drained to exterior.

I. Interstory Drift: Accommodate design displacement of adjacent stories indicated.

1. Design Displacement: As indicated on Drawings.
2. Test Performance: Complying with criteria for passing based on building occupancy type when tested according to AAMA 501.4 at design displacement and 1.5 times the design displacement.

J. Seismic Performance: Aluminum-framed entrances and storefronts shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. Seismic Drift Causing Glass Fallout: Complying with criteria for passing based on building occupancy type when tested according to AAMA 501.6 at design displacement and 1.5 times the design displacement.
2. Vertical Interstory Movement: Complying with criteria for passing based on building occupancy type when tested according to AAMA 501.7 at design displacement and 1.5 times the design displacement.

K. Energy Performance: Certify and label energy performance according to NFRC as follows:

1. Thermal Transmittance (U-factor): Fixed glazing and framing areas shall have U-factor of not more than 0.47 Btu/sq. ft. x h x deg F (2.55 W/sq. m x K) as determined according to NFRC 100.
2. Solar Heat Gain Coefficient: Fixed glazing and framing areas shall have a solar heat gain coefficient of no greater than 0.35 as determined according to NFRC 200.
3. Condensation Resistance: Fixed glazing and framing areas shall have an NFRC-certified condensation resistance rating of no less than 15 as determined according to NFRC 500.

L. Noise Reduction: Test according to ASTM E 90, with ratings determined by ASTM E 1332, as follows.

1. Outdoor-Indoor Transmission Class: Minimum 26.

M. Windborne-Debris Impact Resistance: Pass missile-impact and cyclic-pressure tests when tested according to ASTM E 1886 and testing information in ASTM E 1996 for Wind Zone 5.

1. Large-Missile Test: For glazed openings located within 30 feet (9.1 m) of grade.

N. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes:

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
2. Thermal Cycling: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5.

a. High Exterior Ambient-Air Temperature: That which produces an exterior metal-surface temperature of 180 deg F (82 deg C).
b. Low Exterior Ambient-Air Temperature: 0 deg F (minus 18 deg C).
c. Interior Ambient-Air Temperature: 75 deg F (24 deg C).

O. Structural-Sealant Joints:

1. Designed to carry gravity loads of glazing.
2. Designed to produce tensile or shear stress of less than 20 psi (138 kPa).

P. Structural Sealant: Capable of withstanding tensile and shear stresses imposed by structural-sealant-glazed storefront system without failing adhesively or cohesively. When tested for preconstruction adhesion and compatibility, cohesive failure of sealant shall occur before adhesive failure.

1. Adhesive failure occurs when sealant pulls away from substrate cleanly, leaving no sealant material behind.
2. Cohesive failure occurs when sealant breaks or tears within itself but does not separate from each substrate because sealant-to-substrate bond strength exceeds sealant's internal strength.

2.2 MANUFACTURERS

A. Basis-of-Design: Subject to compliance with requirements, provide systems that match size and appearance of aluminum windows within the specifications of this section division, Trifab 451T (thermal) Storefront System, as manufactured by Kawneer Company, Inc., or comparable product by one of the following:

1. Architectural Windows.
2. Efco Corporation.
3. CRL – U.S. Aluminum

B. Source Limitations: Obtain all components of aluminum-framed entrance and storefront system, including framing spandrel panels and venting windows and accessories, from single manufacturer.

2.3 FRAMING

A. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.

1. Construction: Thermally broken.
2. System Dimensions: 2” x 4 ½” (50.8mm x 114.3 mm).
3. Glazing Plane: Front (exterior).
4. Finish: High-performance organic finish.
5. Color: Match Architect’s sample.

B. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.

C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

D. Materials:

1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

a. Sheet and Plate: ASTM B 209 (ASTM B 209M).
b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).
c. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
d. Structural Profiles: ASTM B 308/B 308M.

2. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM, and prepare surfaces according to applicable SSPC standard.

a. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
b. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
c. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.4 ENTRANCE DOOR SYSTEMS

A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.

1. Door Construction: 2-inch overall thickness, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
2. Door Design: Medium or Wide stile. 10” high bottom rail for ADA compliance.
3. Glazing stops and gaskets.
4. Material: extra thick (3/16”)

B. Entrance Door Hardware: Refer to Section 08 71 00 "Door Hardware.”

1. Weather stripping: manufacturer’s standard.

2. All hardware to be surface mounted to facilitate future maintenance.
3. Hardware finishes: As selected by Architect from Manufacture's full range.

C. Additional requirements:

1. Thresholds: Stainless steel, raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch (12.7 mm).
2. Opening-Force Requirements:
   a. Egress Doors: Not more than 15 lbf (67 N) to release the latch and not more than 30 lbf (133 N) to set the door in motion[and not more than 15 lbf (67 N) to open the door to its minimum required width].
   b. Accessible Interior Doors: Not more than 5 lbf (22.2 N) to fully open door.
3. Removable Mullions: BHMA A156.3, extruded aluminum.
   a. When used with panic exit devices, provide removable mullions listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305. Use only mullions that have been tested with exit devices to be used.

2.5 GLAZING

A. Glazing: Comply with Section 08 80 00 "Glazing."

B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.

C. Glazing Sealants: As recommended by manufacturer.

D. Sealants used inside the weatherproofing system shall have a VOC content of 250 g/L.

E. Structural Glazing Sealants: ASTM C 1184, chemically curing silicone formulation that is compatible with system components with which it comes in contact, specifically formulated and tested for use as structural sealant and approved by structural-sealant manufacturer for use in storefront system indicated.

1. Color: As selected by Architect from manufacturer's full range of colors.

F. Weatherseal Sealants: ASTM C 920 for Type S; Grade NS; Class 25; Uses NT, G, A, and O; chemically curing silicone formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural-sealant, weatherseal-sealant, and structural-sealant-glazed storefront manufacturers for this use.

1. Color: Match structural sealant.

2.6 ACCESSORIES

A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.

2. Reinforce members as required to receive fastener threads.
3. Use exposed fasteners with countersunk Phillips screw heads fabricated from 300 series stainless steel.

B. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch (25.4 mm) that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.

1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.

C. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.

D. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil (0.762-mm) thickness per coat.

E. Aluminum sunscreen extrusion profile – to be selected by Architect from Manufacturer's standard profiles. Anchored directly to the vertical or horizontal mullions – refer to Drawings. Color to match storefront and windows.

2.7 FABRICATION

A. Form or extrude aluminum shapes before finishing.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Fabricate components that, when assembled, have the following characteristics:

1. Profiles that are sharp, straight, and free of defects or deformations.
2. Accurately fitted joints with ends coped or mitered.
3. Physical and thermal isolation of glazing from framing members.
4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
5. Provisions for field replacement of glazing from interior.
6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

E. Structural-Sealant-Glazed Framing Members: Include accommodations for using temporary support device to retain glazing in place while structural sealant cures.

F. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.

1. At exterior doors, provide compression weather stripping at fixed stops.

2. At interior doors, provide silencers at stops to prevent metal-to-metal contact. Install three silencers on strike jamb of single-door frames and two silencers on head of frames for pairs of doors.

G. Entrance Doors: Reinforce doors as required for installing entrance door hardware.

1. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.
2. At exterior doors, provide weather sweeps applied to door bottoms.

H. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.

I. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.8 ALUMINUM FINISHES

A. High-Performance Organic Coating Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.

1. Fluoropolymer 3-Coat Coating System: Manufacturer's standard 3-coat, thermocured system composed of specially formulated inhibitive primer, fluoropolymer color coat, and clear fluorocarbon topcoat, with both color coat and clear topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605

a. Color and Gloss: Match Architect’s sample of Alucobond Anodic Clear Mica Cool PVDF-2/gloss level-30.
b. It is the intent that all aluminum framing members on the project shall match in color and gloss.

2.9 SOURCE QUALITY CONTROL

A. Structural Sealant: Perform quality-control procedures complying with ASTM C 1401 recommendations including, but not limited to, assembly material qualification procedures, sealant testing, and assembly fabrication reviews and checks.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare surfaces that are in contact with structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.

3.3 INSTALLATION

A. General:

1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
6. Seal perimeter and other joints watertight unless otherwise indicated.

B. Metal Protection:

1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Set continuous sill members and flashing in full sealant bed as specified in Section 079200 "Joint Sealants" to produce weathertight installation.

D. Install components plumb and true in alignment with established lines and grades.

E. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.

F. Install glazing as specified in Section 088000 "Glazing."

G. Install weatherseal sealant according to Section 07 92 00 "Joint Sealants" and according to sealant manufacturer's written instructions to produce weatherproof joints. Install joint filler behind sealant as recommended by sealant manufacturer.

H. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.

1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

3.4 ERECTION TOLERANCES

A. Erection Tolerances: Install aluminum-framed entrances and storefronts to comply with the following maximum tolerances:

1. Plumb: 1/8 inch in 10 feet (3.2 mm in 3 m); 1/4 inch in 40 feet (6.35 mm in 12.2 m).
2. Level: 1/8 inch in 20 feet (3.2 mm in 6 m); 1/4 inch in 40 feet (6.35 mm in 12.2 m).
3. Alignment:

    a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch (12.7 mm) wide, limit offset from true alignment to 1/16 inch (1.6 mm).
    b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch (12.7 to 25.4 mm) wide, limit offset from true alignment to 1/8 inch (3.2 mm).
    c. Where surfaces are separated by reveal or protruding element of 1 inch (25.4 mm) wide or more, limit offset from true alignment to 1/4 inch (6 mm).

4. Location: Limit variation from plane to 1/8 inch in 12 feet (3.2 mm in 3.6 m); 1/2 inch (12.7 mm) over total length.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Field Quality-Control Testing: Perform the following test on representative areas of aluminum-framed entrances and storefronts and mockups.

1. Water-Spray Test: Before installation of interior finishes has begun, areas designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.

    a. Perform a minimum of two tests in areas as directed by Architect.
    b. Perform tests in each test area as directed by Architect. Perform at least three tests, prior to 10, 35, and 70 percent completion.

C. Structural-Sealant Adhesion: Test structural sealant according to recommendations in ASTM C 1401, Destructive Test Method A, "Hand Pull Tab (Destructive)," Appendix X2.

1. Test a minimum of three areas on each building facade.
2. Repair installation areas damaged by testing.

D. Aluminum-framed entrances and storefronts will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports.

3.6 MAINTENANCE SERVICE

A. Entrance Door Hardware:

1. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of entrance door hardware.
2. Initial Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of entrance door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper entrance door hardware operation at rated speed and capacity. Use parts and supplies that are the same as those used in the manufacture and installation of original equipment.

3.7 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION

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SECTION 08 51 14 - METAL WINDOW PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.1 SCOPE

A. The Panels required are as manufactured by Mapes Architectural Panels, LLC, Lincoln, NE. Panels consist of metal skins laminated to stabilizer substrates with an insulating core material. Panels are designed to be glazed into a window system or curtain wall system.

B. Related Work
   1. Section 05100 - Structural Steel
   2. Section 06100 - Back Up Walls
   3. Section 07200 - Insulation
   4. Section 07600 - Metal Flashing
   5. Section 07920 - Caulking
   6. Section 08500 - Windows
   7. Section 08900 - Storefront/Curtain Wall
   8. Section 09200 - Interior Wall Finish

1.2 QUALITY ASSURANCE

A. Panel manufacturer shall have a minimum of 25 years experience.

B. Field measurements shall be taken prior to completion of manufacturing and cutting.

C. Maximum deviation from vertical and horizontal alignment of installed panels is 1/8" (3mm) in 20' (6m) non-commutative.

1.3 REFERENCES

A. American Society of Testing Materials (ASTM)
   1. E330-84: Structural Performance of Exterior Windows, Curtain Walls and Doors under the influence of wind loads.
   2. D1781-76: Climbing Drum Peel Test for Adhesives.
   3. D3363-74: Method for Film Hardness by Pencil Test.
   4. D2794-90: Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
   5. D3359-90: Method for Measuring Adhesion by the tape test.

1.4 SUBSTITUTIONS

A. The materials and products specified in this section establish a minimum standard of required function, design, appearance quality and warranty to be met by any proposed substitution.

B. No substitutions will be considered unless a written request for approval has been submitted by the bidder and received by the architect 10 days prior to the bid date.

1.5 SUBMITTALS

A. Submittals shall be in conformance with section ____. Included section number of Division and refer to CSI Division I, Section 1340 - Shop Drawings, Product Data and Samples.

B. Samples:
    1. Panel makeup - 2 samples - 10"x10"
    2. Two samples of each color and finish texture - 3"x5"
C. Submission Drawings: Indicate thickness, dimension and components of parts. Detail glazing methods, framing and tolerances to accommodate thermal movement.
D. Affidavit certifying materials meet all requirements as specified.
E. 2 copies of manufacturers standard literature for specified material.

1.6 DELIVERY, STORAGE AND HANDLING

A. Protect finish and edge in accordance with panel manufacturer's recommendations.
B. Store materials in accordance with panel manufacturer's recommendations.

PART 2 - PRODUCTS

2.1 PANELS - LAMINATED

A. Laminated metal faced Mapes-R panels as manufactured by Mapes Industries, Inc.
B. Acceptable alternatives: Panels having similar composite construction and finish providing manufacturer has a minimum of 25 years panel laminating experience and comparable published warranties.

2.2 FINISH

A. Finishes
B. Exterior: Standard Kynar
C. Interior: Standard Kynar
D. Color: Field and Accent color as selected by architect from manufacturers full range.

2.3 PANEL FABRICATION

A. Exterior Substrate: Tempered Hardboard
B. Core: Isocyanurate
C. Interior Substrate: ½” Gypsum Board
D. Tolerances - .8% of panels dimension length and width - (+/-) 1/16" thickness
E. Panel Thickness – 2.5"
F. R-Value – 14.81
G. U-Value - 0.07
H. 1” Rabbeted edge to fit within the specified framing system

2.4 ACCESSORIES

A. Recommended for use as an infill panel component in window and curtain wall systems. Related material to complete installation as recommended by the manufacturer.
B. Seals against moisture intrusion as recommended by the manufacturer. Polyurethane and silicone based sealant with a 20 year life are recommended.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Panel surfaces shall be free from defects prior to installation.

3.2 EXECUTION

A. Erect panels plumb, level and true.

B. Glaze panels securely and in accordance with approved shop drawings and manufacturers instructions to allow for necessary thermal movement and structural support.
C. Do not install panels that are observed to be defective including warped, bowed, dented, scratched and delaminating components.
D. Weatherseal all joints as required using methods and materials as previously specified.
E. Separate dissimilar metals using gasketed fasteners and blocking to eliminate the possibility of electrolytic reaction.

3.3 ADJUSTING AND CLEANING

A. Remove masking film as soon as possible after installation. Masking intentionally left in place after panel installation will be the responsibility of the contractor.
B. Weep holes and drainage channels must be unobstructed and free from dirt and sealant.

END OF SECTION 08 51 14

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SECTION 08 56 71 - BULLET-RESISTANT STEEL WINDOWS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Bullet-resistant fixed steel window assemblies.

B. Related Sections:
   1. Division 01: Administrative, procedural, and temporary work requirements.

1.2 REFERENCES

A. American Welding Society (AWS) D1.3/D1.3M - Structural Welding Code - Sheet Steel.

B. ASTM International (ASTM) A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.

C. Underwriters Laboratories (UL) 752 - Bullet Resisting Equipment.

1.3 SYSTEM DESCRIPTION

A. Design Requirements: Provide window frames of “non-ricochet type" intended to permit capture and retention of attacking projectile, lessening potential of random injury or lateral penetration.

1.4 SUBMITTALS

A. Submittals for Review:
   1. Shop Drawings: Include window profiles and sizes, type and spacing of frame anchors, reinforcement size and locations, details of joints and connections, and welding details.
   2. Product Data: Include product description for window assemblies including bullet-resistant ratings.
   3. Samples: 2 x 2 inch coating samples showing available colors.

B. Closeout Submittals:
   1. Maintenance Data: Include instructions for cleaning of glazed panels.

1.5 QUALITY ASSURANCE

A. Fixed Window Assemblies: Ballistic Level 3, tested to UL 752.

1.6 DELIVERY, STORAGE AND HANDLING

A. Store window assemblies upright in protected, dry area, off ground or floor, with at least 1/4 inch space between individual units.

B. Do not cover with non vented coverings that create excessive humidity.

C. Remove wet coverings immediately.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Contract Documents are based on products by ARMORTEX, 5926 Corridor Parkway, Schertz, Texas, 800-880-8306, www.armortex.com.
Basis of Design: Transaction Window NV Split Frame, Model: W1-FW-HM-RS by ARMORTEX.

B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Steel Sheet:
1. ASTM A1008/1008M, cold rolled, free from scale, pitting, coil breaks, and other surface defects.

B. Bullet-Resistant Composite: UL Listed Bullet Resistant Composite by ARMORTEX, of UL Ballistic Level equal to specified frame ballistic protection level.

C. Ballistic Steel: Hi-Hard Ballistic Steel, of UL Ballistic Level equal to specified frame ballistic protection level.

D. Glazing: UL Listed laminated glass or glass/polycarbonate composite.

2.3 FABRICATION

A. Frames:
1. Fabricate from 16 gage steel lined with bullet-resistant composite.
2. Bullet-resistant rating equivalent to or greater than glazing.
3. Weld frame corners; knock-down and mechanical joints not acceptable.
4. Frame modules capable of being joined with other frame modules to form continuous line.
5. Replacement of glazing from secure side of window, not requiring removal of frame from opening.

B. Operable Units:
1. Hinge vertically utilizing full-length continuous hinge.
2. Sash secured by keyed positive locking latch. Where multiple operable windows occur, key all locks alike.

C. Welding: In accordance with AWS D1.3/D1.3M. Grind exposed welds flush and smooth.

D. Finish work neat and free from defects.

E. Allowable Tolerances: Plus or minus 1/16 inch for frame opening width, height, diagonal dimensions, and overall width and height (outside to outside).

2.4 FINISHES

A. Stainless Steel: No. 3 brushed finish.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install window assemblies in accordance with manufacturer's instructions and approved Shop Drawings.

B. Set plumb, square, and level.

C. Secure to adjacent construction using fastener type best suited to application.

D. Field alterations to window assemblies not permitted unless approved in advance by manufacturer and Architect.

3.2 ADJUSTING

A. Touch up minor scratches and abrasions in [primer paint] [finish coat] to match factory finish.

END OF SECTION 08 56 71

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SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Mechanical and electrified door hardware
2. Electronic access control system components
3. Field verification, preparation and modification of existing doors and frames to receive new door hardware.

B. Section excludes:

1. Windows
2. Cabinets (casework), including locks in cabinets
3. Signage
4. Toilet accessories
5. Overhead doors

C. Related Sections:

1. Division 01 Section "Alternates" for alternates affecting this section.
2. Division 06 Section "Rough Carpentry"
3. Division 06 Section "Finish Carpentry"
4. Division 07 Section "Joint Sealants" for sealant requirements applicable to threshold installation specified in this section.
5. Division 08 Sections:

    a. "Metal Doors and Frames"
    b. "Flush Wood Doors"
    c. "Stile and Rail Wood Doors"
    d. "Interior Aluminum Doors and Frames"
    e. "Aluminum-Framed Entrances and Storefronts"
    f. "Stainless Steel Doors and Frames"
    g. "Special Function Doors"
    h. "Entrances"

6. Division 09 sections for touchup, finishing or refinishing of existing openings modified by this section.
7. Division 26 "Electrical" sections for connections to electrical power system and for low-voltage wiring.
8. Division 28 "Electronic Safety and Security" sections for coordination with other components of electronic access control system and fire alarm system.

1.02 REFERENCES

A. UL LLC

1. UL 10B - Fire Test of Door Assemblies
2. UL 10C - Positive Pressure Test of Fire Door Assemblies
3. UL 1784 - Air Leakage Tests of Door Assemblies
4. UL 305 - Panic Hardware

B. DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule
2. Recommended Locations for Builders Hardware
3. Keying Systems and Nomenclature
4. Installation Guide for Doors and Hardware

C. NFPA – National Fire Protection Association

1. NFPA 70 – National Electric Code
2. NFPA 80 – 2016 Edition – Standard for Fire Doors and Other Opening Protectives
3. NFPA 101 – Life Safety Code
4. NFPA 105 – Smoke and Draft Control Door Assemblies
5. NFPA 252 – Fire Tests of Door Assemblies

D. ANSI - American National Standards Institute

1. ANSI A117.1 – 2017 Edition – Accessible and Usable Buildings and Facilities
2. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties
3. ANSI/BHMA A156.28 - Recommended Practices for Keying Systems
4. ANSI/WDMA I.S. 1A - Interior Architectural Wood Flush Doors
5. ANSI/SDI A250.8 - Standard Steel Doors and Frames

1.03 SUBMITTALS

A. General:

1. Submit in accordance with Conditions of Contract and Division 01 Submittal Procedures.
2. Prior to forwarding submittal:

   a. Comply with procedures for verifying existing door and frame compatibility for new hardware, as specified in PART 3, ''EXAMINATION'' article, herein.
   b. Review drawings and Sections from related trades to verify compatibility with specified hardware.
   c. Highlight, encircle, or otherwise specifically identify on submittals: deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.

B. Action Submittals:

1. Product Data: Submit technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:

a. Wiring Diagrams: For power, signal, and control wiring and including:
   1) Details of interface of electrified door hardware and building safety and security systems.
   2) Schematic diagram of systems that interface with electrified door hardware.
   3) Point-to-point wiring.
   4) Risers.

3. Samples for Verification: If requested by Architect, submit production sample of requested door hardware unit in finish indicated and tagged with full description for coordination with schedule.

   a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.

4. Door Hardware Schedule:

   a. Submit concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work critical in Project construction schedule.
   b. Submit under direct supervision of a Door Hardware Institute (DHI) certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule published by DHI.
   c. Indicate complete designations of each item required for each opening, include:
      1) Door Index: door number, heading number, and Architect's hardware set number.
      2) Quantity, type, style, function, size, and finish of each hardware item.
      3) Name and manufacturer of each item.
      4) Fastenings and other pertinent information.
      5) Location of each hardware set cross-referenced to indications on Drawings.
      6) Explanation of all abbreviations, symbols, and codes contained in schedule.
      7) Mounting locations for hardware.
      8) Door and frame sizes and materials.
      9) Degree of door swing and handing.
      10) Operational Description of openings with electrified hardware covering egress, ingress (access), and fire/smoke alarm connections.

5. Key Schedule:

   a. After Keying Conference, provide keying schedule that includes levels of keying, explanations of key system's function, key symbols used, and door numbers controlled.
   b. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
   c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
   d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.

e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion. Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.

C. Informational Submittals:

1. Provide Qualification Data for Supplier, Installer and Architectural Hardware Consultant.
2. Provide Product Data:

a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
b. Include warranties for specified door hardware.

D. Closeout Submittals:

1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:

a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
b. Catalog pages for each product.
c. Final approved hardware schedule edited to reflect conditions as installed.
d. Final keying schedule
e. Copy of warranties including appropriate reference numbers for manufacturers to identify project.
f. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.

E. Inspection and Testing:

1. Submit written reports to the Owner and Authority Having Jurisdiction (AHJ) of the results of functional testing and inspection for:

a. fire door assemblies, in compliance with NFPA 80.
b. required egress door assemblies, in compliance with NFPA 101.

1.04 QUALITY ASSURANCE

A. Qualifications and Responsibilities:

1. Supplier: Recognized architectural hardware supplier with a minimum of 5 years documented experience supplying both mechanical and electromechanical door hardware similar in quantity, type, and quality to that indicated for this Project. Supplier to be recognized as a factory direct distributor by the manufacturer of the primary materials with a warehousing facility in the Project's vicinity. Supplier to have on staff, a certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.
2. Installer: Qualified tradesperson skilled in the application of commercial grade hardware with experience installing door hardware similar in quantity, type, and quality as indicated for this Project.

3. Architectural Hardware Consultant: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:

    a. For door hardware: DHI certified AHC or DHC.
    b. Can provide installation and technical data to Architect and other related subcontractors.
    c. Can inspect and verify components are in working order upon completion of installation.
    d. Capable of producing wiring diagram and coordinating installation of electrified hardware with Architect and electrical engineers.

4. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.

B. Certifications:

1. Fire-Rated Door Openings:

    a. Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction.
    b. Provide only items of door hardware that are listed products tested by UL LLC, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.

2. Smoke and Draft Control Door Assemblies:

    a. Provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105
    b. Comply with the maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at tested pressure differential of 0.3-inch wg (75 Pa) of water.

3. Electrified Door Hardware

    a. Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.

4. Accessibility Requirements:

    a. Comply with governing accessibility regulations cited in "REFERENCES" article 087100, 1.02.D3 herein for door hardware on doors in an accessible route. This project must comply with all Federal Americans with Disability Act regulations and all Local Accessibility Regulations.

C. Pre-Installation Meetings

1. Keying Conference

    a. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:

1) Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
2) Preliminary key system schematic diagram.
3) Requirements for key control system.
4) Requirements for access control.
5) Address for delivery of keys.

2. Pre-installation Conference

a. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
b. Inspect and discuss preparatory work performed by other trades.
c. Inspect and discuss electrical roughing-in for electrified door hardware.
d. Review sequence of operation for each type of electrified door hardware.
e. Review required testing, inspecting, and certifying procedures.
f. Review questions or concerns related to proper installation and adjustment of door hardware.

3. Electrified Hardware Coordination Conference:

a. Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site. Promptly replace products damaged during shipping.
B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package. Deliver each article of hardware in manufacturer's original packaging.
C. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
D. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.
E. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.
F. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

1.06 COORDINATION

A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.
B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.

D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.
E. Existing Openings: Where existing doors, frames and/or hardware are to remain, field verify existing functions, conditions and preparations and coordinate to suit opening conditions and to provide proper door operation.

1.07 WARRANTY

A. Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within published warranty period.

1. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.
2. Warranty Period: Beginning from date of Substantial Completion, for durations indicated in manufacturer's published listings.

a. Mechanical Warranty
   1) Locks
      a) Schlage ND Series: 10 years
   2) Exit Devices
      a) Von Duprin: 3 years
   3) Closers
      a) LCN 4000 Series: 30 years

b. Electrical Warranty
   1) Locks
      a) Schlage: 1 year
   2) Exit Devices
      a) Von Duprin: 1 year

1.08 MAINTENANCE

A. Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.
B. Turn over unused materials to Owner for maintenance purposes.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. The Owner requires use of certain products for their unique characteristics and project suitability to ensure continuity of existing and future performance and maintenance standards. After investigating available product offerings, the Awarding Authority has elected to prepare proprietary specifications. These products are specified with the notation: "No Substitute."

1. Where "No Substitute" is noted, submittals and substitution requests for other products will not be considered.

B. Approval of manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturers" in the individual article for the product category shall be in accordance with QUALITY ASSURANCE article, herein.
C. Approval of products from manufacturers indicated in "Acceptable Manufacturers" is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer's product.
D. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.02 MATERIALS

A. Fabrication

1. Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. provide screws according to manufacturer’s recognized installation standards for application intended.
2. Finish exposed screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
3. Provide concealed fasteners wherever possible for hardware units exposed when door is closed. Coordinate with “Metal Doors and Frames”, “Flush Wood Doors”, “Stile and Rail Wood Doors” to ensure proper reinforcements. Advise the Architect where visible fasteners, such as thru bolts, are required.

B. Modification and Preparation of Existing Doors: Where existing door hardware is indicated to be removed and reinstalled.

1. Provide necessary fillers, Dutchmen, reinforcements, and fasteners, compatible with existing materials, as required for mounting new opening hardware and to cover existing door and frame preparations.
2. Use materials which match materials of adjacent modified areas.
3. When modifying existing fire-rated openings, provide materials permitted by NFPA 80 as required to maintain fire-rating.

C. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.

1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

D. Cable and Connectors:

1. Where scheduled in the hardware sets, provide each item of electrified hardware and wire harnesses with number and gage of wires enough to accommodate electric function of specified hardware.
2. Provide Molex connectors that plug directly into connectors from harnesses, electric locking and power transfer devices.
3. Provide through-door wire harness for each electrified locking device installed in a door and wire harness for each electrified hinge, electrified continuous hinge, electrified pivot, and electric power transfer for connection to power supplies.

2.03 HINGES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

    a. Ives 5BB series

2. Acceptable Manufacturers and Products:

    a. Hager BB1191/1279 series
    b. Stanley FBB series

B. Requirements:

1. Provide hinges conforming to ANSI/BHMA A156.1.
2. Provide five knuckle, ball bearing hinges.
3. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:

    a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
    b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high

4. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:

    a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
    b. Interior: Heavy weight, steel, 5 inches (127 mm) high

5. 2 inches or thicker doors:

    a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
    b. Interior: Heavy weight, steel, 5 inches (127 mm) high

6. Adjust hinge width for door, frame, and wall conditions to allow proper degree of opening.
7. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
8. Where new hinges are specified for existing doors or existing frames, provide new hinges of identical size to hinge preparation present in existing door or existing frame.
9. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:

    a. Steel Hinges: Steel pins
    b. Non-Ferrous Hinges: Stainless steel pins
    c. Out-Swinging Exterior Doors: Non-removable pins
    d. Out-Swinging Interior Lockable Doors: Non-removable pins
    e. Interior Non-lockable Doors: Non-rising pins

10. Provide hinges with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component. Provide mortar guard for each electrified hinge specified.

2.04 CONTINUOUS HINGES

A. Manufacturers:

1. Scheduled Manufacturer:

a. Ives

2. Acceptable Manufacturers:

a. Select
b. Roton

B. Requirements:

1. Provide aluminum geared continuous hinges conforming to ANSI/BHMA A156.26, Grade 1.
2. Provide aluminum geared continuous hinges, where specified in the hardware sets, fabricated from 6063-T6 aluminum.
3. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
4. Provide hinges capable of supporting door weights up to 450 pounds, and successfully tested for 1,500,000 cycles.
5. On fire-rated doors, provide aluminum geared continuous hinges classified for use on rated doors by testing agency acceptable to authority having jurisdiction.
6. Provide aluminum geared continuous hinges with electrified option scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware.
7. Provide hinges 1 inch (25 mm) shorter in length than nominal height of door, unless otherwise noted or door details require shorter length and with symmetrical hole pattern.

2.05 CYLINDRICAL LOCKS – GRADE 1

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

a. Schlage ND series

B. Requirements:

1. Provide cylindrical locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 1, and UL Listed for 3-hour fire doors.
2. Cylinders: Refer to ''KEYING'' article, herein.
3. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with 1/2-inch latch throw. Provide proper latch throw for UL listing at pairs.
4. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
5. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
7. Provide electrified options as scheduled in the hardware sets.
8. Lever Trim: Solid cast levers without plastic inserts and wrought roses on both sides.

a. Lever Design: RHO

2.06 EXIT DEVICES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

   a. Von Duprin 98/35A series

2. Acceptable Manufacturers and Products:

   a. Precision APEX 2000 series
   b. Falcon 24/25 series

B. Requirements:

1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide smooth touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.
4. Touchpad must extend a minimum of one half of door width. No plastic inserts are allowed in touchpads.
5. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrified requirements.
6. Provide exit devices with weather resistant components that can withstand harsh conditions of various climates and corrosive cleaners used in outdoor pool environments.
7. Provide flush end caps for exit devices.
8. Provide exit devices with manufacturer's approved strikes.
9. Provide exit devices cut to door width and height. Install exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
10. Mount mechanism case flush on face of doors or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
11. Provide cylinder or hex-key dogging as specified at non fire-rated openings.
12. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion, provide type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.
13. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.
14. Provide electrified options as scheduled.
15. Top latch mounting: double- or single-tab mount for steel doors, face mount for aluminum doors eliminating requirement of tabs, and double tab mount for wood doors.
16. Provide exit devices with optional trim designs to match other lever and pull designs used on the project.

2.07 CYLINDERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

   a. Schlage Everest 29 Primus XP

2. Acceptable Manufacturers and Products:

    a. No Substitute

B. Requirements:

1. Provide cylinders/cores, compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset, manufacturer's series as indicated. Refer to "KEYING" article, herein.
2. Provide cylinders in the below-listed configuration(s), distributed throughout the Project as indicated.

    a. High Security: dual-locking cylinder with permanent core requiring restricted, patented keyway. Dual-locking mechanism with interlocking finger pin(s) to check for patented features on keys.

3. Patent Protection: Cylinders/cores requiring use of restricted, patented keys, patent protected.
4. Nickel silver bottom pins.

2.08 KEYING

A. Scheduled System:

1. Existing factory registered system:

    a. Provide cylinders/cores keyed into Owner's existing factory registered keying system. Comply with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

B. Requirements:

1. Construction Keying:

    a. Replaceable Construction Cores.
        1) Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
            a) 3 construction control keys
            b) 12 construction change (day) keys.
        2) Owner or Owner's Representative will replace temporary construction cores with permanent cores.

2. Permanent Keying:

    a. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.
        1) Master Keying system as directed by the Owner.

    b. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
    c. Provide keys with the following features:

1) Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
2) Patent Protection: Keys and blanks protected by one or more utility patent(s).
3) Geographically Exclusive: Where High Security or Security cylinders/cores are indicated, provide nationwide, geographically exclusive key system complying with the following restrictions.

d. Identification:
1) Mark permanent cylinders/cores and keys with applicable blind code for identification. Do not provide blind code marks with actual key cuts.
2) Identification stamping provisions must be approved by the Architect and Owner.
3) Stamp cylinders/cores and keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
4) Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.
5) Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.

e. Quantity: Furnish in the following quantities.
1) Change (Day) Keys: 3 per cylinder/core.
2) Permanent Control Keys: 3.
3) Master Keys: 6.

2.09 DOOR CLOSERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

a. LCN 4040XP series

2. Acceptable Manufacturers and Products:

a. Corbin-Russwin DC8000 series
b. Sargent 281 series

B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with high strength cast iron cylinder, and full complement bearings at shaft.
3. Cylinder Body: 1-1/2-inch (38 mm) diameter with 5/8-inch (16 mm) diameter double heat-treated pinion journal.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.

7. Provide closers with solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers.
8. Pressure Relief Valve (PRV) Technology: Not permitted.
9. Finish for Closer Cylinders, Arms, Adapter Plates, and Metal Covers: Powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI Standard A156.4 and ASTM B117, or has special rust inhibitor (SRI).
10. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.10 PROTECTION PLATES

A. Manufacturers:

1. Scheduled Manufacturer:

a. Ives

2. Acceptable Manufacturers:

a. Burns
b. Trimco

B. Requirements:

1. Provide protection plates with a minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
2. Sizes plates 2 inches (51 mm) less width of door on single doors, pairs of doors with a mullion, and doors with edge guards. Size plates 1 inch (25 mm) less width of door on pairs without a mullion or edge guards.
3. At fire rated doors, provide protection plates over 16 inches high with UL label.

2.11 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

A. Manufacturers:

1. Scheduled Manufacturers:

a. Glynn-Johnson

2. Acceptable Manufacturers:

a. Rixson
b. Sargent

B. Requirements:

1. Provide overhead stop at any door where conditions do not allow for a wall stop or floor stop presents tripping hazard.
2. Provide friction type at doors without closer and positive type at doors with closer.

2.12 DOOR STOPS AND HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer:

   a. Ives

2. Acceptable Manufacturers:

   a. Trimco
   b. Burns

B. Provide door stops at each door leaf:

1. Provide wall stops wherever possible. Provide concave type where lockset has a push button of thumbturn.
2. Where a wall stop cannot be used, provide universal floor stops.
3. Where wall or floor stop cannot be used, provide overhead stop.
4. Provide roller bumper where doors open into each other and overhead stop cannot be used.

2.13 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

A. Manufacturers:

1. Scheduled Manufacturer:

   a. Zero International

2. Acceptable Manufacturers:

   a. National Guard
   b. Reese

B. Requirements:

1. Provide thresholds, weather-stripping, and gasketing systems as specified and per architectural details. Match finish of other items.
2. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
3. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.
4. Size thresholds 1/2 inch (13 mm) high by 5 inches (127 mm) wide by door width unless otherwise specified in the hardware sets or detailed in the drawings.

2.14 SILENCERS

A. Manufacturers:

1. Scheduled Manufacturer:

    a. Ives

2. Acceptable Manufacturers:

    a. Burns
    b. Trimco

B. Requirements:

1. Provide "push-in" type silencers for hollow metal or wood frames.
2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
3. Omit where gasketing is specified.

2.15 DOOR POSITION SWITCHES

A. Manufacturers:

1. Scheduled Manufacturer:

    a. Schlage

2. Acceptable Manufacturers:

    a. GE-Interlogix
    b. Sargent

B. Requirements:

1. Provide recessed or surface mounted type door position switches as specified.
2. Coordinate door and frame preparations with door and frame suppliers. If switches are being used with magnetic locking device, provide minimum of 4 inches (102 mm) between switch and magnetic locking device.

2.16 FINISHES

A. FINISH: BHMA 626/652 (US26D); EXCEPT:

1. Hinges at Exterior Doors: BHMA 630 (US32D)
2. Aluminum Geared Continuous Hinges: BHMA 628 (US28)
3. Push Plates, Pulls, and Push Bars: BHMA 630 (US32D)
4. Protection Plates: BHMA 630 (US32D)
5. Overhead Stops and Holders: BHMA 630 (US32D)
6. Door Closers: Powder Coat to Match
7. Wall Stops: BHMA 630 (US32D)
8. Latch Protectors: BHMA 630 (US32D)
9. Weatherstripping: Clear Anodized Aluminum
10. Thresholds: Mill Finish Aluminum

B. FINISH: BHMA 643E/716 (US11); EXCEPT:

1. Door Closers: Powder Coat to Match.
2. Weatherstripping: Dark Bronze Anodized Aluminum.
3. Thresholds: Extruded Architectural Bronze, Oil-Rubbed

PART 3 - EXECUTION

3.01 EXAMINATION

A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance. Verify doors, frames, and walls have been properly reinforced for hardware installation.
B. Field verify existing doors and frames receiving new hardware and existing conditions receiving new openings. Verify that new hardware is compatible with existing door and frame preparation and existing conditions.
C. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
D. Submit a list of deficiencies in writing and proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.

1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
2. Custom Steel Doors and Frames: HMMA 831.
3. Interior Architectural Wood Flush Doors: ANSI/WDMA I.S. 1A
4. Installation Guide for Doors and Hardware: DHI TDH-007-20

B. Install door hardware in accordance with NFPA 80, NFPA 101 and provide post-install inspection, testing as specified in section 1.03.E unless otherwise required to comply with governing regulations.
C. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.
D. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.
E. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.
F. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
G. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.
H. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated.
I. Lock Cylinders:

1. Install construction cores to secure building and areas during construction period.

2. Replace construction cores with permanent cores as indicated in keying section.
3. Furnish permanent cores to Owner for installation.

J. Wiring: Coordinate with Division 26, ELECTRICAL and Division 28 ELECTRONIC SAFETY AND SECURITY sections for:

1. Conduit, junction boxes and wire pulls.
2. Connections to and from power supplies to electrified hardware.
3. Connections to fire/smoke alarm system and smoke evacuation system.
4. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.
5. Connections to panel interface modules, controllers, and gateways.
6. Testing and labeling wires with Architect's opening number.

K. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.
L. Closer/Holders: Mount closer/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.
M. Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room, or alternate location as directed by Architect.
N. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."
O. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.
P. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
Q. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
R. Door Bottoms and Sweeps: Apply to bottom of door, forming seal with threshold when door is closed.

3.03 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Spring Hinges: Adjust to achieve positive latching when door can close freely from an open position of 30 degrees.
2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
3. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

3.04 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.
B. Clean operating items per manufacturer's instructions to restore proper function and finish.
C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.05 DOOR HARDWARE SCHEDULE

A. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.
B. Discrepancies, conflicting hardware, and missing items are to be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application.
C. Hardware items are referenced in the following hardware schedule. Refer to the above specifications for special features, options, cylinders/keying, and other requirements.

Abbreviation	Name
BYO	By Others
GLY	Glynn-Johnson Corp
IVE	H.B. Ives
LCN	Lcn Commercial Division
MIS	Misc - Out-Sourced Items
SCE	Schlage Electronic Security
SCH	Schlage Lock Company
VON	Von Duprin
ZER	Zero International Inc

HARDWARE GROUP NO. 01

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		F643E/716	IVE
1	EA	CLASSROOM LOCK	ND70TD RHO		643e	SCH
1	EA	CUSTOM STRIKE	AS REQ'D TO MATCH FRAME PREP		613	
1	EA	FSIC CORE	23-030 CKC EV D		613	SCH
1	EA	FLOOR STOP	FS436		643E/716	IVE
3	EA	SILENCER	SR64		GRY	IVE

GC TO RE-WORK EXISTING DOOR AND AS REQUIRED FOR NEW HARDWARE

HARDWARE GROUP NO. 02

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		F643E/716	IVE
1	EA	CLASSROOM LOCK	ND70TD RHO		643e	SCH
1	EA	FSIC CORE	23-030 CKC EV D		613	SCH
1	EA	SURFACE CLOSER	4040XP		695	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		613	IVE
1	EA	WALL STOP	WS406/407CCV		613	IVE
1	EA	SEALS	188S		BLK	BYO

END OF SECTION

SECTION 08 80 00 – GLAZING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes glazing for the following products, including those specified in other Sections where glazing requirements are specified by reference to this Section:
   1. Windows.
   2. Vision lites / Interior Borrowed Lites.
   3. Entrances and other doors.

B. Related Sections: The following sections contain requirements that relate to this Section.
   1. Division 06 Section "Rough Carpentry”
   2. Division 07 Section “Joint Sealants”
   3. Division 08 Sections "Aluminum Entrances & Storefronts" and "Flush Wood Doors"

C. This work includes all glazing, with the exception that at the East and West additions, the exterior glazing at windows, storefronts and curtainwalls is installed under separate envelope project.

1.3 DEFINITIONS

A. Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or a specified gas.

B. Deterioration of Coated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in metallic coating.

C. Deterioration of Insulating Glass: Failure of hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

D. Deterioration of Laminated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1.4 PERFORMANCE REQUIREMENTS

A. General: Provide glazing systems that are produced, fabricated, and installed to withstand normal thermal movement, wind loading, and impact loading (where applicable), without failure including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; and other defects in construction.

B. Glass Design: Glass thicknesses indicated on Drawings are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites for the various size openings in the thicknesses and strengths (annealed or heat-treated) to meet or exceed the following criteria:
   1. Minimum glass thicknesses of lites, whether composed of annealed or heat-treated glass, are selected so the worst-case probability of failure does not exceed the following:
      a. 8 lites per 1000 for lites set vertically or not over 15 degrees off vertical and under wind action. Determine minimum thickness of monolithic annealed glass according to ASTM E 1300. For other than monolithic annealed glass, determine thickness per glass manufacturer's standard method of analysis including applying adjustment factors to ASTM E 1300 based on type of glass.

C. Normal thermal movement results from the following maximum change (range) in ambient and surface temperatures acting on glass-framing members and glazing components. Base engineering calculation on materials' actual surface temperatures due to both solar heat gain and nighttime sky heat loss.
   1. Temperature Change (Range): 120 F deg, ambient; 180 F deg, material surfaces.

1.5 SUBMITTALS

A. General: Submit the following according to Conditions of Contract and Division 1 Specification Sections.

B. Product data for each glass product and glazing material indicated.

C. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

D. Samples for verification purposes of 12-inch square samples of each type of glass indicated except for clear monolithic glass products, and 12-inch long samples of each color required (except black) for each type of sealant or gasket exposed to view. Install sealant or gasket sample between two strips of material representative in color of the adjoining framing system.

E. Product certificates signed by glazing materials manufacturers certifying that their products comply with specified requirements.
   1. Separate certifications are not required for glazing materials bearing manufacturer's permanent labels designating type and thickness of glass, provided labels represent a quality control program of a recognized certification agency or independent testing agency acceptable to authorities having jurisdiction.

F. Compatibility and adhesion test reports from sealant manufacturer indicating that glazing materials were tested for compatibility and adhesion with glazing sealants. Include sealant manufacturer's interpretation of test results relative to sealant performance and recommendations for primers and substrate preparation needed for adhesion.

G. Compatibility test report from manufacturer of insulating glass edge sealant indicating that glass edge sealants were tested for compatibility with other glazing materials including sealants, glazing tape, gaskets, setting blocks, and edge blocks.

H. Product test reports for each type of glazing sealant and gasket indicated, evidencing compliance with requirements specified.

I. Maintenance data for glass and other glazing materials to include in Operating and Maintenance Manual specified in Division 1.

1.6 QUALITY ASSURANCE

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, except where more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
   1. FGMA Publications: "FGMA Glazing Manual."
   2. SIGMA Publications: TM-3000 "Vertical Glazing Guidelines."

B. Safety Glass: Products complying with ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for Category II materials.
   1. Subject to compliance with requirements, provide safety glass permanently marked with certification label of Safety Glazing Certification Council (SGCC) or other certification agency acceptable to authorities having jurisdiction.

C. Fire-Resistive Glazing Products for Door Assemblies: Glazing for assemblies that comply with NFPA 80 and that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing to NFPA 257.

D. Fire-Resistive Glazing Products for Window Assemblies: Glazing for assemblies that comply with NFPA 80 and that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing to NFPA 257.

E. Safety Glazing Products: Comply with testing requirements in 16CFR 1201
   1. Subject to compliance with requirements, obtain safety glazing products permanently marked with certification label of the Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction.
   2. Where glazing units, including Kind FT glass and laminated glass, are specified in Part 2 articles for glazing lites more than 9 sq. ft (0.84 sq. m) in exposed surface area of one side, provide glazing products that comply with Category II materials, for lites 9 sq. ft (0.84 sq. m) or less in exposed surface area on one side, provide glazing products that comply with Category I or II materials, except for hazardous locations where Category II materials are required by 16 CFR 1201 and regulations of authorities having jurisdiction.

F. Insulating Glass Certification Program: Provide insulating glass units permanently marked either on spacers or at least one component lite of units with appropriate certification label of inspecting and testing agency indicated below:
   1. Insulating Glass Certification Council (IGCC).
   2. Associated Laboratories, Inc. (ALI).
   3. National Certified Testing Laboratories (NCTL).

G. Glazier Qualifications: Engage an experienced glazier who has completed glazing similar in material, design, and extent to that indicated for Project with a record of successful in-service performance.

H. Single-Source Responsibility for Glass: Obtain glass from one source for each product indicated below:

1. Primary glass of each (ASTM C 1036) type and class indicated.
2. Heat-treated glass of each (ASTM C 1048) condition indicated.
3. Insulating glass of each construction indicated.
4. Fire resistive glass (ASTM E119) of each type and class indicated.

I. Single-Source Responsibility for Glazing Accessories: Obtain glazing accessories from one source for each product and installation method indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials to comply with manufacturer's directions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Where insulating glass units will be exposed to substantial altitude changes, comply with insulating glass fabricator's recommendations for venting and sealing to avoid hermetic seal ruptures.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or below 40 deg F (4.4 deg C).

1.9 WARRANTY

A. General: Warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

B. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form in which coated-glass manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

1. Warranty Period: 10 years from date of Substantial Completion.

C. Manufacturer's Special Warranty on Laminated Glass: Manufacturer's standard form in which laminated-glass manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially

obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1. Warranty Period: 10 years from date of Substantial Completion.

D. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form in which insulating-glass manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GLASS PRODUCTS

A. NOTE: ALL GLASS USED SHALL BE SAFETY GLASS MEETING REQUIREMENTS FOR CPSC 16 CFR 1201.

B. Annealed Float Glass: ASTM C 1036, Type I (transparent glass, flat), Class as indicated below, and Quality q3 (glazing select). Minimum ¼ inch thick.
1. Class 1 (clear) unless otherwise indicated.

C. Heat-Treated Float Glass: ASTM C 1048, Type I (transparent glass, flat), Class 1 (clear), Quality q3 (glazing select), kind as indicated below. Minimum ¼ inch thick.
1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.
2. Provide Kind HS (heat-strengthened) float glass in place of annealed float glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.
3. For uncoated glass, comply with requirements for Condition A.
4. For coated vision glass, comply with requirements for Condition C (other uncoated glass).
5. Provide Kind FT (fully tempered) float glass in place of annealed or Kind HS (heat-strengthened) float glass where safety glass is indicated

D. Sputter-Coated Float Glass: ASTM C 1376, float glass with metallic-oxide or -nitride coating deposited by vacuum deposition process after manufacture and heat treatment (if any), and complying with other requirements specified.

E. Laminated Glass: ASTM C 1172 and complying with testing requirements in 16 CFR 1201 for Category II materials, and with other requirements specified. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
1. Interlayer: Polyvinyl butyral of thickness indicated with a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after laminating glass lites and installation
   a. For polyvinyl butyral interlayers, laminate lites in autoclave with heat and pressure.
2. Laminating process: Fabricate laminated glass to produce glass free of foreign substances and air or glass pockets.

F. Insulating-Glass Units, General: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace and complying with ASTM E 774 for Class CBA units and with requirements specified in this Article and in Part 2 "Insulating-Glass Units" Article.
   1. Provide Kind HS (heat-strengthened) float glass in place of annealed glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.
   2. Overall Unit Thickness and Thickness of Each Lite: Dimensions indicated for insulating-glass units are nominal and the overall thicknesses of units are measured perpendicularly from outer surfaces of glass lites at unit's edge.
   3. Sealing System: Dual seal, with primary and secondary sealants as follows:
   4. Manufacturer’s standard sealants.
      a. Polyisobutylene and polysulfide.
      b. Polyisobutylene and hot-melt butyl.
      c. Polyisobutylene and silicone.
      d. Polyisobutylene and polyurethane
   5. Spacer Specifications: Manufacturer's standard spacer material and construction.
   6. Spacer Specifications: Manufacturer's standard spacer material and construction complying with the following requirements:
      a. Spacer Material: Aluminum with clear anodic finish.
      b. Corner Construction: Manufacturer's standard corner construction.
   7. Low “E” Glass: Provide nominal 1” insulated glass comprised of inner ¼” pane of clear glass with Low “E” coating, ½” air space, outer ¼” pane of clear glass
   8. Winter U-value: .31
   9. Solar reflectance: 29%
   10. Sealed insulating glass units shall be in conformance to ASTM E 774-92; permanent IGCC certification label for CBA rating level.

2.2 FIRE-RATED GLAZING PRODUCTS

A. Laminated Ceramic Glazing Material: Proprietary Category II safety glazing product in the form of 2 lites of clear ceramic glazing material laminated together to produce a laminated lite of 5/16-inch (8-mm) nominal thickness; polished on both surfaces; weighing 4 lb/sq. ft. (19.5 kg/sq. m); and as follows:
   1. Fire-Protection Rating: As indicated for the assembly in which glazing material is installed, and permanently labeled by a testing and inspecting agency acceptable to authorities having jurisdiction.
   2. Polished on both surfaces, transparent.
   3. Approved products: Fire lite plus premium or approved equal.
   4. Provide glazing resistant to heat rate of rise transfer, compliant with ASTM E 119, where required.

2.3 GLAZING SEALANTS

A. General:

   1. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
   2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.

3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Dow Corning Corporation; 790.
b. GE Advanced Materials - Silicones; SilPruf LM SCS2700.
c. May National Associates, Inc.; Bondaflex Sil 290.
d. Pecora Corporation; 890.
e. Sika Corporation, Construction Products Division; SikaSil-C990.
f. Tremco Incorporated; Spectrem 1.

2. Applications: For weather seal.

C. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 25, Use NT.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Dow Corning Corporation; 799.
b. GE Advanced Materials - Silicones; UltraGlaze SSG4000
c. May National Associates, Inc.; Bondaflex Sil 200 GPN or Bondaflex Sil 201 FC.
d. Polymeric Systems, Inc.; PSI-631.
e. Schnee-Morehead, Inc., an ITW company; SM5731 Poly-Glaze Plus.
f. Tremco Incorporated; Proglaze SSG or Tremsil 600.

2. Applications: For structural seal.

D. Glazing Sealant: Acid-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 25, Use NT.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Dow Corning Corporation; 795.
b. General Electric; Siliglaze-II 2800
c. Tremco Incorporated; Spectrum 2

2. Applications: Fire and Safety Rated Glazing

3. Glazing Sealants for Fire-Rated Glazing Products: Products that are approved by testing agencies that listed and labeled fire-resistant glazing products with which they are used for applications and fire-protection ratings indicated.

2.4 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tape: Preformed, butyl-based elastomeric tape with a solids content of 100 percent, nonstaining and nonmigrating in contact with nonporous surfaces, with or without spacer

rod as recommended by tape and glass manufacturers for application indicated, packaged on rolls with a release paper backing, and complying with AAMA 800 for products indicated below:
1. AAMA 806.1.

B. Expanded Cellular Glazing Tape: Closed-cell, polyvinyl chloride foam tape, factory coated with adhesive on both surfaces, packaged on rolls with release liner protecting adhesive, and complying with AAMA 800 for product 810.5.

C. Available Products: Subject to compliance with requirements, glazing tape that may be incorporated in the Work include, but is not limited to, the following:
1. Back-Bedding Mastic Glazing Tape Without Spacer Rod:
   a. Dyna-Seal, Pecora Corp.
   b. PTI 626 Architectural Sealant Tape, Protective Treatments, Inc.
   c. S-M 5710 H.P Poly-Glaze Tape Sealant, Schnee-Morehead, Inc.
   d. SST-800 Tape, Tremco, Inc.
2. Expanded Cellular Glazing Tape:
   a. Norseal V-980 Closed-Cell Glazing Tape, Norton Company.

2.5 GLAZING GASKETS

A. Lock-Strip Gaskets: Neoprene extrusions in size and shape indicated, fabricated into frames with molded corner units and zipper lock strips, complying with ASTM C 542, black.

B. Dense Compression Gaskets: Molded or extruded gaskets of material indicated below, complying with standards referenced with name of elastomer indicated below, and of profile and hardness required to maintain watertight seal:
1. EPDM, ASTM C 864.
2. Silicone, ASTM C 1115.
3. Thermoplastic polyolefin rubber, ASTM C 1115.
4. Any material indicated above.

C. Soft Compression Gaskets: Extruded or molded closed-cell, integral-skinned gaskets of material indicated below, complying with ASTM C 509, Type II, black, and of profile and hardness required to maintain watertight seal:
1. EPDM.
2. Silicone.
3. Thermoplastic polyolefin rubber.
4. Any material indicated above.

D. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the work include, but are not limited to, the following companies.
1. Lock-Strip Gaskets:
   a. Stanlock Div., Griffith Rubber Mills.
2. Preformed Gaskets:
   a. Advanced Elastomer Systems, L.P.
   b. Schnee-Morehead, Inc.
   c. Tremco, Inc.

2.6 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials involved for glazing application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore A durometer hardness of 85 plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side-walking).

F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

G. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.

H. Plastic Foam Joint Fillers: Preformed, compressible, resilient, nonstaining, nonextruding, nonoutgassing, strips of closed-cell plastic foam of density, size, and shape to control sealant depth and otherwise contribute to produce optimum sealant performance.

2.7 FABRICATION OF GLASS AND OTHER GLAZING PRODUCTS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.

C. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 GLAZING SCHEDULE

A. Type G1 – 45min Fire Rated, Clear Laminated Safety Glass (Interior U.O.N.)

B. Type G2 – Clear Insulated Laminated Tempered Safety Glass with Security Film (Exterior U.O.N.)

C. Type G3 – 45min Fire Rated, Clear Laminated Safety Glass with Security Film (Interior U.O.N.)

D. Type G4 – Clear Ballistic Glass (Interior U.O.N.)

E. Type G5– Clear Laminated Safety Glass (Interior U.O.N.)

3.2 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
   1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
   2. Presence and functioning of weep systems.
   3. Minimum required face and edge clearances.
   4. Effective sealing between joints of glass-framing members.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the completed work.

C. Do not proceed with glazing until unsatisfactory conditions have been corrected.

3.3 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings that are not firmly bonded to substrates.

3.4 GLAZING, GENERAL

A. Comply with combined recommendations of manufacturers of glass, sealants, gaskets, and other glazing materials, except where more stringent requirements are indicated, including those in referenced glazing publications.

B. Glazing channel dimensions as indicated on Drawings provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.

C. Protect glass from edge damage during handling and installation as follows:
   1. Use a rolling block in rotating glass units to prevent damage to glass corners. Do not impact glass with metal framing. Use suction cups to shift glass units within openings; do not raise or drift glass with a pry bar. Rotate glass lites with flares or bevels on bottom horizontal edges so edges are located at top of opening, unless otherwise indicated by manufacturer's label.
   2. Remove damaged glass from Project site and legally dispose of off site. Damaged glass is glass with edge damage or other imperfections that, when installed, weaken glass and impair performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.

E. Install elastomeric setting blocks in sill rabbets, sized and located to comply with referenced glazing standard, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

3.5 TAPE GLAZING

A. Position tapes on fixed stops so that when compressed by glass their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously but not in one continuous length. Do not stretch tapes to make them fit opening.

C. Where framing joints are vertical, cover these joints by applying tapes to heads and sills first and then to jambs. Where framing joints are horizontal, cover these joints by applying tapes to jambs and then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until just before each lite is installed.

F. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

3.6 GASKET GLAZING (DRY)

A. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with stretch allowance during installation.

B. Secure compression gaskets in place with joints located at corners to compress gaskets producing a weather tight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

C. Install gaskets so they protrude past face of glazing stops.

3.7 SEALANT GLAZING (WET)

A. Install continuous spacers between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel weep systems until sealants cure. Secure spacers in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass. Install pressurized gaskets to protrude slightly out of channel to eliminate dirt and moisture pockets.

3.8 LOCK-STRIP GASKET GLAZING

A. Comply with ASTM C 716 and gasket manufacturer's printed recommendations. Provide supplementary wet seal and weep system unless otherwise indicated.

3.9 CLEANING AND PROTECTION

A. Protect exterior glass from breakage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for build-up of dirt, scum, alkali deposits, or stains, and remove as recommended by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way, including natural causes, accidents and vandalism, during construction period.

E. Wash glass on both faces in each area of Project not more than 4 days prior to date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended by glass manufacturer.

3.10 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.
   1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
   2. Set aside and protect materials suitable for reuse and/or remanufacturing.
   3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 08 80 00

SECTION 08 83 00 - MIRRORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. The work performed under this Section includes the performance criteria, materials, production, and erection of Mirrors for the project and consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all Mirrors as required by schedules, keynotes and drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction including, but not limited to the following:

1. Tempered glass mirrors qualifying as safety glazing.

B. Related Sections:

1. Division 08 "Glazing" for glass with reflective coatings used for vision and spandrel lites.

1.3 ACTION SUBMITTALS

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

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

B. Shop Drawings: Include mirror elevations, edge details, mirror hardware, and attachments to other work.

C. Samples: For each type of the following products:

1. Mirrors: 12 inches (300 mm) square, including edge treatment on two adjoining edges.
2. Mirror Clips: Full size.
3. Mirror Trim: 12 inches (300 mm) long.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Product Certificates: For each type of mirror and mirror mastic, from manufacturer.

C. Preconstruction Test Reports: From mirror manufacturer indicating that mirror mastic was tested for compatibility and adhesion with mirror backing film and substrates on which mirrors are installed.

D. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

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

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

B. Source Limitations for Mirrors: Obtain mirrors from single source from single manufacturer.

C. Source Limitations for Mirror Accessories: Obtain mirror glazing accessories from single source.

D. Glazing Publications: Comply with the following published recommendations:

1. GANA's "Glazing Manual" unless more stringent requirements are indicated. Refer to this publication for definitions of glass and glazing terms not otherwise defined in this Section or in referenced standards.
2. GANA Mirror Division's "Mirrors, Handle with Extreme Care: Tips for the Professional on the Care and Handling of Mirrors."

E. Safety Glazing Products: For tempered mirrors, provide products complying with testing requirements in 16 CFR 1201 for Category II materials.

F. Preconstruction Mirror Mastic Compatibility Test: Submit mirror mastic products to mirror manufacturer for testing to determine compatibility of mastic with mirror backing film and substrates on which mirrors are installed.

1.7 DELIVERY, STORAGE, AND HANDLING

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

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

1.8 PROJECT CONDITIONS

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

B. Mirror shall be installed flush with tile.

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form in which mirror manufacturer agrees to replace mirrors that deteriorate within specified warranty period. Deterioration of mirrors is defined as defects developed from normal use that are not attributed to mirror breakage or to maintaining and cleaning mirrors contrary to manufacturer's written instructions. Defects include discoloration, black spots, and clouding of the silver film.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SILVERED FLAT GLASS MIRRORS

A. Refer to Restroom and Accessory Schedule for toilet room mirror bases of design.

B. Where mirror product is not specifically noted otherwise, furnish and install glass Mirrors, General: ASTM C 1503**;** manufactured using copper-free, low-lead mirror coating process.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Arch Aluminum & Glass Co., Inc.
b. Donisi Mirror Company.
c. Gardner Glass, Inc.
d. Guardian Industries.
e. Independent Mirror Industries, Inc.
f. Lenoir Mirror Company. National Glass Industries.
g. Stroupe Mirror Co., Inc.
h. Sunshine Mirror; Westshore Glass Corp.
i. Virginia Mirror Company, Inc.
j. Walker Glass Co., Ltd.

C. Tempered Clear Glass: Mirror Glazing Quality, for blemish requirements; and comply with ASTM C 1048 for Kind FT, Condition A, tempered float glass before silver coating is applied.

1. Nominal Thickness: 6.0 mm.

2.2 MISCELLANEOUS MATERIALS

A. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

B. Edge Sealer: Coating compatible with glass coating and approved by mirror manufacturer for use in protecting against silver deterioration at mirrored glass edges.

C. Mirror Mastic: An adhesive setting compound, asbestos-free, produced specifically for setting mirrors and certified by both mirror manufacturer and mastic manufacturer as compatible with glass coating and substrates on which mirrors will be installed.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Franklin International; Titebond Division.
b. Laurence, C. R. Co., Inc.
c. Macco Adhesives; Liquid Nails Division.
d. OSI Sealants, Inc.
e. Palmer Products Corporation.
f. Pecora Corporation.
g. Royal Adhesives & Sealants; Gunther Mirror Mastics Division.
h. Sommer & Maca Industries, Inc.

2. Adhesive shall have a VOC content of not more than 70 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

D. Film Backing for Safety Mirrors: Film backing and pressure-sensitive adhesive; both compatible with mirror backing paint as certified by mirror manufacturer.

2.3 MIRROR HARDWARE

A. Aluminum J-Channels: Aluminum extrusions with a return deep enough to produce a glazing channel to accommodate mirrors of thickness indicated and in lengths required to cover bottom and top edges of each mirror in a single piece.

1. Bottom Trim: J-channels formed with front leg and back leg not less than 3/8 and 7/8 inch (9.5 and 22 mm) in height, respectively, and a thickness of not less than 0.05 inch (1.3 mm).

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

1) Laurence, C. R. Co., Inc.; CRL Standard "J" Channel.
2) Sommer & Maca Industries, Inc.; Aluminum Shallow Nose "J" Moulding Lower Bar.
3) Sommer & Maca Industries, Inc.; Heavy Gauge Aluminum Shallow Nose "J" Moulding Lower Bar.

2. Top Trim: J-channels formed with front leg and back leg not less than 5/8 and 1 inch (16 and 25 mm) in height, respectively, and a thickness of not less than 0.062 inch (1.57 mm).

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

        1) Laurence, C. R. Co., Inc.; CRL Deep "J" Channel.
        2) Sommer & Maca Industries, Inc.; Aluminum Deep Nose "J" Moulding Upper Bar.
        3) Sommer & Maca Industries, Inc.; Heavy Gauge Aluminum Deep Nose "J" Moulding Lower Bar.

3. Finish: Clear bright anodized.

B. Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.

C. Anchors and Inserts: Provide devices as required for mirror hardware installation. Provide toothed or lead-shield expansion-bolt devices for drilled-in-place anchors. Provide galvanized anchors and inserts for applications on inside face of exterior walls and where indicated.

2.4 FABRICATION

A. Mirror Sizes: To suit Project conditions, and before tempering**,** cut mirrors to final sizes and shapes.

B. Cutouts: Fabricate cutouts before tempering for notches and holes in mirrors without marring visible surfaces. Locate and size cutouts so they fit closely around penetrations in mirrors.

C. Mirror Edge Treatment: Rounded polished.

1. Seal edges of mirrors with edge sealer after edge treatment to prevent chemical or atmospheric penetration of glass coating.
2. Require mirror manufacturer to perform edge treatment and sealing in factory immediately after cutting to final sizes.

D. Film-Backed Safety Mirrors: Apply film backing with adhesive coating over mirror backing paint as recommended in writing by film-backing manufacturer to produce a surface free of bubbles, blisters, and other imperfections.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, over which mirrors are to be mounted, with Installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance of the Work.

B. Verify compatibility with and suitability of substrates, including compatibility of mirror mastic with existing finishes or primers.

C. Proceed with installation only after unsatisfactory conditions have been corrected and surfaces are dry.

3.2 PREPARATION

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

3.3 INSTALLATION

A. General: Install mirrors to comply with mirror manufacturer's written instructions and with referenced GANA publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.

B. Mirrors shall be installed flush with face of tile.

C. Provide a minimum air space of 1/8 inch (3 mm) between back of mirrors and mounting surface for air circulation between back of mirrors and face of mounting surface.

D. Wall-Mounted Mirrors: Install mirrors with mastic and mirror hardware. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirrors.

1. Top and Bottom Aluminum J-Channels: Provide setting blocks 1/8 inch (3 mm) thick by 4 inches (100 mm) long at quarter points. To prevent trapping water, provide, between setting blocks, two slotted weeps not less than 1/4 inch (6.4 mm) wide by 3/8 inch (9.5 mm) long at bottom channel.
2. Install mastic as follows:

    a. Apply barrier coat to mirror backing where approved in writing by manufacturers of mirrors and backing material.
    b. Apply mastic to comply with mastic manufacturer's written instructions for coverage and to allow air circulation between back of mirrors and face of mounting surface.
    c. After mastic is applied, align mirrors and press into place while maintaining a minimum air space of 1/8 inch (3 mm) between back of mirrors and mounting surface.

3.4 CLEANING AND PROTECTION

A. Protect mirrors from breakage and contaminating substances resulting from construction operations.

B. Do not permit edges of mirrors to be exposed to standing water.

C. Maintain environmental conditions that will prevent mirrors from being exposed to moisture from condensation or other sources for continuous periods of time.

D. Wash exposed surface of mirrors not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash mirrors as recommended in writing by mirror manufacturer.

3.5 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area

END OF SECTION 08 83 00

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SECTION 08 87 17 - SAFETY AND SECURITY GLAZING FILMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Glazing film applied to existing and new glazing assemblies.

B. New Glazing: Factory or shop install film to glazing before installation in frames.

C. Glazing assemblies to receive film are indicated on drawings.

1.02 RELATED REQUIREMENTS

A. Section 08 11 13 - Hollow Metal Doors and Frames: New doors with glazing to receive film.

B. Section 08 41 13 - aluminum entrances and storefronts: New glazing to receive film.

D. Section 08 80 00 - Glazing: New glazing to received film (as indicated on drawings).

1.03 ABBREVIATIONS AND ACRONYMS

A. CFR - Code of Federal Regulations.

B. GSA - General Services Administration.

1.04 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; current edition.

B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015.

C. ASTM C1184 - Standard Specification for Structural Silicone Sealants; 2014.

D. ASTM D882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting; 2012.

E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2016.

F. GSA TS01 - Standard Test Method for Glazing and Window Systems Subject to Dynamic Overpressure Loadings; General Services Administration; 2003.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Record of product certification for safety requirements.
   2. Preparation instructions and recommendations.
   3. Storage and handling requirements and recommendations.
   4. Installation methods.

C. Shop Drawings: Detailing installation of film, anchoring accessories, and sealant.

D. Samples: For each film product to be used, minimum size 4 inches by 6 inches, representing actual product, color, and patterns.

E. Samples, Supplemental Anchors: Where supplemental anchors are necessary to achieve specified performance submit detailed information in accordance with substitution procedures; include two samples, minimum length 2 inches.

F. Test Reports: Detailed reports of full-scale chamber tests to specified criteria, using assemblies identical to those required for this project.

G. Specimen Warranty.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Glazing film manufacturer specializing in manufacture of safety glazing films with minimum 10 years successful experience.

B. Installer Qualifications: Certified by glazing film manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of authorities having jurisdiction.

1.08 FIELD CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.09 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide 10 year manufacturer's replacement warranty to cover film against peeling, cracking, discoloration, and deterioration.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: ArmoredOne 23 mil #AOTSF23, by Armored One LLC, 386 N Midler Ave, Syracuse, NY 13206, www.armoredone.com/contact/

D. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 SAFETY AND SECURITY GLAZING FILM

A. Safety Glazing: Retrofit existing glazing assemblies to provide impact resistance complying with ANSI Z97.1 and 16 CFR 1201, Category II.
   1. 1/4 inch thick clear annealed glass.
   2. 1” insulated safety glass
   3. Surface applied film.
   4. Requiring no supplemental anchoring devices.

2.03 MATERIALS

A. Security Glazing Film:

   1. Transparent polyester film for permanent bonding to glass.

2. Final installed product must be a minimum of 0.023 inches (23 Mil) thick.
   a. Installing multiple layers of thinner film to accomplish the required thickness is not allowed.
3. Adhesive Type: Pressure sensitive.
4. Tensile Strength: ASTM D-882, 32,000 psi minimum.
5. Breaking Strength: ASTM D-882, 640 lbs. / inch.
6. Elongation at Break: ASTM D-882, 230%
7. Haze: ASTM D1003, <4%
8. Color b: ASTM D2244, 4.2
9. Visible Light Transmission: 87%
10. Visible Light Reflected (Int): 12%
11. Visible Light Reflected (Ext): 12%
12. UV Block:>99%
13. Total Solar Energy Reflected: 11%
14. Total Solar Energy Transmitted: 77%
15. Total Solar Energy Absorbed: 12%
16. Shading Coefficient: 0.93
17. Total Solar Energy Rejected: 19%
18. Solar Heat Gain Coefficient: 0.81
19. U-Value Winter: 1.03
20. K-Value Winter: 5.85
21. Glare Reduction: 3%
22. Surface Burning Characteristics: Flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E84 (Class A).

B. Retrofit existing glazing assemblies to provide impact resistance and forced/attack resistance complying with WEY-SA-C1, ANSI Z97. I and CPSC 16 CFR 1201 Category II, ASTM E330, UL972, EN356 P4A, and GSA Level C as specified:

C. Provide supplemental anchoring system as required to meet forced entry resistance requirements.

D. Light Transmission of Film Applied on 1/4-inch-Thick Clear Annealed Glass:
   1. Visible light Transmittance: 86 percent.

E. Anchoring System: DOW 995 or GE SCS2000 SilPruf Structural Sealant with high impact styrene trim.

PART 3 EXECUTION

3.1 EXAMINATION

A. Field -Applied Film: Verify that existing conditions are adequate for proper application and performance of film.

B. Examine glass and frames. Verify that existing conditions are adequate for proper application and performance of film.

C. Verify glass is not cracked, chipped, broken, or damaged.

D. Verify that frames are securely anchored and free of defects.

E. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean glass of dust, dirt, paint, oil, grease, mildew, mold, and other contaminants that would inhibit adhesion.

B. Immediately prior to applying film, thoroughly wash glass with neutral cleaning solution.

C. Protect adjacent surfaces.

D. Do not begin installation until substrates have been properly prepared.

3.3 INSTALLATION

A. Do not apply glazing film when surface temperature is less that 40 degrees F or if precipitation is imminent.

B. Install in accordance with manufacturer's instructions, without air bubbles, wrinkles, streaks, bands, thin spots, pinholes, or gaps, as required to achieve specified performance.

C. Accurately cut film with straight edges to required sizes allowing 1/16 inch to 1/8 inch gap at perimeter of glazed panel unless otherwise required by anchorage method.

D. Seams: Seam film only as required to accommodate material sizes; form seams vertically without overlaps and gaps; do not install with horizontal seams.

E. Supplemental Anchors: Install in accordance with manufacturer's instructions and shop drawings.

F. Clean glass and anchoring accessories following installation. Remove excess sealants and other glazing materials from adjacent finished surfaces.

G. Remove labels and protective covers.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 09 03 70 – NEW BONDED TERRAZZO TO MATCH EXISTING TERRAZZO FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. The procedures include general guidelines offered by GSA (US Government Services Administration) to follow when restoring terrazzo in early twentieth century buildings. It identifies specific design issues and outlines recommended installation solutions that have the least visual or physical impact on the historic materials. The work of this Section includes performance criteria and consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all terrazzo work: installing new bonded terrazzo to replace existing severely damaged portions of existing terrazzo floors, or to enlarge or alter an area of existing/historic terrazzo floors and installation of construction / expansion joints.

B. Related Requirements:

1. Division 07 "Joint Sealants" for sealants installed with terrazzo.

1.3 DEFINITIONS

A. Aggregate: Marble chips / and aggregates similar to original installation.

1.4 REFERENCES

A. NTMA Standards: Comply with specified provisions and recommendations of the National Terrazzo and Mosaic Association, Inc. (NTMA): http://www.ntma.com/

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to terrazzo including, but not limited to, the following:

a. Inspect and discuss condition of substrate and other preparatory work performed by other trades.

b. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
c. Review special terrazzo designs and patterns.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Submittals:

1. Product Data: For adhesives, documentation including printed statement of VOC content.
2. Product Data: For sealers, documentation including printed statement of VOC content.
3. Product Data: For terrazzo flooring, documentation from an independent testing agency indicating compliance with the FloorScore Standard.
4. Laboratory Test Reports: For adhesives and flooring system, documentation indicating that products comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Shop Drawings: Include terrazzo installation requirements. Include plans, elevations, sections, component details, and attachments to other work. Show layout of the following:

1. Divider strips.
2. Control-joint strips.
3. Expansion-joint strips.
4. Accessory strips.
5. Abrasive strips.

D. Samples: For each exposed product and for each color and texture specified, 6 inches (150 mm) in size.

E. Samples for Initial Selection: NTMA color plates showing the full range of colors and patterns available for each terrazzo type.

F. Samples for Verification: For each type, material, color, and pattern of terrazzo and accessory required showing the full range of color, texture, and pattern variations expected. Label each terrazzo sample to identify manufacturer's matrix color and aggregate types, sizes, and proportions. Prepare Samples of same thickness and from same material to be used for the Work, in size indicated below:

1. Terrazzo: 6-inch- (150-mm-) square Samples.
2. Accessories: 6-inch- (150-mm-) long Samples of each exposed strip item required.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Material Certificates: For each type of terrazzo material or product, from manufacturer.

1.8 CLOSEOUT SUBMITTALS

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

1.9 QUALITY ASSURANCE

A. Installer Qualifications: An installer who is a contractor member of NTMA.

B. Source Limitations for Aggregates: Obtain each color, grade, type, and variety of granular materials from single source with resources to provide materials of consistent quality in appearance and physical properties.

C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockups for terrazzo including accessories.

a. Size: Minimum 100 sq. ft. (9 sq. m) of typical poured-in-place flooring condition for each color and pattern in locations directed by Architect.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in supplier's original wrappings and containers, labeled with source's or manufacturer's name, material or product brand name, and lot number if any.

B. Store materials in their original, undamaged packages and containers, inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1.11 FIELD CONDITIONS

A. Environmental Limitations: Maintain temperature above 50 deg F (10 deg C) for 48 hours before and during terrazzo installation.

B. Weather Limitations: Proceed with rustic terrazzo installation only when forecasted weather conditions permit work to be performed according to NTMA's written recommendations and temperatures remain above 45 deg F (7.2 deg C).

C. Field Measurements: Verify actual dimensions of construction contiguous with precast terrazzo by field measurements before fabrication.

D. Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during terrazzo installation.

E. Close spaces to traffic during terrazzo application and for not less than 24 hours after application unless manufacturer recommends a longer period.

F. Control and collect water and dust produced by grinding operations. Protect adjacent construction from detrimental effects of grinding operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. NTMA Standards: Comply with NTMA's "Terrazzo Specifications and Design Guide" and with written recommendations for terrazzo type indicated unless more stringent requirements are specified.

B. FloorScore Compliance: Terrazzo floors shall comply with requirements of FloorScore Standard.

C. Low-Emitting Materials: Flooring system shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.2 MATERIALS

A. Portland Cement: ASTM C150, Type I, except as modified to comply with NTMA requirements for compressive strength. Obtain cement from a single source for each required color.
1. Provide non-staining white cement for terrazzo matrix.

B. Sand: ASTM C33

C. Water: Clean, free of oil, soluble salts or other deleterious substances.

D. Aggregate: Natural, sound, crushed marble chips without excessive flats or flakes, complying with NTMA requirements. When matching existing terrazzo, the original aggregate types and ratios are often found listed on original drawings.
1. Colors and gradation of aggregate sizes as required to match original existing intact materials and patterns.
2. Aggregate colors and matrix pigments should be matched after cleaning or taken from the interior of core samples.

E. Matrix Pigments: Pure mineral or synthetic pigments, resistant to alkalies and non-fading. Mix pigments with matrix to provide required colors.

F. Curing Compound: Liquid-membrane-forming compound, ASTM C309, Type 1.

G. Divider Strips in new spaces and restored spaces:
1. Depth and style required for terrazzo type and thickness. Divider strips should be of solid composition and match historic profiles (size, color, material).
2. Materials: brass. Do not use coated divider strips.

H. Use conventional terrazzo grinding equipment rather than lighter type machines.

I. Accessory Strips: Match width, material and color of divider strips, unless otherwise required. Provide following types of accessory strips as required for complete installation.
   1. Control Joint Strips: Double or split units, 1/8" wide, of same material and color as divider strips with 1/8" wide full-depth filler, laminated between strips.
   2. Adhesive Bonding Agent: Epoxy or polyester resin.

2.3 MIXES

A. Underbed: One part portland cement to 4-1/2 parts sand and sufficient water to provide workability at as low a slump as possible.

B. Terrazzo Topping: One 94 pound bag of portland cement as per 200 pounds of marble chips and approximately 5 gallons of water.
   1. Add color pigment as required to match existing color. Do not exceed, however, 2 pounds of pigment per bag of cement.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine the terrazzo to determine the type of terrazzo topping used. Match marble chips and matrix for existing terrazzo by size, mineral content and color. See Submittals. Color samples should be taken after cleaning.

B. Perform a thorough examination of the existing conditions. Perform any necessary tests on an inconspicuous surface to determine the current conditions and appropriate steps and materials necessary for replication and replacement of select areas of existing terrazzo surfaces.

3.2 PREPARATION

A. Surface Preparation:
   1. Clean and prepare substrate to comply with NTMA specifications for type of terrazzo application indicated. Clean substrate of loose chips and foreign matter. Grind concrete substrate to provide surfaces within tolerances required by NTMA for type of terrazzo application.
   2. For cementitious terrazzo, comply with NTMA recommendations for proportioning mixes, installation of strips, and for placing, curing, grinding, grouting and finishing.
   3. Exercise extreme care to ensure fluids from grinding operation do not react with divider or control joint strips to produce a stain on aggregate or discolor strips.
   4. Delay grinding and finishing until heavy trade work is completed and construction traffic through the area is restricted.
   5. Provide terrazzo bases, thresholds, stair treads and landings, without interruptions of seams,except where divider strips, control joints and expansion joints are required. Place and finish terrazzo around obstructions to achieve continuous color, pattern and finish.
   6. Provide control joints where required by installing angle-type divider strips back-to-back with neoprene rubber filler cemented between strips, flush with finish floor.

3.3 ERECTION, INSTALLATION AND APPLICATION

A. Match the historic character and pattern of the terrazzo in all spaces containing or contiguous with existing terrazzo.

B. Sand Cushion (floating) Terrazzo: Comply with NTMA "Guide Specification for Bonded Terrazzo".
1. Used where structural movement is anticipated from settling, expansion, contraction, or vibration, which may cause injury to the terrazzo topping;
2. The overall thickness of the underbed and topping needs to be at least 3 inches.
3. The concrete slab is covered with a thin bed of dry sand, over which is laid a waterproof membrane and reinforcing wire mesh.
4. Install the terrazzo underbed to 5/8 inch below the finished floor line.
5. Place divider strips and then pour terrazzo topping.

C. Bonded-to-Concrete Terrazzo: Comply with NTMA "Guide Specification for Bonded Terrazzo".
1. Used in all general areas-corridors, lobbies,rooms, sidewalks, etc.
2. The minimum overall thickness (most common) is 1-3/4 inches; With reinforcing, 2 or 2-1/2 inches is appropriate.
3. Thoroughly clean and soak the base slab with water.
4. Slush it with dry portland cement to ensure a good bond.
5. Install the underbed followed by the placing of divider strips and terrazzo topping.

D. Monolithic Terrazzo: Installed at 5/8 inch thick, it is bonded to or made integral with the prepared slab.

E. Thin Terrazzo Toppings: Installed at 3/8 inch thick on concrete slab which has first been covered with adhesive bonding agent, i.e., polysulfide liquid polymer.

F. Surfacing: Grout cured terrazzo topping in accordance with NTMA specifications.
1. Delay grinding and finishing until heavy trade work is completed and construction traffic through the area is restricted.
2. Finish by fine grinding with abrasive grit of size specified by NTMA, or as otherwise required to match original intact material.
3. Grind and polish the new areas, patches, and the entire floor as required to produce a clean, smooth, and uniform finish, capable of being sealed and polished to match the original installation.
4. **NOTE: EXERCISE CAUTION WHEN GRINDING NEAR DIVIDER STRIPS.**
5. Cover with vapor barrier sheets to prevent quick hydration.

3.4 ADJUSTING/CLEANING

A. Keep terrazzo free of acids and oils.

B. Protect the floor, especially the grouting, with a penetrating type seal.

C. Daily Cleaning:
1. Daily sweeping with a cotton-wick floor brush, treated with a non-oily dressing, will control dust and make maintenance easier.
2. Regular damp-mopping keeps the surface free from dirt accumulations.

D. Periodic Cleaning:
   1. Machine buffing on a regular basis removes traffic marks and restores luster.
   2. Touching up with sealer in traffic areas as needed protects the surface.
   3. Periodic machine scrubbing removes heavy accumulations of dirt.
   4. Seal and wax as needed.
   5. Use a penetrating type terrazzo seal.
   6. Avoid seals which may turn yellow and discolor.
   7. Normal stripping and buffing procedures are suitable.

E. Clean terrazzo after installation and finishing operations are completed, complying with sealer manufacturer's instructions.

F. Apply sealer to cleaned terrazzo surfaces to comply with sealer manufacturer's instructions.

G. Protect terrazzo from damage and wear during construction operation.

3.5 WASTE MANAGEMENT

A. Coordinate with Division 01.
   1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
   2. Set aside and protect materials suitable for reuse and/or remanufacturing.
   3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 09 03 70

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SECTION 09 22 16 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Non-load-bearing steel framing systems for interior gypsum board assemblies.
2. Suspension systems for interior gypsum ceilings, soffits, and grid systems.

B. Related Requirements:

1. None

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For dimpled steel studs and runners and firestop tracks, from ICC-ES.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 FRAMING SYSTEMS

A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.

1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
2. Protective Coating: ASTM A 653/A 653M, G40 (Z120), Coating with equivalent corrosion resistance of ASTM A 653/A 653M, G40 (Z120), hot-dip galvanized unless otherwise indicated.

B. Studs and Runners: ASTM C 645. Use either steel studs and runners or dimpled steel studs and runners.

1. Steel Studs and Runners:

a. Thickness: 20 ga. **Unless otherwise indicated**
b. Depth: As indicated on Drawings.

C. Slip-Type Head Joints: Where indicated, provide one of the following:

1. Single Long-Leg Runner System: ASTM C 645 top runner with 2-inch- (51-mm-) deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top runner and with continuous bridging located within 12 inches (305 mm) of the top of studs to provide lateral bracing.
2. Double-Runner System: ASTM C 645 top runners, inside runner with 2-inch- (51-mm-) deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit inside runner.
3. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.

a. Products: Subject to compliance with requirements, provide one of the following or approved equal:

1) Dietrich Metal Framing; SLP-TRK Slotted Deflection Track.
2) MBA Building Supplies; FlatSteel Deflection Track or Slotted Deflecto Track.
3) Steel Network Inc. (The); VertiTrack VTD Series.
4) Superior Metal Trim; Superior Flex Track System (SFT).
5) Telling Industries; Vertical Slip Track.

D. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.

1. Products: Subject to compliance with requirements, provide one of the following, or approved equal:

a. Fire Trak Corp.; Fire Trak System.
b. Grace Construction Products; FlameSafe FlowTrak System.

E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.

1. Minimum Base-Metal Thickness: 0.0219 inch (0.556 mm).

F. Cold-Rolled Channel Bridging: Steel, 0.053-inch (1.34-mm) minimum base-metal thickness, with minimum 1/2-inch- (13-mm-) wide flanges.

1. Depth: As indicated on Drawings.
2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches (38 by 38 mm), 0.068-inch- (1.72-mm-) thick, galvanized steel.

G. Hat-Shaped, Rigid Furring Channels: ASTM C 645.

1. Minimum Base-Metal Thickness: 0.0219 inch (0.556 mm).
2. Depth: 7/8 inch (22.2 mm).

H. Resilient Furring Channels: 1/2-inch- (13-mm-) deep, steel sheet members designed to reduce sound transmission.

1. Configuration: Asymmetrical or hat shaped.

I. Cold-Rolled Furring Channels: 0.053-inch (1.34-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges.

1. Depth: As indicated on Drawings.
2. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum uncoated-steel thickness of 0.033 inch (0.8 mm).
3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.

J. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches (32 mm), wall attachment flange of 7/8 inch (22 mm), minimum uncoated-metal thickness of 0.018 inch (0.45 mm), and depth required to fit insulation thickness indicated.

2.3 SUSPENSION SYSTEMS

A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.

B. Hanger Attachments to Concrete:

1. Anchors: Fabricated from corrosion-resistant materials with holes or loops for attaching wire hangers and capable of sustaining, without failure, a load equal to 5 times that imposed by construction as determined by testing according to ASTM E 488 by an independent testing agency.
2. Powder-Actuated Fasteners: Suitable for application indicated, fabricated from corrosion-resistant materials with clips or other devices for attaching hangers of type indicated, and capable of sustaining, without failure, a load equal to 10 times that imposed by construction as determined by testing according to ASTM E 1190 by an independent testing agency.

C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch (4.12 mm) in diameter.

D. Flat Hangers: Steel sheet, 1 by 3/16 inch (25 by 5 mm) by length indicated.

E. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.053 inch (1.34 mm) and minimum 1/2-inch- (13-mm-) wide flanges.

F. Furring Channels (Furring Members):

1. Cold-Rolled Channels: 0.053-inch (1.34-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges, 3/4 inch (19 mm) deep.
2. Steel Studs and Runners: ASTM C 645.
3. Dimpled Steel Studs and Runners: ASTM C 645.
4. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch (22 mm) deep.
5. Resilient Furring Channels: 1/2-inch- (13-mm-) deep members designed to reduce sound transmission.

G. Grid Suspension System for Gypsum Board Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Armstrong World Industries, Inc.; Drywall Grid Systems.
b. Chicago Metallic Corporation; Drywall Grid System.
c. USG Corporation; Drywall Suspension System.

2.4 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards.

1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

B. Isolation Strip at Exterior Walls: Provide one of the following:

1. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), nonperforated.
2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch (3.2 mm) thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

B. Coordination with Sprayed Fire-Resistive Materials:

1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches (610 mm) o.c.
2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

3.3 INSTALLATION, GENERAL

A. Installation Standard: ASTM C 754.

1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.

B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

C. Install bracing at terminations in assemblies.

D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING FRAMED ASSEMBLIES

A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

1. Single-Layer Application: 16 inches (406 mm) o.c. unless otherwise indicated.
2. Multilayer Application: 16 inches (406 mm) o.c. unless otherwise indicated.
3. Tile Backing Panels: 16 inches (406 mm)] o.c. unless otherwise indicated.

B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

C. Install studs so flanges within framing system point in same direction.

D. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.

    a. Install two studs at each jamb unless otherwise indicated.
    b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch (13-mm) clearance from jamb stud to allow for installation of control joint in finished assembly.
    c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.

3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.

    a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.

5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
6. Curved Partitions:

    a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
    b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches (150 mm) o.c.

E. Direct Furring:

1. Screw to wood framing.
2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.

F. Z-Furring Members:

1. Erect insulation, specified in Section 072100 "Thermal Insulation," vertically and hold in place with Z-furring members spaced 24 inches (610 mm) o.c.
2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.
3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring

channel to web of attached channel. At interior corners, space second member no more than 12 inches (305 mm) from corner and cut insulation to fit.

G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

3.5 INSTALLING SUSPENSION SYSTEMS

A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

1. Hangers: 48 inches (1219 mm) o.c.
2. Carrying Channels (Main Runners): 48 inches (1219 mm) o.c.
3. Furring Channels (Furring Members): 16 inches (406 mm) o.c.

B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

C. Suspend hangers from building structure as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.

    a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.

    a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.

3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
5. Do not attach hangers to steel roof deck.
6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
8. Do not connect or suspend steel framing from ducts, pipes, or conduit.

D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

E. Seismic Bracing: Sway-brace suspension systems with hangers used for support.

F. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

G. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

3.6 WASTE MANAGEMENT

A. Coordinate with Section 017423.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 092216

SECTION 09 29 00 - GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This section includes the performance criteria, materials, production, and erection of gypsum board for the project. The work performed under this Section consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all gypsum board as required by this section, schedules, keynotes and drawings including, but not limited to the following.

1. Interior gypsum board.
2. Moisture resistant gypsum board (all wet locations and as tile backer)
3. Trim.

B. Related Requirements:
1. Section 09 22 16 "Non-Structural Metal Framing" for non-structural framing and suspension systems that support gypsum board panels.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance of Ceiling Suspension Systems: Ceiling suspension systems and cantilevered ceiling soffits shall withstand the effects of gravity and seismic effects.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings for Gypsum Board Ceiling Systems: Include reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, and as reviewed by a qualified professional engineer using input from installers of the items involved:.

1. Layout of all ceilings/soffits with dimensions based on as-built construction
2. Gypsum board ceiling suspension-system members.
3. Miscellaneous metal/steel framing sizing for soffits and cantilevers
4. Method of attaching hangers to building structure.

a. Furnish layouts and sizing for cast-in-place anchors, clips, metal framing, miscellaneous steel shapes, and other ceiling attachment devices whose installation is specified in other Sections.

5. Size and location of initial access modules for suspended gypsum board ceilings and soffits.
6. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
7. Minimum Drawing Scale: 1/8 inch = 1 foot (1:96) for layout drawings, 1 inch = 1 foot for detail drawings

C. Evaluation Reports: For each ceiling suspension system and anchor and fastener type, from ICC-ES.

D. Field quality-control reports.

E. Samples: For the following products:

1. Trim Accessories: Full-size Sample in 12-inch- (300-mm-) long length for each trim accessory indicated.
2. Textured Finishes: 12” x 12” sample for each textured finish indicated and on same backing indicated for Work.

1.5 QUALITY ASSURANCE

A. Mockups: Before beginning gypsum board installation, install mockups of at least 100 sq. ft. (9 sq. m) in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Install mockups for the following:

a. Each level of gypsum board finish indicated for use in exposed locations.
b. Each texture finish indicated.

2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
3. Simulate finished lighting conditions for review of mockups.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

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

C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.

PART 2 - Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. National Gypsum Company
2. American Gypsum.
3. CertainTeed Corp.
4. Georgia-Pacific Gypsum LLC.
5. Lafarge North America Inc.
6. USG Corporation.

B. Gypsum Wallboard: ASTM C 1396/C 1396M.

1. Thickness: 5/8 inch (12.7 mm).
2. Long Edges: Tapered.

C. Gypsum Board, Type X: ASTM C 1396/C 1396M.

1. Thickness: 5/8 inch (15.9 mm).
2. Long Edges: Tapered.

D. Flexible Gypsum Board: ASTM C 1396/C 1396M. Manufactured to bend to fit radii and to be more flexible than standard regular-type gypsum board of same thickness.

1. Thickness: 1/4 inch (6.4 mm).
2. Long Edges: Tapered.

E. Gypsum Ceiling Board: ASTM C 1396/C 1396M.

1. Thickness: 1/2 inch (12.7 mm).
2. Long Edges: Tapered.

A. Abuse-Resistant Gypsum Board: ASTM C 1629/C 1629M. **(At all whiteboard walls)**

1. Products Paper Faced, ASTM C 1396: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. National Gypsum Company; Hi-Abuse XP.
2. Products Glass-Mat Faced, ASTM C 1658: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. National Gypsum Company; eXP Interior Extreme AR Gypsum Panel.
3. Core**:** 5/8 inch (15.9 mm), Type X.
4. Long Edges: Tapered.
5. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
6. Surface Abrasion Resistance: Level 3 in accordance with ASTM C 1629.
7. Indentation Resistance: Level 1 in accordance with ASTM C 1629.
8. Soft Body Impact Resistance: Level 2 in accordance with ASTM C 1629.

B. Impact-Resistant Gypsum Board: ASTM C 1629/C 1629M.

1. Products Paper Faced, ASTM C 1396: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. National Gypsum Company; Hi-Impact XP.
2. Products Glass-Mat Faced, ASTM C 1658: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Georgia-Pacific Gypsum LLC; DensArmor Plus Impact-Resistant Interior Panel.
   b. National Gypsum Company; eXP Interior Extreme IR Gypsum Panel.
3. Core**:** 5/8 inch (15.9 mm), Type X.
4. Long Edges: Tapered.
5. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
6. Surface Abrasion Resistance: Level 3 in accordance with ASTM C 1629.
7. Indentation Resistance: Level 1 in accordance with ASTM C 1629.
8. Soft Body Impact Resistance: Level 3 in accordance with ASTM C 1629.
9. Hard Body Impact Resistance: Level 2 in accordance with ASTM C 1629.

C. Moisture- and Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces. **(At all bathroom locations)**

1. Core: 5/8 inch (15.9 mm), Type X.
2. Long Edges: Tapered.
3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

D. Glass-Mat Interior Gypsum Board: ASTM C 1658/C 1658M. With fiberglass mat laminated to both sides. Specifically designed for interior use, where indicated on Drawings. Retain "Products" Subparagraph and list of manufacturers and products below to require specific products or a comparable product from other manufacturers. **(At all plumbing walls, with or without tile)**

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

   a. Georgia-Pacific Gypsum LLC; DensArmor Plus.
   b. National Gypsum Company; eXP Interior Extreme.

2. Core: 5/8 inch, Type X.
3. Long Edges: Tapered.
4. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.4 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet.
2. Shapes:

   a. Cornerbead.
   b. Bullnose bead.
   c. LC-Bead: J-shaped; exposed long flange receives joint compound.
   d. L-Bead: L-shaped; exposed long flange receives joint compound.
   e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
   f. Expansion (control) joint.
   g. Curved-Edge Cornerbead: With notched or flexible flanges.

2.5 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.

C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints**,** rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.

    a. Use setting-type compound for installing paper-faced metal trim accessories.

3. Fill Coat: For second coat, use setting-type, sandable topping compound.
4. Finish Coat: For third coat, use setting-type, sandable topping compound.
5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.

2.6 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

1. Laminating adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.

D. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

E. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

1. Products: Subject to compliance with requirements, provide product by one of the following:

    a. Accumetric LLC; BOSS 824 Acoustical Sound Sealant.
    b. Grabber Construction Products; Acoustical Sealant GSC.
    c. Pecora Corporation
    d. Specified Technologies, Inc.; Smoke N Sound Acoustical Sealant.
    e. USG Corporation; SHEETROCK Acoustical Sealant.

2. Acoustical joint sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

F. Thermal Insulation: As specified in Section 07 21 00 "Thermal Insulation."

G. Vapor Retarder: As specified in Section 07 21 00 "Thermal Insulation."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and framing, with Installer present, for compliance with requirements and other conditions affecting performance.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C 840 and Gypsum Association GA 214-10.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
2. Fit gypsum panels around ducts, pipes, and conduits.
3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:

1. Wallboard Type: As indicated on Drawings.
2. Type X: As indicated on Drawings and at all fire rated assemblies.
3. Flexible Type: As indicated on Drawings.
4. Ceiling Type: As indicated on Drawings.
5. Abuse-Resistant Type: At interior of exterior walls and whiteboard walls.
6. Impact-Resistant Type: At lobbies, entries and corridors
7. Moisture- and Mold-Resistant Type: As indicated on Drawings and at all wet areas and as tile backer.
8. Glass-Mat Interior Type: At all plumbing wall with or without tile.

B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
2. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.

    a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
    b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.

3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Multilayer Application:

1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches (400 mm) minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.

2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
3. On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
4. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.

E. Curved Surfaces:

1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch- (300-mm-) long straight sections at ends of curves and tangent to them.
2. For double-layer construction, fasten base layer to studs with screws 16 inches (400 mm) o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches (300 mm) o.c.

3.4 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints at locations indicated on Drawings and according to ASTM C 840 and in specific locations approved by Architect for visual effect.

C. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners unless otherwise indicated.
2. Bullnose Bead: Use at outside corners.
3. LC-Bead: Use at exposed panel edges.
4. L-Bead: Use where indicated.
5. U-Bead: Use at exposed panel edges and where indicated.
6. Curved-Edge Cornerbead: Use at curved openings.

3.5 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints**,** rounded or beveled edges**,** and damaged surface areas.

C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840 and Gypsum Association GA 214-10:

1. Level 1:

a. All joints and interior angles shall have tape set in joint compound. Surface shall be free of excess joint compound. Minor tool marks and ridges are acceptable:

1) At ceiling plenum areas, concealed areas, behind metal lockers, behind built-in millwork, and where indicated.

2. Level 2:

a. All joints and interior angles shall have tape embedded in joint compound and wiped with joint knife leaving a thin coating of joint compound over all joints and interior angles. Fastener heads and accessories shall be covered with a coat of joint compound. Surface shall be free of excess joint compound. Minor tools marks and ridges are acceptable. Joint compound applied over the body of the tape at the time of tape embedment shall be considered a separate coat of joint compound and shall satisfy the conditions of this level:

1) At gypsum panels that are substrate for tile or acoustical tile, and where indicated on Drawings.

3. Level 3:

a. All joints and interior angles shall have tape embedded in joint compound and shall be immediately wiped with joint knife leaving a thin coating of joint compound over all joints and interior angles. One additional coat of joint compound shall be applied over all joints and interior angles. Fastener heads and accessories shall be covered with two separate coats of joint compound. All joint compound shall be smooth and free of tool marks and ridges:

1) At panel surfaces receiving medium- or heavy-textured finishes before painting, or heavy wallcoverings where lighting conditions are not critical, and where indicated on Drawings.

4. Level 4:

a. All joints and interior angles shall have tape embedded in joint compound and shall be immediately wiped with joint knife leaving a thin coating of joint compound over all joints and interior angles. Two separate coats of joint compound shall be applied over all flat joints and one separate coat of joint compound shall be applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. All joint compound shall be smooth and free of tool marks and ridges. Prepared surfaces shall be coated with drywall primer prior to application of final finishes:

1) At panel surfaces receiving light-textured finishes, wallcoverings, and flat paints, and at panel surfaces that will be exposed to view unless otherwise indicated. This is generally the standard exposed finish, unless noted otherwise. Not recommended where glossy or semi-glass enamel paints are specified.

b. Primer and its application to surfaces are specified in other Section 099123 “Painting.”

5. Level 5:

a. All joints and interior angles shall have tape embedded in joint compound and shall be immediately wiped with joint knife leaving a thin coating of joint compound over all joints and interior angles. Two separate coats of joint compound shall be applied over all flat joints and one separate coat of joint compound shall be applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. A thin skim coat of joint compound trowel applied, or a material manufactured especially for this purpose and applied in accordance with manufacturer’s recommendations, applied to entire surface. The surface shall be smooth and free of tool marks and ridges. Prepared surfaces shall be coated with drywall primer prior to application of final finishes:

1) At panel surfaces receiving gloss and semigloss enamels and other surfaces subject to severe lighting, and where indicated on Drawings.

b. Primer and its application to surfaces are specified in other Section 099123 “Painting.”

3.6 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.

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

3.7 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other scrap for recycling.

END OF SECTION 09 29 00

SECTION 09 30 13 - CERAMIC TILE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
   1. Ceramic tile.
   2. Porcelain tile.
   3. Stone thresholds installed as part of tile installations.

B. Related Sections include the following:
   1. Division 9 Section "Gypsum Board Assemblies" for glass mat, water resistant gypsum backing board installed in gypsum wallboard assemblies.

1.3 PERFORMANCE REQUIREMENTS

A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:
   1. Level Surfaces: Minimum 0.6.

B. Load-Bearing Performance: For ceramic tile installed on walkway surfaces, provide installations rated for the following load-bearing performance level based on testing assemblies according to ASTM C 627 that are representative of those indicated for this Project:
   1. Moderate: Passes cycles 1 through 10.

1.4 SUBMITTALS

A. Product Data: For each type of tile, mortar, grout, and other products specified.

B. Shop Drawings: For the following:
   1. Tile patterns and locations.
   2. Widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

C. Tile Samples for Initial Selection: Manufacturer's color charts consisting of actual tiles or sections of tiles showing the full range of colors, textures, and patterns available for each type and composition of tile indicated. Include Samples of accessories involving color selection.

D. Samples for Verification: Of each item listed below, prepared on Samples of size and construction indicated. Where products involve normal color and texture variations, include Sample sets showing the full range of variations expected.
   1. Each type and composition of tile and for each color and texture required, at least 12 inches square, mounted on braced cementitious backer units, and with grouted joints using product complying with specified requirements and approved for completed work in color or colors selected by Architect.
   2. Full-size units of each type of trim and accessory for each color required.
   3. Stone thresholds in 6-inch lengths.

E. Product Certificates: Signed by manufacturers certifying that the products furnished comply with requirements.

F. Qualification Data: For firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names of architects and owners, and other information specified.

G. Setting Material Test Reports: Indicate and interpret test results for compliance of tile-setting and -grouting products with specified requirements.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who has completed tile installations similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

B. Source Limitations for Tile: Obtain each color, grade, finish, type, composition, and variety of tile from one source with resources to provide products from the same production run for each contiguous area of consistent quality in appearance and physical properties without delaying the Work.

C. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.

D. Source Limitations for Other Products: Obtain each of the following products specified in this Section from one source and by a single manufacturer for each product:
   1. Stone thresholds.
   2. Joint sealants.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement of ANSI A137.1 for labeling sealed tile packages.

B. Prevent damage or contamination to materials by water, freezing, foreign matter, and other causes.

C. Handle tile with temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is completed and ambient temperature and humidity conditions are being maintained to comply with referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 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. Tile Products:
      a. American Olean Tile Company.
      b. Crossville Tile
      c. ProSpec LLC.
      d. Dal-Tile Corporation.
      e. Emser Tile
      f. Stone Source
      g. Horizon Tile

B. Tile-Setting and -Grouting Materials:
      a. American Olean Tile Company.
      b. ProSpec LLC.
      c. Bostik.
      d. Dal-Tile Corporation.
      e. Laticrete International, Inc.
      f. Mapei Corporation.

2.2 PRODUCTS, GENERAL

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

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI standards referenced in "Setting Materials" and "Grouting Materials" articles.

C. Colors, Textures, and Patterns: Where manufacturer's standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements:

1. See Finish Schedule for exact tile product information.

D. Factory Blending: For tile exhibiting color variations within the ranges selected during Sample submittals, blend tile in the factory and package so tile units taken from one package show the same range in colors as those taken from other packages and match approved Samples.

E. Mounting: Where factory-mounted tile is required, provide back- or edge-mounted tile assemblies as standard with manufacturer, unless another mounting method is indicated.
1. Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for these kinds of installations and has a record of successful in-service performance.

2.3 WALL TILE

A. Porcelain Wall Tile Basis of Design: Crossville “Alaska” & Dal-Tile “Color Wave” tile complying with the following requirements:

1. Composition: Porcelain.
2. Module Size: Varies. Refer to Finish Schedule
3. Thickness: 5/16 inch.
4. Colors: As noted on finish schedule.
5. Pattern and Borders: Contrasting color patterns and borders as directed by the Architect

B. Trim Units: Provide tile trim units to match color and characteristics of adjoining flat tile and to comply with the following requirements:
1. Size: As indicated, coordinated with sizes and coursing of adjoining flat tile where applicable.
2. Shapes: As follows, selected from manufacturer's standard shapes:
a. Round Incorner Base for Thin-Set Mortar Installations: Coved.
b. 2x8 bullnose where specified on Finish Schedule.
c. Wainscot Cap for Thin-Set Mortar Installations: Stainless steel trim.
d. External Corners for Thin-Set Mortar Installations: Stainless steel trim.
e. Internal Corners: Field-butted square corners, except with coved base and cap angle pieces designed to member with stretcher shapes.

2.4 STONE THRESHOLDS

A. General: Provide stone thresholds that are uniform in color and finish, fabricated to sizes and profiles indicated to provide transition between tile surfaces and adjoining finished floor surfaces.
1. Fabricate thresholds to heights indicated, but not more than 1/2 inch above adjoining finished floor surfaces, with transition edges beveled on a slope of no greater than 1:2.

B. Marble Thresholds: Provide marble thresholds complying with ASTM C 503 requirements for exterior use and with a minimum abrasive-hardness value of 10 per ASTM C 241.
1. As selected from manufacturer’s standard colors and finishes.

2.5 SETTING MATERIALS

A. Organic Adhesive: ANSI A136.1, Type I as recommended by manufacturer.

B. Tile Setting Adhesive: Elastomeric, waterproof, liquid applied.

2.6 GROUTING MATERIALS

A. Dry-Set Grout: ANSI A118.6, color as selected from the manufacturer's standard range of colors.

2.7 ELASTOMERIC SEALANTS

A. General: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer and characteristics indicated that comply with applicable requirements of Division 7 Section "Joint Sealants."

B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints, unless otherwise indicated.

C. Walls: One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and temperature extremes.

D. Floors: Multipart, Pourable Urethane Sealant for Use T: ASTM C 920; Type M; Grade P; Class 25; Uses T, M, A, and, as applicable to joint substrates indicated, O.

E. Available Products: Subject to compliance with requirements, products which may be incorporated into the Work include, but are not limited to, the following:
   1. One-Part, Mildew-Resistant Silicone Sealants:
      a. Dow Corning 786; Dow Corning Corporation.
      b. Sanitary 1700; GE Silicones.
      c. Pecora 898 Sanitary Silicone Sealant; Pecora Corp.
      d. Rhodorsil 6B White; Rhone-Poulenc, Inc.
      e. Tremsil 600 White; Tremco, Inc.
   2. Multipart, Pourable Urethane Sealants:
      a. Chem-Calk 550; Bostik.
      b. Vulkem 245; Mameco International, Inc.
      c. NR-200 Urexpan; Pecora Corp.
      d. THC-900; Tremco, Inc.

2.8 MISCELLANEOUS MATERIALS

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland-cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

B. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

2.9 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

B. Add materials, water, and additives in accurate proportions.

C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

2.10 FINISHING AND EDGE PROTECTION FOR WALLS

A. Install stainless steel edge trim at horizontal and vertical corners of tile installations. Profiles for each location to be selected by Architect.

B. Basis of Design: Schluter Systems, Plattsburgh, N.Y.
   1. Bullnose
   2. Straight profile with anchoring leg
   3. Rounded outer corner with anchoring leg

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
   1. Verify that substrates for setting tile are firm; dry; clean; free from oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 series of tile installation standards for installations indicated.
   2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.
   3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust latter in consultation with Architect.

B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove coatings, including curing compounds, and other substances that contain soap, wax, oil, or silicone and are incompatible with tile-setting materials by using a terrazzo or concrete grinder, a drum sander, or a polishing machine equipped with a heavy-duty wire brush.

B. Provide concrete substrates for tile floors installed with dry-set or latex-portland cement mortars that comply with flatness tolerances specified in referenced ANSI A108 series of tile installation standards for installations indicated.
   1. Use trowelable leveling and patching compounds per tile-setting material manufacturer's written instructions to fill cracks, holes, and depressions.
   2. Remove protrusions, bumps, and ridges by sanding or grinding.

C. Blending: For tile exhibiting color variations within the ranges selected during Sample submittals, verify that tile has been blended in the factory and packaged so tile units taken from one package show the same range in colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 INSTALLATION, GENERAL

A. ANSI Tile Installation Standards: Comply with parts of ANSI A108 series of tile installation standards in "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and to methods indicated.

B. TCA Installation Guidelines: TCA's "Handbook for Ceramic Tile Installation." Comply with required TCA installation methods.

C. Extend tile work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

E. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are the same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.
   1. For tile mounted in sheets (if any), make joints between tile sheets the same width as joints within tile sheets so joints between sheets are not apparent in finished work.

F. Lay out tile wainscots to next full tile beyond dimensions indicated.

G. Expansion Joints: Locate expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
   1. Locate joints in tile surfaces directly above joints in concrete substrates.

H. Grout tile to comply with the requirements of the following tile installation standards:

1. For ceramic tile grouts (sand-portland cement, dry-set, commercial portland cement, and latex-portland cement grouts), comply with ANSI A108.10.

3.4 WALL TILE INSTALLATION

A. Install types of tile designated for wall installations to comply with TCA installation methods and ANSI setting-bed standards.

B. Joint Widths: Install tile on walls with the following joint widths:
   1. Ceramic Mosaic Tile: 1/16 inch.
   2. Wall Tile: 1/16 inch.

3.5 EDGE PROTECTION INSTALLATION FOR WALLS

A. Install as per manufacturer’s instructions as an integral component during wall tile installation.

3.6 CLEANING AND PROTECTING

A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
   1. Remove latex-portland cement grout residue from tile as soon as possible.
   2. Unglazed tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Protect metal surfaces, cast iron, and vitreous plumbing fixtures from effects of acid cleaning. Flush surface with clean water before and after cleaning.

B. Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work.

C. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer that ensure tile is without damage or deterioration at the time of Substantial Completion.
   1. When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.
   2. Prohibit foot and wheel traffic from tiled floors for at least 7 days after grouting is completed.

D. Before final inspection, remove any cleaner from tile surfaces.

3.7 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

   1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.

2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other scrap for recycling.

END OF SECTION 09 30 13

SECTION 09 51 23 - ACOUSTICAL CEILING TILES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This section includes the performance criteria, materials, production, and erection of continuous/wall-to-wall acoustical tile ceilings for the project. The work performed under this Section consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all acoustical tile ceilings as required by the this section, schedules, keynotes and drawings, including, but not limited to the following:

1. Acoustical tiles for ceilings.
2. Exposed grid suspension systems.
3. Wire hangers, fasteners, main runners, cross tees, and wall angle moldings.
4. Perimeter trim

1.3 PRE-INSTALLATION MEETINGS

A. Pre-installation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each color and texture specified, 6-inches- (150-mm-) in size.

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

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

1. Acoustical Tile: Set of full-size Samples of each type, color, pattern, and texture.
2. Concealed Suspension-System Members: 6-inch- (150-mm-) long Sample of each type.
3. Exposed Moldings and Trim: Set of 6-inch- (150-mm-) long Samples of each type and color.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Ceiling suspension-system members.
2. Method of attaching hangers to building structure.

a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.

3. Size and location of initial access modules for acoustical tile.
4. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
5. Minimum Drawing Scale: 1/8 inch = 1 foot (1:96).

B. Qualification Data: For testing agency.

C. Product Test Reports: For each acoustical tile ceiling, for tests performed by manufacturer and witnessed by a qualified testing agency.

D. Evaluation Reports: For each acoustical tile ceiling suspension system and anchor and fastener type, from ICC-ES.

E. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

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

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Acoustical Ceiling Units: Full-size tiles equal to **2** percent of quantity installed.
2. Suspension-System Components: Quantity of each concealed grid and exposed component equal to **2** percent of quantity installed.

1.8 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to the National Voluntary Laboratory Accreditation Program (NVLAP) for testing indicated.

B. Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.

C. Acoustical Panels: As with other architectural features located at the ceiling, may obstruct or skew the planned fire sprinkler water distribution pattern through possibly delay or accelerate the activation of the sprinkler or fire detection systems by channeling heat from a fire either toward or away from the device. Designers and installers are advised to consult a fire protection engineer, NFPA 13, or their local codes for guidance where automatic fire detection and suppression systems are present.

D. Coordination of Work: Coordinate acoustical ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockup of typical ceiling area as shown on Drawings.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical tiles, suspension-system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical tiles, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical tiles carefully to avoid chipping edges or damaging units in any way.

1.10 WARRANTY

A. Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace panels that fail within the warranty period. Failures include, but are not limited to the following:
1. Acoustical Panels: Sagging and warping
2. Grid System: Rusting and manufacturer's defects
3.

B. Warranty Period:
1. Acoustical panels: Ten (10) years from date of substantial completion.
2. Grid: Ten (10) years from date of substantial completion.
3. Acoustical panels and grid systems with HumiGuard Plus or HumiGuard Max performance supplied by one source manufacturer is Thirty (30) years from date of substantial completion.

C. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

1.11 FIELD CONDITIONS

A. Environmental Limitations: Do not install acoustical tile ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical tile ceiling installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Acoustical ceiling shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. Design and size components to withstand seismic loads in accordance with the minimum established by ASTM C636.

B. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: Comply with ASTM E 1264 for Class A materials.
2. Smoke-Developed Index: 50 or less.

C. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.2 ACOUSTICAL TILES, GENERAL

A. Source Limitations: Obtain each type of acoustical ceiling tile and supporting suspension system from single source from single manufacturer.

B. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent (refer to specific acoustic tile).

C. Acoustical Tile Standard: Provide manufacturer's standard tiles of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances unless otherwise indicated.

1. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches (400 mm) away from test surface according to ASTM E 795.

D. Acoustical Tile Colors and Patterns: Match appearance characteristics indicated for each product type.

1. Where appearance characteristics of acoustical tiles are indicated by referencing pattern designations in ASTM E 1264 and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.

E. Provide glass-fiber based panels made with binder containing no urea formaldehyde.

2.3 ACOUSTICAL TILES

A. Basis-of-Design Product: Subject to compliance with requirements, provide Armstrong Industries products as indicated on Drawings or comparable product by one of the following:
1. CertainTeed Corp.
2. USG Interiors, Inc.; Subsidiary of USG Corporation.

B. ACT-1: Armstrong Optima Tegular, 3257 (Classrooms/Corridors/Offices or as indicated in drawings)
1. Surface Texture: Fine.
2. Composition: Fiberglass.
3. Color: White.
4. Size: 24IN x 48IN
5. Edge Profile: Square Tegular 9/16IN for interface with Suprafine XL 9/16" Exposed Tee grid.
6. Noise Reduction Coefficient(NRC): ASTM C 423; Classified with UL label on product carton 0.95.
7. Ceiling Attenuation Class (CAC)
8. Sabin: N/A
9. Articulation Class (AC): ASTM E 1111; 190.
10. Flame Spread: ASTM E 1264; Class A (UL).
11. Light Reflectance White Panel: ASTM E 1477; 0.90.
12. Dimensional Stability: HumiGuard Plus.
13. Recycle Content: Post-Consumer - 12% Pre-Consumer Waste - 59%.

C. ACT-2: Armstrong Optima Tegular, 3255 (Classrooms/Corridors/Offices or as indicated in drawings)
1. Surface Texture: Fine.
2. Composition: Fiberglass.
3. Color: White.
4. Size: 24IN x 24IN
5. Edge Profile: Square Tegular 9/16IN for interface with Suprafine XL 9/16" Exposed Tee grid.
6. Noise Reduction Coefficient(NRC): ASTM C 423; Classified with UL label on product carton 0.95.
7. Ceiling Attenuation Class (CAC)

8. Sabin: N/A
9. Articulation Class (AC): ASTM E 1111; 190.
10. Flame Spread: ASTM E 1264; Class A (UL).
11. Light Reflectance White Panel: ASTM E 1477; 0.90.
12. Dimensional Stability: HumiGuard Plus.
13. Recycle Content: Post-Consumer - 12% Pre-Consumer Waste - 59%.

D.

2.4 METAL SUSPENSION SYSTEMS, GENERAL

A. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Metal Suspension-System Standard: Provide manufacturer's standard metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635/C 635M.

C. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.135-inch- (3.5-mm-) diameter wire.

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

E. Angle Hangers: Angles with legs not less than 7/8 inch (22 mm) wide; formed with 0.04-inch- (1-mm-) thick, galvanized-steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation; with bolted connections and 5/16-inch- (8-mm-) diameter bolts.

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

G. Seismic Clips: Manufacturer's standard seismic clips designed and spaced to secure acoustical tiles in-place.

2.5 METAL SUSPENSION SYSTEM

A. Basis-of-Design Product: Subject to compliance with requirements, Armstrong product or provide comparable product by one of the following:

1. Armstrong World Industries, Inc.
2. USG Interiors, Inc.; Subsidiary of USG Corporation.

B. Pair suspension systems with the following ACT and ATC types:
1. ACT-1: 9/16 inch Suprafine XL.
2. ACT-2: 9/16 inch Suprafine XL

C. Direct-Hung, Double-Web Suspension System Components: Main beams and cross tees, base metal and end detail, fabricated from commercial quality hot dipped galvanized steel complying with ASTM A 653. Main beams and cross tees are double-web steel construction with exposed flange design. Exposed surfaces chemically cleansed, capping prefinished galvanized steel in baked polyester paint. Main beams and cross tees shall have rotary stitching.
   a. Structural Classification: ASTM C 635 Intermediate Duty
   b. Color: White and match the actual color of the selected ceiling tile, unless noted otherwise.
   c. Acceptable Product: Suprafine XL 9/16" Exposed Tee as manufactured by Armstrong World Industries

D. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.

E. Wire for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft annealed, with a yield stress load of at least time three design load, but not less than 12 gauge.
   1. Access: Upward and end pivoted or side pivoted, with initial access openings of size indicated below and located throughout ceiling within each module formed by main and cross runners, with additional access available by progressively removing remaining acoustical tiles.

2.6 METAL EDGE MOLDINGS AND TRIM

A. Manufacturers – Basis of Design: Subject to compliance with requirements, Armstrong product or provide comparable product by one of the following:
   1. USG Interiors, Inc.; Subsidiary of USG Corporation.

B. Products – 2” Axiom trim, or equal

C. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations complying with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.

   1. Provide manufacturer's standard edge moldings that fit acoustical tile edge details and suspension systems indicated and that match width and configuration of exposed runners unless otherwise indicated.
   2. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

2.7 ACOUSTICAL SEALANT

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

   1. Acoustical Sealant for Exposed and Concealed Joints:

      a. Pecora Corporation; AC-20 FTR Acoustical and Insulation Sealant.

b. USG Corporation; SHEETROCK Acoustical Sealant.

2. Acoustical Sealant for Concealed Joints:

a. Henkel Corporation; OSI Sealants Pro-Series SC-175 Rubber Base Sound Sealant.
b. Pecora Corporation; AIS-919.
c. Tremco, Inc.; Tremco Acoustical Sealant.

B. Acoustical Sealant: Manufacturer's standard sealant complying with ASTM C 834 and effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

1. Exposed and Concealed Joints: Nonsag, paintable, nonstaining latex sealant.
2. Concealed Joints: Nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant.
3. Acoustical sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.8 MISCELLANEOUS MATERIALS

A. Acoustical Tile Adhesive: Type recommended by acoustical tile manufacturer, bearing UL label for Class 0-25 flame spread.

1. Adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Staples: 5/16-inch- (8-mm-) long, divergent-point staples.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing and substrates to which acoustical tile ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine acoustical tiles before installation. Reject acoustical tiles that are wet, moisture damaged, or mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Testing Substrates: Before installing adhesively applied tiles on wet-placed substrates such as cast-in-place concrete or plaster, test and verify that moisture level is below tile manufacturer's recommended limits.

B. Measure each ceiling area and establish layout of acoustical tiles to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width tiles at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION OF SUSPENDED ACOUSTICAL TILE CEILINGS

A. General: Install acoustical panel ceilings to comply with ASTM C 636/C 636M and seismic design requirements indicated, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
8. Do not attach hangers to steel deck tabs.
9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
10. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches (200 mm) from ends of each member.
11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.

C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers without

attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.

D. Install edge moldings and trim of type indicated at perimeter of acoustical tile ceiling area and where necessary to conceal edges of acoustical tiles.

1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
2. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3.2 mm in 3.6 m). Miter corners accurately and connect securely.
3. Do not use exposed fasteners, including pop rivets, on moldings and trim.

E. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

F. Arrange directionally patterned acoustical tiles as follows:

1. As indicated on reflected ceiling plans.

G. Install acoustical tiles in coordination with suspension system and exposed moldings and trim. Place splines or suspension-system flanges into kerfed edges so tile-to-tile joints are closed by double lap of material.

1. Fit adjoining tile to form flush, tight joints. Scribe and cut tile for accurate fit at borders and around penetrations through tile.
2. Hold tile field in compression by inserting leaf-type, spring-steel spacers between tile and moldings, spaced 12 inches (305 mm) o.c.
3. Protect lighting fixtures and air ducts to comply with requirements indicated for fire-resistance-rated assembly.

3.4 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:

1. Compliance of seismic design.

B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections and prepare test reports.

C. Perform the following tests and inspections of completed installations of acoustical tile ceiling hangers and anchors and fasteners in successive stages and when installation of ceiling suspension systems on each floor has reached 20 percent completion but no tiles have been installed. Do not proceed with installations of acoustical tile ceiling hangers for the next area until test results for previously completed installations of acoustical tile ceiling hangers show compliance with requirements.

1. Within each test area, testing agency will select one of every 10 power-actuated fasteners and postinstalled anchors used to attach hangers to concrete and will test them

for 200 lbf (890 N) of tension; it will also select one of every two postinstalled anchors used to attach bracing wires to concrete and will test them for 440 lbf (1957 N) of tension.

2. When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 pass consecutively and then will resume initial testing frequency.

D. Acoustical tile ceiling hangers and anchors and fasteners will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports.

3.5 CLEANING

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

3.6 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 09 51 23

SECTION 09 65 13 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This section includes the performance criteria, materials, production, and erection of resilient base and accessories for the project. The work performed under this Section consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all resilient base and accessories as required by this section, schedules, keynotes and drawings, including, but not limited to the following:

1. Resilient base.
2. Resilient molding accessories.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each color and texture specified, not less than 12 inches (300 mm) long.

C. Samples for Initial Selection: For each type of product indicated.

D. Samples for Verification: For each type of product indicated and for each color, texture, and pattern required in manufacturer's standard-size Samples, but not less than 12 inches (300 mm) long.

E. Product Schedule: For resilient base and accessory products. Use same designations indicated on Drawings.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. No extra material to be purchased for purpose of attic stock. All left over material from construction to constitute attic stock – store, maintain and protect accordingly. Package with protective covering for storage and identified with labels describing contents.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C).

1.6 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C), in spaces to receive resilient products during the following time periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).

C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. FloorScore Compliance: Resilient base shall comply with requirements of FloorScore certification.

2.2 THERMOPLASTIC-RUBBER BASE

A. Basis of Design: Subject to compliance with requirements, provide Tarkett; Baseworks 4 ” & 6” **or** comparable products by one of the following:

1. Mannington
2. Armstrong World Industries, Inc.
3. Burke Mercer Flooring Products, Division of Burke Industries Inc.
4. Flexco.
5. Mondo Rubber International, Inc.
6. Nora Systems, Inc.
7. Roppe Corporation, USA.
8. VPI, LLC, Floor Products Division.

B. Product Standard: Tarkett Baseworks Cove Base.

1. Group: I (solid, homogeneous).
2. Style and Location:

1) Profile: 4” Cove & 6” Cove. Refer to drawings

C. Thickness: 5/16"(7.94 mm).

D. Height: 4 " & 6”. Refer to drawings

E. Lengths: Length shall not be less than 1/3 of the length of a wall but not less than 3’-0 whichever is longer.

F. Outside Corners: Pre-Mitered.

G. Inside Corners: Pre-Mitered.

H. Colors: Black See Drawings

2.3 RUBBER MOLDING ACCESSORY

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Tarkett
2. Mannington
3. Roppe Corporation, USA.
4. VPI, LLC, Floor Products Division.

B. Description: Rubber cap for cove carpet; cap for cove resilient flooring; carpet bar for tackless installations; carpet edge for glue-down applications; nosing for carpet; nosing for resilient flooring; reducer strip for resilient flooring; joiner for tile and carpet; transition strips.

C. Profile and Dimensions: As indicated.

D. Locations: Provide rubber molding accessories in areas indicated.

E. Colors and Patterns: As selected by Architect from full range of industry colors.

2.4 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

1. Adhesives shall have a VOC content of 50 g/L or less except that adhesive for rubber stair treads shall have a VOC content of 60 g/L or less.

C. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edges of flooring, and in maximum available lengths to minimize running joints.

PART 3 - EXECUTION

3.1 EXAMINATION

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

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates for Resilient Stair Accessories: Prepare horizontal surfaces according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
4. Moisture Testing: Proceed with installation only after substrates pass testing according to manufacturer's written recommendations, but not less stringent than the following:

    a. Perform anhydrous calcium chloride test according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
    b. Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have maximum 75 percent relative humidity level.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install resilient products until they are the same temperature as the space where they are to be installed.

1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.

E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 RESILIENT BASE INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

G. Preformed Corners: Install preformed corners before installing straight pieces.

H. Job-Formed Corners:

1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches (76 mm) in length.

    a. Form without producing discoloration (whitening) at bends.

2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches (76 mm) in length.

    a. Miter or cope corners to minimize open joints.

3.4 RESILIENT ACCESSORY INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient accessories.

B. Resilient Stair Accessories:

1. Use stair-tread-nose filler to fill nosing substrates that do not conform to tread contours.
2. Tightly adhere to substrates throughout length of each piece.
3. For treads installed as separate, equal-length units, install to produce a flush joint between units.

C. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.

B. Perform the following operations immediately after completing resilient-product installation:

1. Remove adhesive and other blemishes from exposed surfaces.
2. Sweep and vacuum horizontal surfaces thoroughly.
3. Damp-mop horizontal surfaces to remove marks and soil.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Cover resilient products subject to wear and foot traffic until Substantial Completion.

3.6 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other scrap for recycling.

END OF SECTION 09 65 13

SECTION 09 65 19 - RESILIENT FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This section includes the performance criteria, materials, production, and erection of resilient tile flooring, and rubber stair treads for the project. The work performed under this Section consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all floor tile as required by this section.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: Full-size units of each color and pattern of floor tile required.

C. Product Schedule: Use same designations indicated on Drawings.

1.4 CLOSEOUT SUBMITTALS

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

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra material that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Floor tile: Furnish one box for every 50 boxes or a fraction thereof of each type, color and pattern of floor tile installed.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.

   1. Engage an installer who employs workers for this Project who are trained or certified by floor tile manufacturer for installation techniques required.

B. Fire-Test-Response Characteristics: Provide products with the following fire-test-response characteristics as determined by testing identical products per test method indicated below by a testing and inspecting agency acceptable to authorities having jurisdiction.
   1. Critical Radiant Flux: 0.45 W/sq. cm or greater when tested per ASTM E 648.
   2. Smoke Density: Maximum specific optical density of 450 or less when tested per ASTM E 662.

C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

   1. Build mockups for flooring including resilient base and accessories.

      a. Size: Minimum 100 sq. ft. (9.3 sq. m) for each type, color, and pattern in locations directed by Architect.

   2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store flooring and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C). Store floor tiles on flat surfaces.

1.8 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C) in spaces to receive floor tile during the following time periods:

   1. 48 hours before installation.
   2. During installation.
   3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).

C. Close spaces to traffic during flooring installation.

D. Close spaces to traffic for 48 hours after flooring installation.

E. Install flooring after other finishing operations, including painting, have been completed.

F. Do not install resilient flooring over concrete slabs until they are sufficiently cured and dry to achieve a bond with the adhesive in accordance with the manufacturer’s recommended bond and moisture tests.

1.9 EXTRA MATERIALS

A. Furnish extra material described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Luxury Vinyl Tile: Full size units equal to 10 percent of amount installed for each type indicated but not less than 100 square feet.

PART 2 - PRODUCTS

2.1 RESILIENT VINYL TILE.

A. Vinyl Composition Floor Tile: Products complying with ASTM F 1066.

B. Vinyl Composite Tile (VCT): Provide vinyl composition floor tile (Composition 1, non-asbestos) complying with the following Available Products; PATCRAFT or approved equal.
   1. Pattern: ADMIX
   2. Color: PER DRAWINGS
   3. Class: Class 3 (through-pattern tile).
   4. Wearing Surface: Smooth.
   5. Thickness:
   6. Size: PER DRAWINGS

2.2 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

C. Edge Strips: Provide resilient transition and/or reducer strips to match flooring, as required to accommodate changes in floor heights and/or materials.

D. Adhesives for Solid Vinyl Tile: As recommended by manufacturer to meet site conditions.
   1. Basis of design:
      a. Tarkett 800 Pressure Sensitive Adhesive
      b. Tarkett 940 Two-Part Polyurethane Adhesive
      c. Tarkett 120 SpraySmart Adhesive (up to 7 pounds moisture \ 85% relative humidity and less than 11 pH)

E. Floor Polish: Provide protective, liquid floor-polish products recommended by floor tile manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

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

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates: Prepare according to manufacturer’s written instructions to ensure adhesion of resilient flooring.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
4. Moisture Testing: Proceed with installation only after substrates pass testing according to floor tile manufacturer's written recommendations, but not less stringent than the following:

    a. Perform anhydrous calcium chloride test according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 5 lb of water/1000 sq. ft. in 24 hours.
    b. Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

D. For wood subfloors, verify the following:
1. Underlayment over subfloor complies with requirements specified in Division 6 Section "Rough Carpentry."
2. Underlayment surface is free of irregularities and substances that may interfere with adhesive bond, show through surface, or stain flooring.

E. Floor covering shall not be installed over expansion joints.

F. Do not install floor tiles until they are the same temperature as the space where they are to be installed.

1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.

G. Do not proceed with installation until unsatisfactory conditions have been corrected.

H. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.3 FLOOR TILE INSTALLATION

A. Comply with manufacturer's written instructions for installing floor tile.

B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

1. Lay tiles in pattern indicated.

C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

1. Lay tiles with grain running in one direction in pattern of colors and sizes indicated.

D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.

G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in finished floor areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

H. Adhere floor tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.

B. Perform the following operations immediately after completing floor tile installation:

1. Remove adhesive and other blemishes from exposed surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.

C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Floor Polish, in areas specified: Remove soil, adhesive, and blemishes from floor tile surfaces before applying liquid floor polish.

1. Apply two coat(s).

E. Cover floor tile until Substantial Completion.

3.5 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other scrap for recycling.

END OF SECTION 09 65 19

SECTION 09 67 23 - RESINOUS FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Definitions: Resinous flooring includes penetrating, moisture tolerant, two-component epoxy primer, a high performance, three-component mortar consisting of epoxy resin, curing agent and selected, graded aggregates blended with inorganic pigments, a two-component, general service epoxy coating and a selected, graded aggregate.

B. Related Work
   1. Division 3 Self Leveling Toppings
   2. Division 7 Section Joint Sealers

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's technical data, installation instructions, and general recommendations for each resinous flooring material required. Include certification indicating compliance of materials with requirements.

B. Samples: Submit, for verification purposes, 4-inch square samples of each type of resinous flooring required, applied to a rigid backing, in color and finish indicated.
   1. For initial selection of colors and finishes, submit manufacturer's color charts showing full range of colors and finishes available.

1.4 QUALITY ASSURANCE

A. Single Source Responsibility: Obtain primary resinous flooring materials including primers, resins, hardening agents, finish or sealing coats from a single manufacturer with not less than ten years of successful experience in manufacturing and installing principal materials described in this section. Contractor shall have completed at least five projects of similar size and complexity; Stonhard, Palma, or approved equal. Provide secondary materials only of type and from source recommended by manufacturer of primary materials.

B. Pre-Installation Conference
   1. General contractor shall arrange a meeting not less than thirty days prior to starting work.
   2. Attendance
      a. General Contractor
      b. Architect/Owner's Representative

c. Manufacturer/Installer's Representative

C. ISO 9002: All materials, including primers, resins, curing agents, finish coats, aggregates and sealants are manufactured and tested under an ISO 9002 registered quality system.

1.5 DELIVERY, STORAGE AND HANDLING

A. Material shall be delivered to job site and checked by flooring contractor for completeness and shipping damage prior to job start.

B. All materials used shall be factory pre-weighed and pre-packaged in single, easy to manage batches to eliminate on site mixing errors. No on site weighing or volumetric measurements allowed.

C. Material shall be stored in a dry, enclosed area protected from exposure to moisture. Temperature of storage area shall be maintained between 60 and 85°F/16 and 30°C.

1.6 PROJECT CONDITIONS

A. Concrete substrate shall be properly cured for a minimum of 30 days. A vapor barrier must be present for concrete subfloors on or below grade, or as indicated based on manufacturer's requirements and slab moisture content. Otherwise, an osmotic pressure resistant grout must be installed prior to the resinous flooring.

B. Utilities, including electric, water, heat (air temperature between 60 and 85°F/16 and 30°C) and finished lighting to be supplied by General Contractor.

C. Job area to be free of other trades during, and for a period of 24 hours, after floor installation.

D. Protection of finished floor from damage by subsequent trades shall be the responsibility of the General Contractor.

1.7 WARRANTY

A. Manufacturer shall furnish a single, written warranty covering both material and workmanship for a period of one (1) full year from date of installation.

PART 2 - PRODUCTS

2.1 COLORS

A. Colors: Per finish schedule

2.2 EPOXY FLOORING & BASE

A. Basis of Design: Dur-A-Flex, Inc., 95 Goodwin Street, East Hartford, CT 06108, Phone: (860) 528-9838, Fax: (860) 528-2802 Or Approved Equal

B. System Materials:
   a. Primer: Dur-A-Flex, Inc, Dur-A-Glaze #4 WB resin and hardener.
   b. First Broadcast Coat: Dur-A-Flex, Inc, Dur-A-Gard OPF resin and hardener.
      i. Chips: Dur-A-Flex, Inc. Micro Decorative Colored Chips.
   c. Second Broadcast and Grout Coat: Dur-A-Flex, Inc. Dur-A-Glaze #4 resin and Water Clear hardener.
      ii. Chips: Dur-A-Flex, Inc. Micro Decorative Colored Chips.
   d. Grout coat: Dur-A-Flex, Inc. Dur-A-Glaze #4 resin and Water Clear hardener.
   e. Topcoat: Dur-A-Flex, Inc. Armor Top resin, hardener and grit.

C. Patch Materials
   a. Shallow Fill and Patching: Use Dur-A-Flex, Inc. Dur-A-Glaze #4 Cove Rez.
   b. Deep Fill and Sloping Material (over ¼ inch): Use Dur-A-Flex, Inc. Dur-A-Crete.

D. PRODUCT REQUIREMNTS:

1. Physical Properties: Provide flooring system in which physical properties of topping including aggregate, when tested in accordance with standards or procedures referenced below, are as follows:

A. Primer	Dur-A-Glaze #4 WB
1. Percent Solids	56 %
2. VOC	2 g/L
3. Bond Strength to Concrete ASTM D 4541	550 psi, substrates fails
4. Hardness, ASTM D 3363	3H
5. Elongation, ASTM D 2370	9 %
6. Flexibility (1/4: Cylindrical mandrel), ASTM D 1737	Pass
7. Impact Resistance, MIL D-2794	>160
6. Abrasion Resistance ASTM D 4060, CS 17 wheel, 1,000 g Load	30 mg loss

B. Broadcast Coat	Dur-A-Gard OPF
1. Percent Solids	100 %
2. VOC	59 g/L
3. Compressive Strength, ASTM D 695	16,000 psi
4. Tensile Strength, ASTM D 638	3,800 psi
5. Flexural Strength, ASTM D 790	4,000 psi
6. Abrasion Resistance, ASTM D 4060 C-10 Wheel, 1,000 gm load, 1,000 cycles	35 mg loss
7. Flame Spread/NFPA-101, ASTM E 84	Class A
8. Impact Resistance MIL D-3134	0.025 inch Max
9. Water Absorption. MIL D-3134	Pass
10. Potlife @ 70 F	20-25 minutes

C. Broadcast Coat and Grout Coat	Dur-A-Glaze #4 Water Clear

1.	Percent Solids		100 %
2.	VOC		3.8 g/L
3.	Compressive Strength, ASTM D 695		11,200 psi
4.	Tensile Strength, ASTM D 638		2,100 psi
5.	Flexural Strength, ASTM D 790		5,100 psi
6.	Abrasion Resistance, ASTM D 4060 C-10 Wheel, 1,000 gm load, 1,000 cycles		29 mg loss
7.	Flame Spread/NFPA-101, ASTM E 84		Class A
8.	Impact Resistance MIL D-24613		0.0007 inches, no cracking or delamination
9.	Water Absorption. MIL D-24613		Nil
10.	Potlife @ 70 F		20 minutes

D. Topcoat — Armor Top

1.	Percent Solids		95 %
2.	VOC		0 g/L
3.	Tensile Strength, ASTM D 2370		7,000 psi
4.	Adhesion, ASTM 4541		Substrate Failure
5.	Hardness, ASTM D 3363		4H
6.	60^0 Gloss ASTM D 523		70
7.	Abrasion Resistance, ASTM D4060 CS 17 wheel (1,000 g load) 1,000 cycles	Gloss	Satin
		4	8 mg loss with grit
		10	12 mg loss without grit
8.	Pot Life, 70 F, 50% RH		2 Hours
9.	Full Chemical Resistance		7 days

2. Other manufacturers as approved by Architect.

2.3 JOINT SEALANT MATERIALS

A. Type produced by manufacturer of resinous flooring system for type of service and joint condition indicated.

PART 3 - EXECUTION

3.1 PREPARATION

A. Substrate: Concrete preparation shall be by mechanical means and include use of a scabbler, scarifier or shot blast machine for removal of bond inhibiting materials such as curing compounds or laitance.

3.2 APPLICATION

A. General: Apply each component of resinous flooring system in compliance with manufacturer's directions to produce a uniform monolithic wearing surface of thickness indicated, uninterrupted except at divider strips, sawn joints or other types of joints (if any), indicated or required.

B. Primer: Mix and apply primer over properly prepared substrate with strict adherence to manufacturer's installation procedures and coverage rates. Coordinate timing of primer application with application of troweled mortar to ensure optimum adhesion between resinous flooring materials and substrate.

C. Troweled Mortar: Mix mortar material according to manufacturer's recommended procedures. Uniformly spread mortar over substrate using manufacturer's specially designed screed box adjusted to manufacturer's recommended height. Hand trowel apply mixed material over freshly primed substrate using stainless steel finishing trowels.

D. Coating/Texture: Remove any surface imperfections by lightly abrading and vacuuming the floor surface. Mix coating and texture according to manufacturer's recommended procedures. Squeegee apply and backroll textured coating with strict adherence to manufacturer's installation procedures and coverage rates.

3.3 FIELD QUALITY CONTROL

A. The right is reserved to invoke the following material testing procedure at any time, and any number of times during period of flooring application.

B. The Owner will engage service of an independent testing laboratory to sample materials being used on the job site. Samples of material will be taken, identified and sealed, and certified in presence of Contractor.

C. Testing laboratory will perform tests for any of characteristics specified, using applicable testing procedures referenced herein, or if none referenced, in manufacturer's product data.

D. If test results show materials being used do not comply with specified requirements, Contractor may be directed by Owner to stop work; remove non-complying materials; pay for testing; reapply flooring materials to properly prepared surfaces which had previously been coated with unacceptable materials.

3.4 CURING, PROTECTION AND CLEANING

A. Cure resinous flooring materials in compliance with manufacturer's directions, taking care to prevent contamination during stages of application and prior to completion of curing process. Close area of application for a minimum of 24 hours.

B. Protect resinous flooring materials from damage and wear during construction operation. Where temporary covering is required for this purpose, comply with manufacturer's recommendations for protective materials and method of application. General Contractor is responsible for protection and cleaning of surfaces after final coats.

C. Cleaning: Remove temporary covering and clean resinous flooring just prior to final inspection. Use cleaning materials and procedures recommended by resinous flooring manufacturer.

3.5 WASTE MANAGEMENT

A. Coordinate with Division 01.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 09 67 23

SECTION 09 68 13 - TILE CARPETING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This section includes the performance criteria, materials, production, and erection of carpet tile for the project. The work performed under this Section consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all carpet tile as required by the this section, schedules, keynotes and drawings, including, but not limited to the following:

1. Modular, tufted carpet tile.

B. Related Requirements:

1. Division 03: “Self-Leveling Toppings”

2. Division 09: "Resilient Base and Accessories", "Resilient Tile Flooring" for resilient wall base and accessories installed with carpet tile.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to carpet tile installation including, but not limited to, the following:

a. Review delivery, storage, and handling procedures.
b. Review ambient conditions and ventilation procedures.
c. Review subfloor preparation procedures.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
2. Include installation recommendations for each type of substrate.

B. Shop Drawings: Show the following:

1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
2. Carpet tile type, color, and dye lot.
3. Type of subfloor.
4. Type of installation.
5. Pattern of installation.
6. Pattern type, location, and direction.
7. Pile direction.
8. Type, color, and location of insets and borders.
9. Type, color, and location of edge, transition, and other accessory strips.
10. Transition details to other flooring materials.

C. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1. Carpet Tile: Full-size Sample.
2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch- (300-mm-) long Samples.

D. Product Schedule: For carpet tile. Use same designations indicated on Drawings.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.

C. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:

1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. No extra material to be purchased for purpose of attic stock. All left over material from construction to constitute attic stock – store, maintain and protect accordingly. Package with protective covering for storage and identified with labels describing contents.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Master II certification level.

B. Fire-Test-Response Ratings: Where indicated, provide carpet tile identical to those of assemblies tested for fire response according to NFPA 253 by a qualified testing agency.

C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mockups at locations and in sizes shown on Drawings.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Comply with CRI 104.

1.10 FIELD CONDITIONS

A. Comply with CRI 104 for temperature, humidity, and ventilation limitations.

B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at occupancy levels during the remainder of the construction period.

C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.

D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.11 WARRANTY

A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.

1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
2. Failures include, but are not limited to, more than 10 percent edge raveling, snags, runs, dimensional stability, excess static discharge, loss of tuft bind strength, loss of face fiber, and delamination.
3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE

A. All carpet tile products to be Class A rated.

B. Basis-of-Design Product: Subject to compliance with requirements, provide:

CPT-1

1. Patcraft Gemscape Tile
2. Color: As per schedule on drawings
3. Pattern: Surface Striation Color
4. Construction: Tufted
5. Surface Texture: Multi Level pattern loop
6. Gauge: 1/10 (39.37 rows per 10 cm)
7. Dye Method: Solution Dyed
8. Fiber Type: Ecosolution Q100 Nylon
9. Backing System: Non Woven Synthetic
10. Size: 24 inches by 24inches
11. Installation: Quarter Turn
12. Soil Release Technology
13. Performance Characteristics: Foot Traffic Recommendation TARR: Heavy

CPT-2

1. Patcraft Visual Energy
2. Color: As per Architects sample
3. Pattern: Vivid
4. Construction: Tufted
5. Surface Texture: Multi Level pattern loop
6. Gauge: 1/10 (39.37 rows per 10 cm)
7. Dye Method: Solution Dyed
8. Fiber Type: Ecosolution Q100 Nylon
9. Backing System: Non Woven Synthetic
10. Size: 24 inches by 24inches
11. Installation: Quarter Turn
12. Soil Release Technology
13. Performance Characteristics: Foot Traffic Recommendation TARR: Heavy

2.2 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.

B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet tile and is recommended by carpet tile manufacturer for releasable installation.

1. Adhesives shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Metal Edge/Transition Strips: Extruded aluminum with satin finish of profile and width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance. Examine carpet tile for type, color, pattern, and potential defects.

B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:

1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by carpet tile manufacturer.
2. Subfloor finishes comply with requirements specified in Section 033000 "Cast-in-Place Concrete" for slabs receiving carpet tile.
3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch (3 mm) wide or wider and protrusions more than 1/32 inch (0.8 mm) unless more stringent requirements are required by manufacturer's written instructions.

C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet tile manufacturer.

D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

A. General: Comply with CRI 104, Section 14, "Carpet Modules," and with carpet tile manufacturer's written installation instructions.

B. Installation Method: As recommended in writing by carpet tile manufacturer.

C. Maintain dye lot integrity. Do not mix dye lots in same area.

D. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.

E. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.

G. Install pattern parallel to walls and borders.

3.4 CLEANING AND PROTECTION

A. Perform the following operations immediately after installing carpet tile:

1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet tile manufacturer.
2. Remove yarns that protrude from carpet tile surface.
3. Vacuum carpet tile using commercial machine with face-beater element.

B. Perform the following operations for existing carpet tile:
1. Vacuum carpet tile using commercial machine with face-beater element.
2. Remove stains and spots using cleaners as recommended by the carpet tile manufacturer.

C. Protect installed carpet tile to comply with CRI 104, Section 16, "Protecting Indoor Installations."

D. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

3.5 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 09 68 13

SECTION 09 72 00 - WALL COVERINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Wallpaper.

1.3 ALLOWANCES

A. See Section 01 21 00 "Allowances" for description of allowances affecting items specified in this Section.

1.4 UNIT PRICES

A. See Section 01 22 00 "Unit Prices" for description of unit prices affecting items specified in this Section.

1.5 ALTERNATES

A. See Section 01 23 00 "Alternates" for description of alternates affecting items specified in this Section.

1.6 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site

1.7 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include data on physical characteristics, durability, fade resistance, and fire-test-response characteristics.

B. Shop Drawings: Show location and extent of each wall-covering type. Indicate pattern placement seams and termination points.

C. Samples: For each type of wall covering and for each color, pattern, texture, and finish specified, full width by 6 inches long in size.

1. Wall-Covering Sample: From same production run to be used for the Work, with specified treatments applied.
   a. Show complete pattern repeat.
   b. Mark top and face of fabric.

D. Samples for Initial Selection: For each type of wall covering.

E. Samples for Verification: For each type of wall covering and for each color, pattern, texture, and finish specified, full width by 36 inches long in size.

1. Wall-Covering Sample: From same production run to be used for the Work, with specified treatments applied.
   a. Show complete pattern repeat.
   b. Mark top and face of fabric.

1.8 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each wall covering, for tests performed by a qualified testing agency.

1.9 CLOSEOUT SUBMITTALS

A. Maintenance Data: For wall coverings to include in maintenance manuals.

1.10 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same production run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Wall-Covering Materials: For each type, color, texture, and finish, full width by length to equal to **5** percent of amount installed.

1.11 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and to set quality standards for installation.

1. Build mockups for each type of wall covering on each substrate required. Comply with requirements in ASTM F1141 for appearance shading characteristics.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.12 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install wall coverings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and HVAC system is operating and maintaining ambient temperature and humidity conditions at levels intended for occupants after Project completion during the remainder of the construction period.

B. Lighting: Do not install wall covering until lighting that matches conditions intended for occupants after Project completion is provided on the surfaces to receive wall covering.

C. Ventilation: Provide continuous ventilation during installation and for not less than the time recommended by wall-covering manufacturer for full drying or curing.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates in accordance with test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   a. Flame-Spread Index: 25 or less.
   b. Smoke-Developed Index: 50 or less.

2.2 WALLPAPER

A. Basis of Design: Maharam or Approved equal

B. Description: Provide wallpaper in rolls from same production run and that complies with ASTM F793/F793M.

1. Category: III, Decorative with High Serviceability

C. Width: 52 inches

D. Repeat: 18 ¼” V, 52” H

E. Mildew Resistance: Rating of zero or 1 when tested in accordance with ASTM G21.

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

2.3 ACCESSORIES

A. Adhesive: Mildew-resistant, nonstaining, adhesive, for use with specific wall covering and substrate application indicated and as recommended in writing by wall-covering manufacturer.

B. Primer/Sealer: Mildew resistant, complying with requirements in Section 09 91 00 "Painting" and recommended in writing by primer/sealer and wall-covering manufacturers for intended substrate.

C. Metal Primer: Interior ferrous metal primer complying with[requirements in Section 09 91 00 "Painting" and recommended in writing by primer and wall-covering manufacturers for intended substrate.

D. Wall Liner: Nonwoven, synthetic underlayment and adhesive as recommended in writing by wall-covering manufacturer.

E. Seam Tape: As recommended in writing by wall-covering manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation surfaces being true in plane and vertical and horizontal alignment, maximum moisture content, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Comply with manufacturer's written instructions for surface preparation.

B. Clean substrates of substances that could impair bond of wall covering, including dirt, oil, grease, mold, and mildew.

C. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.

1. Moisture Content: Maximum of 5 percent on new plaster, concrete, and concrete masonry units when tested with an electronic moisture meter.
2. Plaster: Allow plaster to cure for at least 90 days. Neutralize areas of high alkalinity. Apply primer/sealer as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
3. Metals: If not factory primed, clean and apply metal primer as recommended in writing by metal-primer manufacturer and wall-covering manufacturer.
4. Gypsum Board: Apply primer/sealer as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
5. Painted Surfaces:
    a. Check for pigment bleeding. Apply primer/sealer to areas susceptible to pigment bleeding as recommended in writing by primer/sealer manufacturer.
    b. Sand gloss, semigloss, and eggshell finishes with fine sandpaper.

D. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

E. Acclimatize wall-covering materials by removing them from packaging in the installation areas not less than 24 hours before installation.

3.3 INSTALLATION OF WALL LINER

A. Install wall liner, without gaps or overlaps. Form smooth wrinkle-free surface for finished installation. Do not begin wall-covering installation until wall liner has dried.

3.4 INSTALLATION OF WALL COVERING

A. Comply with wall-covering manufacturers' written installation instructions applicable to products and applications indicated.

B. Cut wall-covering strips in roll number sequence. Change the roll numbers at partition breaks and corners.

C. Install strips in same order as cut from roll.

1. For solid-color, even-texture, or random-match wall coverings, reverse every other strip.

D. Install wall covering without lifted or curling edges and without visible shrinkage.

E. Match pattern [72 inches] <Insert dimension> above the finish floor.

F. Install seams vertical and plumb at least 6 inches from outside corners and [3 inches] [6 inches] from inside corners unless a change of pattern or color exists at corner. Horizontal seams are not permitted.

G. Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without overlaps or gaps between strips.

H. Fully bond wall covering to substrate. Remove air bubbles, wrinkles, blisters, and other defects.

3.5 CLEANING

A. Remove excess adhesive at seams, perimeter edges, and adjacent surfaces.

B. Use cleaning methods recommended in writing by wall-covering manufacturer.

C. Replace strips that cannot be cleaned.

D. Reinstall hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

END OF SECTION 09 72 00

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SECTION 09 91 00 - PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This section includes the performance criteria, materials, production, and erection of surface preparation and the application of paint systems for the project. The work performed under this Section consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all surface preparation and the application of paint systems as required by the this section, schedules, keynotes and drawings, including, but not limited to the following substrates:

1. Concrete.
2. Concrete masonry units (CMU).
3. Steel.
4. Cast iron.
5. Galvanized metal.
6. Aluminum (not anodized or otherwise coated).
7. Wood.
8. Gypsum board.
9. Plaster.
10. Spray-textured ceilings.
11. ASJ insulation covering.

B. Related Requirements:

1. Division 05 "Structural Steel Framing" for shop priming of metal substrates with primers specified in this Section.

1.3 DEFINITIONS

A. Gloss Level 1 G! Matte or Flat Finish: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

B. Gloss Level G2 Velvet Finish: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

C. Gloss Level G3 Eggshell Finish: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

D. Gloss Level G4 Satin Finish: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

E. Gloss Level G5 Semi-Gloss Finish: 35 to 70 units at 60 degrees, according to ASTM D 523.

F. Gloss Level G6 Gloss Finish: 70 to 85 units at 60 degrees, according to ASTM D 523.

G. Gloss Level G7 High-Gloss Finish: More than 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

B. Samples for Initial Selection: For each type of topcoat product.

C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches square.
2. Step coats on Samples to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

D. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.
3. VOC content.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. No extra material to be purchased for purpose of attic stock. All left over material from construction to constitute attic stock – store, maintain and protect accordingly. Package with protective covering for storage and identified with labels describing contents.

1.6 QUALITY ASSURANCE

A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.

a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
b. Other Items: Architect will designate items or areas required.

2. Final approval of color selections will be based on mockups.

    a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.8 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).

B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Akzo Nobel
2. Benjamin Moore & Co.
3. ICI Paints.
4. Kelly-Moore Paints.
5. Mastercoating technologies – Zolatone
6. PPG Architectural Finishes, Inc.
7. Sherwin-Williams Company (The)
8. Insl-X

2.2 PAINT, GENERAL

A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."

B. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

C. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction and, for interior paints and coatings applied at Project site, the following VOC limits, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

1. Flat Paints and Coatings: 50 g/L.
2. Nonflat Paints and Coatings: 150 g/L.
3. Dry-Fog Coatings: 400 g/L.
4. Primers, Sealers, and Undercoaters: 200 g/L.
5. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
6. Zinc-Rich Industrial Maintenance Primers: 340 g/L.
7. Pretreatment Wash Primers: 420 g/L.
8. Floor Coatings: 100 g/L.
9. Shellacs, Clear: 730 g/L.
10. Shellacs, Pigmented: 550 g/L.

D. Colors: As indicated in a finish schedule.

2.3 BLOCK FILLERS

A. Block Filler, Latex, Interior/Exterior: MPI #4.

1. Glidden Professional – Concrete Coatings Block Filler Interior / Exterior Primer.
2. Akzo Nobel.
3. Sherwin Williams – Preprite – Interior / Exterior Block filler.

2.4 PRIMERS/SEALERS

A. Primer Sealer, Latex, Interior: MPI #50.

1. Product by one of the approved manufacturers found in the MPI list.

B. Primer, Alkali Resistant, Water Based: MPI #3.

1. Product by one of the approved manufacturers found in the MPI list.

C. Primer Sealer, Interior, Institutional Low Odor/VOC: MPI #149.

1. Product by one of the approved manufacturers found in the MPI list.

D. Primer, Latex, for Interior Wood: MPI #39.

1. Product by one of the approved manufacturers found in the MPI list.

E. Primer Sealer, Alkyd, Interior: MPI #45.

1. Product by one of the approved manufacturers found in the MPI list.

F. Primer Sealer, Alkyd, Interior: MPI #69 (Gymnasium Ceiling).

1. Product by one of the approved manufacturers found in the MPI list.

G. Primer, Bonding, Water Based: MPI #17.

1. Product by one of the approved manufacturers found in the MPI list.

H. Primer, Bonding, Solvent Based: MPI #69.

1. Product by one of the approved manufacturers found in the MPI list.

I. Wood-Knot Sealer: Sealer recommended in writing by topcoat manufacturer for use in paint systems indicated.

2.5 METAL PRIMERS

A. Primer, Rust-Inhibitive, Water Based: MPI #107.

1. Product by one of the approved manufacturers found in the MPI list.

B. Primer, Alkyd, Anti-Corrosive, for Metal: MPI #79.

1. Product by one of the approved manufacturers found in the MPI list.

C. Primer, Alkyd, Quick Dry, for Metal: MPI #76.

1. Product by one of the approved manufacturers found in the MPI list.

D. Primer, Galvanized, Water Based: MPI #134.

1. Product by one of the approved manufacturers found in the MPI list.

E. Primer, Vinyl Wash: MPI #80.

1. Product by one of the approved manufacturers found in the MPI list.

F. Primer, Quick Dry, for Aluminum: MPI #95.

1. Product by one of the approved manufacturers found in the MPI list.

2.6 WATER-BASED PAINTS

A. Latex, Interior, Institutional Low Odor/VOC, Flat (Gloss Level 1): MPI #143.

1. Product by one of the approved manufacturers found in the MPI list.

B. Latex, Interior, Institutional Low Odor/VOC, (Gloss Level 2): MPI #144.

1. Product by one of the approved manufacturers found in the MPI list.

C. Latex, Interior, Institutional Low Odor/VOC, (Gloss Level 3): MPI #145.

1. Product by one of the approved manufacturers found in the MPI list.

D. Latex, Interior, Institutional Low Odor/VOC, Semi-Gloss (Gloss Level 5): MPI #147.

1. Product by one of the approved manufacturers found in the MPI list.

E. Acrylic, Interior, Institutional Low Odor/VOC, Multicolor MPI # 112.

1. Product by one of the approved manufacturers found in the MPI list.

F. Light Industrial Coating, Exterior, Water Based, Semi-Gloss (Gloss Level 5): MPI #163.

1. Product by one of the approved manufacturers found in the MPI list.

2.7 SOLVENT-BASED PAINTS

A. Alkyd, Interior, (Gloss Level 3): MPI #51.

1. Product by one of the approved manufacturers found in the MPI list.

B. Alkyd, Interior, (Flat) Spray Applied Dry Fall : MPI #118 (Gymnasium Ceiling)

C. Alkyd, Interior, Semi-Gloss (Gloss Level 5): MPI #47.

1. Product by one of the approved manufacturers found in the MPI list.

D. Alkyd, Quick Dry, Semi-Gloss (Gloss Level 5): MPI #81.

1. Product by one of the approved manufacturers found in the MPI list.

2.8 DRY FOG/FALL COATINGS

A. Interior Alkyd Dry Fog/Fall: MPI #118.

1. Basis-of-Design Product: Coronado Paint; Superkote 5000Alkyd Dryfall 105-1/131-1 or equal.

2. VOC Content: E Range of E2.

2.9 FLOOR COATINGS

A. Sealer, Water Based, for Concrete Floors: MPI #99.

1. Product by one of the approved manufacturers found in the MPI list.

2.10 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

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

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.
2. Masonry (Clay and CMU): 12 percent.
3. Wood: 15 percent.
4. Gypsum Board: 12 percent.
5. Plaster: 12 percent.

C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

D. Plaster Substrates: Verify that plaster is fully cured.

E. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

E. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:

1. SSPC-SP 2, "Hand Tool Cleaning."
2. SSPC-SP 3, "Power Tool Cleaning."
3. SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."
4. SSPC-SP 11, "Power Tool Cleaning to Bare Metal."

F. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

H. Aluminum Substrates: Remove loose surface oxidation.

I. Wood Substrates:

1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
2. Sand surfaces that will be exposed to view, and dust off.
3. Prime edges, ends, faces, undersides, and backsides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

J. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed in equipment rooms:

a. Equipment, including panelboards and switch gear.
b. Uninsulated metal piping.
c. Uninsulated plastic piping.
d. Pipe hangers and supports.
e. Metal conduit.
f. Plastic conduit.
g. Tanks that do not have factory-applied final finishes.
h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.

2. Paint the following work where exposed in occupied spaces:

a. Equipment, including panelboards.
b. Uninsulated metal piping.
c. Uninsulated plastic piping.
d. Pipe hangers and supports.
e. Metal conduit.
f. Plastic conduit.
g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.

h. Other items as directed by Architect.

3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

4. Do not paint in mechanical rooms except as noted in 3.3.E.1.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.
2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

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

3.6 PAINTING SCHEDULE

A. Concrete Substrates, Nontraffic Surfaces:

1. Institutional Low-Odor/VOC Latex System:

a. Prime Coat: Primer sealer, interior, institutional low odor/VOC**,** MPI #149.
b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
c. Topcoat: Latex, interior, institutional low odor/VOC, (Gloss Level 2), MPI #144.

B. Concrete Substrates, Traffic Surfaces:

1. Water-Based Clear Sealer System:

a. First coat: Sealer, solvent based, for concrete floors, MPI #99.
b. Topcoat: Sealer, solvent based, for concrete floors, MPI #104.

C. CMU Substrates:

1. Institutional Low-Odor/VOC Latex System:

a. Block Filler: Block filler, latex, interior/exterior, MPI #4.
b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
c. Topcoat: Latex, interior, institutional low odor/VOC, (Gloss Level 2), MPI #144.

D. Steel Substrates:

1. Quick-Drying Enamel System:

a. Prime Coat: Primer, alkyd, quick dry, for metal, MPI #76.
b. Intermediate Coat: Alkyd, quick dry, matching topcoat.
c. Topcoat: Alkyd, quick dry, semi-gloss (Gloss Level 5), MPI #81.

E. Galvanized-Metal Substrates:

1. Institutional Low-Odor/VOC Latex System:

a. Prime Coat: Primer, galvanized, water based, MPI #134.
b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
c. Topcoat: Latex, interior, institutional low odor/VOC, (Gloss Level 2), MPI #144.

F. Aluminum (Not Anodized or Otherwise Coated) Substrates:

1. Institutional Low-Odor/VOC Latex System:

a. Prime Coat: Primer, quick dry, for aluminum, MPI #95.
b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
c. Topcoat: Latex, interior, institutional low odor/VOC, (Gloss Level 2), MPI #144.

G. Wood Substrates: Including wood trim, architectural woodwork, doors, wood-based panel products.

1. Institutional Low-Odor/VOC Latex System:

a. Prime Coat: Primer, latex, for interior wood, MPI #39.
b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
c. Topcoat: Latex, interior, institutional low odor/VOC, (Gloss Level 2), MPI #144.

H. Fiberglass and Plastic Substrates:

1. Institutional Low-Odor/VOC Latex System:

a. Prime Coat: Primer, bonding, water based, MPI #17.
b. Prime Coat: Primer, bonding, solvent based, MPI #69.
c. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
d. Topcoat: Latex, interior, institutional low odor/VOC, (Gloss Level 2), MPI #144.

I. Gypsum Board and Plaster Substrates:

1. Institutional Low-Odor/VOC Latex System:

    a. Prime Coat: Primer sealer, interior, institutional low odor/VOC, MPI #149.
    b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
    c. Topcoat: Latex, interior, institutional low odor/VOC, (Gloss Level 2), MPI #144.

2. Institutional Low-Odor/VOC Acrylic System:

    a. Prime Coat: SP203Stain Acrylic Drywall Primer, Master Coating Technologies.
    b. Intermediate Coat: Acrylic Interior, Institutional Low Odor/VOC, Multi-color, Master Coating Technologies., #MPI #112.
    c. Finish Coat: Acrylic Interior, Institutional Low Odor/VOC, Multi-color, Master Coating Technologies., #MPI #112.

J. Cotton or Canvas and ASJ Insulation-Covering Substrates: Including pipe and duct coverings.

1. Institutional Low-Odor/VOC Latex System:

    a. Prime Coat: Primer sealer, latex, interior, MPI #50.
    b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
    c. Topcoat: Latex, interior, institutional low odor/VOC, (Gloss Level 2), MPI #144.

3.7 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.

2. Set aside and protect materials suitable for reuse and/or remanufacturing.

3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 09 50 00

SECTION 10 14 00 - SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes identifying devices.

1.2 SUBMITTALS

A. See Division 1 – General Requirements for submittal procedures.

B. Product Data: Manufacturer’s printed literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions.

C. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts and colors.
1. When room numbers to appear on signs differ from those on the drawings, include drawing room number on schedule.
2. When content of signs is indicated to be determined later, request such information from Owner through Architect at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.
3. Submit for approval by Owner through Architect prior to fabrication.

D. Samples: Submit three samples of each type of sign, of size similar to that required for project, illustrating sign style, font and method of attachment.
1. Selection Samples: Where colors are not specified, submit three sets of color selection charts or chips.
2. Verification Samples: Submit samples showing colors selected

E Manufacturer's Installation Instructions: Submit installation template and attachment devices.

1.3 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.

1.4 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 and building.

C. Store adhesive attachment tape at ambient room temperatures.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Do not install signs when ambient temperature is lower than recommended by manufacturer.

B. Maintain this minimum temperature during and after installation of signs.

PART 2 PRODUCTS

2.1 CAST ALUMINUM LETTERS- NOT USED

A. Provide cast aluminum letters with text and locations as indicated on Drawings.
1. Material: 214 or 514 aluminum alloy.
2. Finish: Sand-blasted edges. Paint as per finish schedule.
4. Letter Style: Century Gothic Upper Case, Bold
5. Mounting: Concealed Studs, with stainless steel spacers.

B. Manufacturers
1. The Southwell Co., San Antonio, TX 78291
2. Andco Industries Corp., Greensboro, NC 27410
3. Matthews International Corp., Pittsburgh, PA 15212
4. Signs and Decal Corp., Brooklyn, NY 11211

2.2 EXTERIOR WALL SIGNS (At Handicapped Entrances)- NOT USED

A. Access entrance symbol sign, Black duranodic aluminum frame. Insert size 9" x 9". Insert shall have a raised 4" accessibility symbol with the verbal description, “Entrance” using 1" Gill Sans upper case letters directly below and followed by Grade 2 braille.

2.3 INTERIOR SIGNS

A. Manufacturers:
1. Ark Ramos
2. Mohawk Sign Systems, Inc.
3. Seton Identification Products.
4. Substitutions: See Division 1 - General Requirements for submittal procedures.

2.4 SIGNAGE APPLICATIONS

A. Accessibility Compliance: All signs are required to comply with ADAAG and ANSI/CC A117.1 and applicable building codes,

B. Room and Door Signs: Provide a sign for every doorway, whether it has a door or not, excluding corridors, lobbies and similar open areas.

2.5 GRAPHIC PROCESS

A. Tactile characters shall be raised the required 1/32" inches from sign face. Glue-on letters or etched backgrounds are not acceptable.

B. All text shall be accompanied by Grade 2 braille. Braille shall be separated ½" from the corresponding raised characters or symbols. Grade 2 braille translation to be provided by signage manufacturer.

C. All letters, numbers and/or symbols shall contrast with their background, either light characters on a dark background or dark characters on a light background. Characters and background shall have a non-glare finish.

D. Plaque material shall be Special Purpose SP125 decorative thermosetting high pressure laminate. Material to be 1/8" thick laminate with a melamine resin surface and a phenolic resin core which provides resistance to abrasion, stains, alcohol, solvents, boiling water, and heat. The material shall be NEMA rated and have flammability and smoke values that meet the standards for flammability of interior materials.

E. Background color as selected by architect from manufacturer's actual color samples.

2.6 ACCESSIBILITY GUIDELINES FOR SIGNAGE

A. Room Identification Signs: Signs which designate permanent rooms or spaces shall comply with the following guidelines:
1. Raised Copy - Letters and numerals shall be raised 1/32" upper case, sans serif or simple serif typestyle.
2. Character Height - Raised characters shall be at least 5/8" high, but no higher than 2".
3. Symbols - Symbols shall be accompanied by the equivalent verbal description placed directly below the symbol. The border dimension of the symbol shall be 6" minimum in height.
4. Braille Tags - Grade 2 Braille shall be on all signs, as required.
5. Colors - The characters and backgrounds of all signs shall be of matte or other non-glare finish. Characters and symbols shall contrast with light characters on a dark background or dark characters on a light background. Colors to be as selected by the Architect from the manufacturer's standard colors.
6. Mounting - Signs shall be installed on the wall adjacent to the latch side of the door. If there is no space on the latch side of the door, including double leaf doors, signs shall be placed on the nearest adjacent wall. Mounting height shall be so that the baseline of the tactile copy is located between 48" at the lowest point to 60" at the highest point. . Mounting location for such signage shall be so that a person may approach within three inches of signage without encountering protruding objects or standing within the swing of a door.

B. Directional and Information Signs: Signs which provide direction to, or information about functional spaces of the building shall comply with the same guidelines as those set for Room Identification Signs with the following additions and exceptions.
1. Character Proportion - Letters and numerals on sign shall have a width to height ratio between 3:5 and 1:1 and a stroke width to height ratio between 1:5 and 1:10.
2. Character Height - Characters and numbers on signs shall be sized according to the viewing distance from which they are to be read. The minimum height is measured using an upper case X. Lower case characters are permitted. Any signs that are suspended

or projected overhead shall have characters at least three inches high and shall maintain a minimum clearance of 80 inches from finished floor.
3. Raised Copy - Directional and Informational signs are NOT required to use raised copy or braille tags.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting Work.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install neatly, with horizontal edges level.

C. Sign Locations:
1. Room and Door Signs: Locate on wall at latch side of door. The sign shall be mounted so that the baseline of the tactile copy shall be between 48" at the lowest point to 60" at the highest point above finished floor.
2. If no location is indicated, obtain Owner/s instructions.
3. Maximum Occupancy Signs posted in Assembly spaces in a conspicuous place near the main or exit access doorway.

D. Protect from damage until Substantial Completion; repair or replace damaged items.

3.3 WASTE MANAGEMENT

A. Coordinate with Division 01

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.

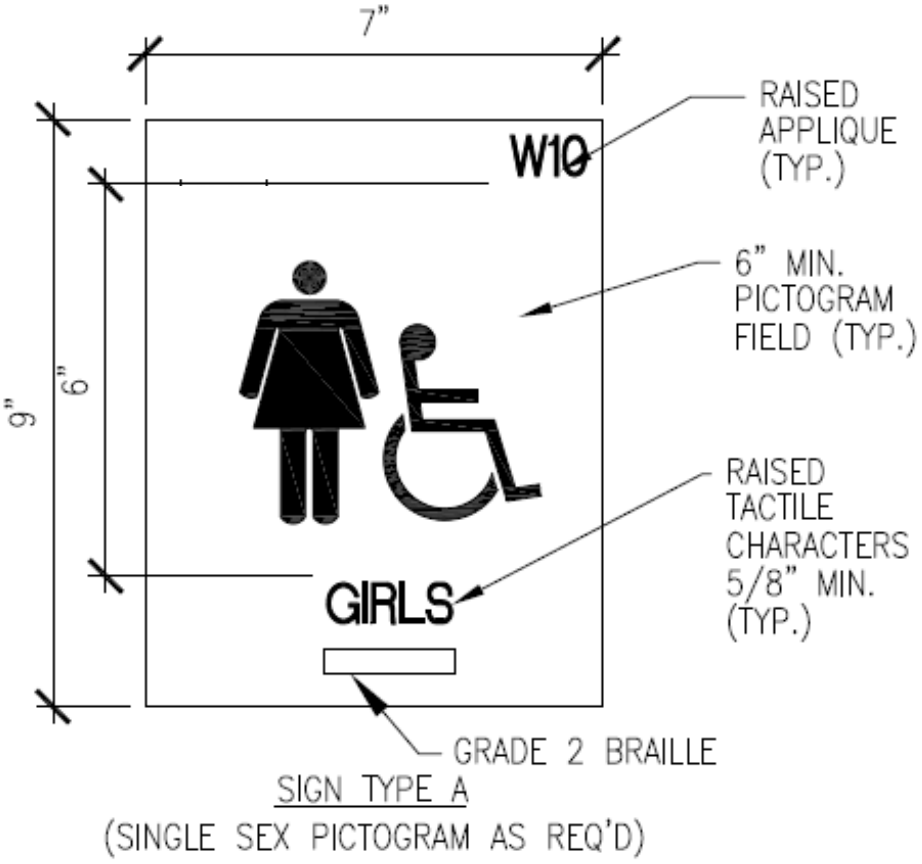
2. Set aside and protect materials suitable for reuse and/or remanufacturing.

3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.



CLASSROOMS/ OFFICE 6”X12”

NTS



TOILET ROOMS
NTS



SINGLE USE FACULTY TOILET ROOMS 9”X9”

NTS

END OF SECTION 10 14 00

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SECTION 10 21 00 - TOILET PARTITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes toilet compartments and screens as follows:
   1. Type: Solid-plastic.
   2. Compartment Style: Overhead braced and floor anchored.

B. Related Sections include the following:
   1. Division 5 Section "Metal Fabrications" for supports that attach units to overhead structural system.
   2. Division 10 "Toilet and Bath Accessories" for toilet paper holders, grab bars, purse shelves, and similar accessories.

1.3 SUBMITTALS

A. Product Data: For each type and style of toilet compartment and screen specified. Include details of construction relative to materials, fabrication, and installation. Include details of anchors, hardware, and fastenings.

B. Shop Drawings: For fabrication and installation of toilet compartment and screen assemblies. Include plans, elevations, sections, details, and attachments to other work.
   1. Show locations of reinforcement and cutouts for compartment-mounted toilet accessories.

C. Samples for Initial Selection: Manufacturer's color charts consisting of sections of actual units showing the full range of colors, textures, and patterns available for each type of compartment or screen indicated.

D. Samples for Verification: Of each compartment or screen color and finish required, prepared on 6-inch-square Samples of same thickness and material indicated for Work.

1.4 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions in areas of installation by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
   1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating units without field measurements. Coordinate supports, adjacent construction, and fixture locations to ensure actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Scranton Products
   2. General Partitions Mfg. Corp.
   3. Bradley Corp.

2.2 MATERIALS

A. General: Provide materials that have been selected for surface flatness and smoothness. Exposed surfaces that exhibit pitting, seam marks, roller marks, stains, discolorations, telegraphing of core material, or other imperfections on finished units are unacceptable.

B. Solid-Plastic, Provide units with eased edges and with minimum 1-inch-thick doors and panels, and 1-1/4 inch pilasters. Provide units with Class B flame spread rating under ASTM E84, with smoke developed less than 450. Provide color as follows:
   1. Color: One color in each room as selected by Architect from manufacturer's full range of colors.

C. Pilaster Shoes and Sleeves (Caps): ASTM A 666, Type 302 or 304 stainless steel, not less than 0.0312 inch thick and 3 inches high, finished to match hardware.

D. Full-Height (Continuous) Brackets: Manufacturer's standard design for attaching panels and screens to walls and pilasters of the following material:
   1. Material: Stainless steel.

E. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories of the following material:
   1. Material: Chrome-plated, nonferrous, cast zinc alloy (zamac) or clear-anodized aluminum.

F. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile in manufacturer's standard finish.

G. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel or chrome-plated steel or brass, finished to match hardware, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use hot-dip galvanized or other rust-resistant, protective-coated steel.

2.3 FABRICATION

A. General: Provide standard doors, panels, screens, and pilasters fabricated for compartment system. Provide units with cutouts and drilled holes to receive compartment-mounted hardware, accessories, and grab bars, as indicated.

B. Overhead-Braced-and-Floor-Anchored Compartments: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, fasteners, and anchors at pilasters to suit floor conditions. Make provisions for setting and securing continuous head rail at top of each pilaster. Provide shoes at pilasters to conceal supports and leveling mechanism.

C. Doors: Unless otherwise indicated, provide 24-inch-wide in-swinging doors for standard toilet compartments and 36-inch-wide out-swinging doors with a minimum 32-inch-wide clear opening for compartments indicated to be handicapped accessible.
   1. Hinges: Manufacturer's standard self-closing type that can be adjusted to hold door open at any angle up to 90 degrees.
   2. Latch and Keeper: Manufacturer's standard surface-mounted latch unit with combination rubber-faced door strike and keeper designed for emergency access. Provide units that comply with accessibility requirements of authorities having jurisdiction at compartments indicated to be handicapped accessible.
   3. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent door from hitting compartment-mounted accessories.
   4. Door Bumper: Manufacturer's standard rubber-tipped bumpers at out-swinging doors or entrance screen doors.
   5. Door Pull: Manufacturer's standard unit that complies with accessibility requirements of authorities having jurisdiction at out-swinging doors. Provide units on both sides of doors at compartments indicated to be handicapped accessible.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, plumb, and level. Provide clearances of not more than 1/2 inch between pilasters and panels and not more than 1 inch between panels and walls. Secure units in position with manufacturer's recommended anchoring devices.

B. Overhead-Braced-and-Floor-Anchored Compartments: Secure pilasters to floor and level, plumb, and tighten. Secure continuous head rail to each pilaster with not less than 2 fasteners. Hang doors and adjust so tops of doors are parallel with overhead brace when doors are in closed position.

3.2 ADJUSTING AND CLEANING

A. Hardware Adjustment: Adjust and lubricate hardware according to manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors and swing doors in entrance screens to return to fully closed position.

B. Provide final protection and maintain conditions that ensure toilet compartments and screens are without damage or deterioration at the time of Substantial Completion.

3.3 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other scrap for recycling.

END OF SECTION 10 21 00

SECTION 10 28 00 – TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. The work performed under this Section includes the performance criteria, materials, production, and erection of toilet, bath and laundry accessories for the project and consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all toilet, bath and laundry accessories as required by schedules, keynotes and drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction including, but not limited to the following:

1. Toilet room accessories.
2. Underlavatory guards.
3. Custodial accessories.

B. Related Sections:
1. Division 09 "Ceramic Tile"

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include the following:

1. Construction details and dimensions.
2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
3. Material and finish descriptions.
4. Features that will be included for Project.
5. Manufacturer's warranty.

B. Samples: Full size, for each accessory item to verify design, operation, and finish requirements.

1. Approved full-size Samples will be returned and may be used in the Work.

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

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

1.4 INFORMATIONAL SUBMITTALS

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

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For toilet and bath accessories to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Source Limitations: For products listed together in the same Part 2 articles, obtain products from single source from single manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.7 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.8 WARRANTY

A. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.

1. Warranty Period: **15** years from date of Substantial Completion.

B. Warranty for Hand Dryers: Manufacturer agrees to repair or replace hand dryers that fail in materials or workmanship within specified warranty period.

1. Warranty Period: **10** years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch (0.8-mm) minimum nominal thickness unless otherwise indicated.

B. Brass: ASTM B 19, flat products; ASTM B 16/B 16M, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.

C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.036-inch (0.9-mm) minimum nominal thickness.

D. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 (Z180) hot-dip zinc coating.

E. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.

F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.

G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).

H. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

I. ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.

2.2 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

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

2.2 TOILET/ SHOWER ROOM ACCESSORIES – See Accessory Schedule on drawings

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
   1. American Specialties, Inc.
   2. A&J Washroom Accessories, Inc.
   3. Bobrick Washroom Equipment, Inc.
   4. Bradley Corporation.
   5. GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.
   6. Tubular Specialties Manufacturing, Inc.

2.3 UNDERLAVATORY GUARDS

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

1. Plumberex Specialty Products, Inc.
2. Truebro by IPS Corporation.

B. Underlavatory Guard:

1. Basis-of-Design Product: ISP Corp Truebro Lav Guard 2.
2. Description: Insulating pipe covering for supply and drain piping assemblies that prevent direct contact with and burns from piping; allow service access without removing coverings.
3. Material and Finish: Antimicrobial, molded plastic, white.

2.4 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

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

B. Grab Bars: Install to withstand a downward load of at least 250 lbf (1112 N), when tested according to ASTM F 446.

3.2 ADJUSTING AND CLEANING

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

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

3.3 WASTE MANAGEMENT

A. Coordinate with Division 01.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 10 28 00

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SECTION 11 16 00 - BULLET RESISTANT FIBERGLASS PANELS

PART 1 GENERAL

1.1 REFERENCE

The publication below forms a part of this specification.
UNDERWRITERS LABORATORY UL 752 9th Edition
Standard for Bullet Resisting Equipment dated Jan. 27,1995

1.2 SUBMITTALS

The following shall be submitted in accordance with Sections 01340 and the SPECIAL CONTRACT REQUIREMENTS: Submit for approval prior to fabrication catalog cuts, brochures, specifications, UL LISTING VERIFICATION, proof of possession of PRODUCT LIABILITY INSURANCE in an amount not less than five million U.S. dollars, and printed data in sufficient detail to indicate compliance with the contract documents and the manufacturer's instructions for the installation of Bullet Resistant Fiberglass.

1.3 DESIGN

Through the design, manufacturing technique and material application the Bullet Resistant Fiberglass shall be of the "non-ricochet type". This design is intended to permit the encapture and retention of an attacking projectile lessening the potential of a random injury or lateral penetration.

1.4 DELIVERY, STORAGE AND HANDLING

Deliver the materials to the project with the manufacturer’s UL Labels intact and legible. Handle the material with care to prevent damage. Store the materials inside under cover, stack flat and off the floor.

1.5 WARRANTY

All materials and workmanship shall be warranted against defects for a period of one (1) year from the date of receipt at the project site.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: ArmorCore 13070 Level 3 = 3/4” Ballistic Fiberglass Panels – multiple layer woven ballistic grade fiberglass panels by Waco Composites. www.armorcore.com

D. Substitutions: See Section 01 60 00 - Product Requirements.

2.1 BULLET RESISTANT FIBERGLASS MATERIAL

The panels shall be made of multiple layers of starch-oil woven roving ballistic grade fiberglass cloth impregnated with a thermoset polyester resin and compressed into flat rigid sheets. The production technique and materials used shall provide the controlled internal delamination to permit the encapture of a penetrating projectile. Panels shall be UL Listed (BRF100/BRF200/BRF300).

Bullet Resistant Fiberglass panels shall be UL Listed (BRF300).

2.2 SECURITY LEVEL

The Bullet Resistant Fiberglass must be UL Listed Rated for Level 3.

2.3 SUBSTITUTIONS

Other UL Listed bullet resistant fiberglass products are acceptable if in compliance with all requirements of this specification. Alternate products must be submitted to the architect for approval.

PART 3 EXECUTION

3.1 SUPPORTING MEMBERS

Prior to installing the bullet resistive material, the contractor shall verify that all supports have been installed as required by the contract documents and the architectural drawings.

3.2 JOINTS

All joints shall be reinforced by a back-up layer of bullet resistive material. The bullet resistance of the joint, as reinforced, shall be at least equal to that of the panel. Minimum width of reinforcing layer at joint shall be 4". (2" on each panel side or a 2" minimum overlap per side)

3.3 INSTALLATION

Panels shall be installed in accordance with the manufacturer's printed recommendations. Panels shall be adhered using an industrial adhesive, mastic, screws or bolts. Method of application shall maintain the bullet resistive rating at junctures with the concrete floor slab, the concrete roof slab, the bullet resistive door frames, the bullet resistive window frames, and all required penetrations.

END OF SECTION 11 16 00

SECTION 12 24 13 - ROLLER WINDOW SHADES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 RELATED SECTIONS

A. Division 06 – Rough Carpentry: Wood blocking and grounds for mounting roller shades.

B. Division 09 – Gypsum Board

C. Division 09 – Acoustic Tile Ceilings

D. Division 26 – Electrical

1.3 REFERENCES

A. ASTM G 21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

B. NFPA 70 - National Electrical Code.

C. NFPA 701 - Fire Tests for Flame-Resistant Textiles and Films.

1.4 SUMMARY

A. The work performed under this Section includes the performance criteria, materials, production, and erection of roller window shades for the project and consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all window shades as required by schedules, keynotes and drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction including, but not limited to the following:
   1. Manually operated roller shades with single rollers at all exterior windows of instructional spaces, including but not limited to, classrooms, conference rooms and offices and all interior door glazing and sidelites.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include styles, material descriptions, construction details, dimensions of individual components and profiles, features, finishes, and operating instructions for roller shades.

B. Shop Drawings: Show fabrication and installation details for roller shades, including shadeband materials, their orientation to rollers, and their seam and batten locations.

1. Manual Roller Shades with chain pull.

C. Samples: For each exposed product and for each color and texture specified, 10 inches (250 mm) long.

D. Samples for Initial Selection: For each type and color of shadeband material.

1. Include Samples of accessories involving color selection.

E. Samples for Verification: For each type of roller shade.

1. Shadeband Material: Not less than 10 inches (250 mm) square. Mark inside face of material if applicable.
2. Roller Shade: Full-size operating unit, not less than 16 inches (400 mm) wide by 36 inches (900 mm) long for each type of roller shade indicated.
3. Installation Accessories: Full-size unit, not less than 10 inches (250 mm) long.

F. Roller-Shade Schedule: Use same designations indicated on Drawings.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Certificates: For each type of shadeband material, signed by product manufacturer.

C. Product Test Reports: For each type of shadeband material, for tests performed by manufacturer and witnessed by a qualified testing agency.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roller shades to include in maintenance manuals.

1.8 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Roller Shades: Full-size units equal to 5 percent of quantity installed for each size, color, and shadeband material indicated, but no fewer than ten units.

1.9 QUALITY ASSURANCE

A. Manufacturer Qualifications: Obtain roller shades system through one source from a single manufacturer with a minimum of ten years experience and minimum of five projects of similar scope and size in manufacturing products comparable to those specified in this section.

B. Installer for Roller Shade System - Qualifications: Installer trained and certified by the manufacturer with a minimum of ten years experience in installing products comparable to those specified in this section.

C. Fire-Test-Response Characteristics: Passes NFPA 701 small and large-scale vertical burn. Materials tested shall be identical to products proposed for use.

D. ShadeCloth Anti-Microbial Characteristics: 'No Growth' per ASTM G 21 results for fungi ATCC9642, ATCC 9644, ATCC9645.

E. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver roller shades in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

1.11 FIELD CONDITIONS

A. Environmental Limitations: Do not install roller shades until construction and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide:

- Mechoshade Systems, Inc. – Mecho/5 Regular Roll Shade in 4133 Pocket manually operated single roller with Thermoveil screens - 1500 Series 3 % density at all interior classrooms/office doors with lites and/or sidelites, support space doors with lites and/or sidelites and, and all corridors windows. Shades are not required at exterior operable doors.

Or comparable product by one of the following:

1. BTX Window Automation, Inc.
2. DFB Sales.
3. Draper Inc.
4. Hunter Douglas Contract.
5. Lutron Electronics Co., Inc.

B. Source Limitations: Obtain roller shades from single source from single manufacturer.

2.2 MANUALLY OPERATED SHADES WITH SINGLE ROLLERS

A. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.

1. Bead Chains: Stainless steel.

a. Loop Length: Full length of roller shade.
b. Limit Stops: Provide upper and lower ball stops.
c. Chain-Retainer Type: Chain tensioner, jamb mounted.

2. Spring Lift-Assist Mechanisms: Manufacturer's standard for balancing roller-shade weight and lifting heavy roller shades.

B. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.

1. Roller Drive-End Location: As directed during shop drawing review.
2. Direction of Shadeband Roll: Reverse, from front of roller.

C. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.

D. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to three inline rollers into a multiband shade that is operated by one roller drive-end assembly.

E. Shadebands:

1. Shadeband Material: Translucent.
2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.

a. Type: Exposed with endcaps.
b. Color and Finish: As selected by Architect from manufacturer's full range.

F. Shade Pocket: For mounting as indicated on the drawings.

1. Extruded aluminum shade pocket, sized to accommodate roller shades, with exposed extruded aluminum closure mount, tile support and removable closure panel to provide access to shades.
2. Basis of Design: 4133 surface mounted with endcaps, as per details.

G. Installation Accessories:

1. Side Channels: With light seals and designed to eliminate light gaps at sides of shades as shades are drawn down. Provide side channels with shadeband guides or other means of aligning shadebands with channels at tops.
2. Bottom (Sill) Channel or Angle: With light seals and designed to eliminate light gaps at bottoms of shades when shades are closed.
3. Installation Accessories Color and Finish: As selected from manufacturer's full range.

2.3 MANUALLY OPERATED SHADES WITH DOUBLE ROLLERS

A. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.

1. Bead Chains: Stainless steel.

a. Loop Length: Full length of roller shade.
b. Limit Stops: Provide upper and lower ball stops.
c. Chain-Retainer Type: Chain tensioner, jamb mounted.

2. Spring Lift-Assist Mechanisms: Manufacturer's standard for balancing roller-shade weight and lifting heavy roller shades.

B. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.

1. Double-Roller Mounting Configuration: Offset, outside roller over and inside roller under.
2. Inside Roller:

a. Drive-End Location: As indicated on Drawings.
b. Direction of Shadeband Roll: Regular, from back of roller.

3. Outside Roller:

a. Drive-End Location: As indicated on Drawings.
b. Direction of Shadeband Roll: Regular, from back of roller.

4. Shadeband-to-Roller Attachment: Manufacturer's standard method.

C. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller mounting configuration, roller assemblies, operating mechanisms, installation accessories, and installation locations and conditions indicated.

D. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to three inline rollers into a multiband shade that is operated by one roller drive-end assembly.

E. Inside Shadebands:

1. Shadeband Material: Light-filtering fabric.
2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.

a. Type: Enclosed in sealed pocket of shadeband material.
b. Color and Finish: As selected by Architect from manufacturer's full range.

F. Outside Shadebands:

1. Shadeband Material: Light-blocking fabric.
2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.

a. Type: Enclosed in sealed pocket of shadeband material.
b. Color and Finish: As selected by Architect from manufacturer's full range.

G. Shade Pocket: For mounting as indicated on the drawings.

1. Extruded aluminum shade pocket, sized to accommodate roller shades, with exposed extruded aluminum closure mount, tile support and removable closure panel to provide access to shades.
2. Basis of Design: 4133 surface mounted with endcaps, as per details.
3. Retain "Recessed Shade Pocket" Subparagraph below for roller enclosure installed above the ceiling.

H. Installation Accessories:

1. Side Channels: With light seals and designed to eliminate light gaps at sides of shades as shades are drawn down. Provide side channels with shadeband guides or other means of aligning shadebands with channels at tops.
2. Bottom (Sill) Channel or Angle: With light seals and designed to eliminate light gaps at bottoms of shades when shades are closed.
3. Installation Accessories Color and Finish: As selected from manufacturer's full range.

2.4 SHADEBAND

A. Shadeband Material Flame-Resistance Rating: Comply with NFPA 701. Testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

B. Shade Bands: Construction of shade band includes the fabric, the enclosed hem weight, shade roller tube, and the attachment of the shade band to the roller tube. Sewn hems and open hem pockets shall not be acceptable.
   1. Concealed Hembar: Shall be continuous extruded aluminum for entire width of shade band and with the following characteristics:
      a. Hembar shall be heat sealed on all sides.
      b. Open ends shall not be accepted.
   2. Shade band and Shade Roller Attachment:
      a. Use extruded aluminum shade roller tube of a diameter and wall thickness required to support shade fabric without excessive deflection.
      b. Provide for positive mechanical attachment of shade band to roller tube; shade band shall be made removable / replaceable with a "snap-on" snap-off" Spline mounting, without having to remove shade roller from shade brackets.
      c. Mounting Spline shall not require use of adhesives, adhesive tapes, staples, and/or rivets.
      d. Any method of attaching shade band to roller tube that requires the use of: adhesive, adhesive tapes, staples, and/or rivets, does not meet the performance requirements of this specification and shall not be accepted.

C. Light-Filtering Fabric: Woven fabric, stain and fade resistant.

   1. Source: Roller-shade manufacturer.
   2. Type: PVC-coated polyester.
   3. Weave: Dense Vertical Weave.
   4. Roll Width: 96 inches (244 mm).
   5. Orientation on Shadeband: Up the bolt.
   6. Openness Factor: 3 percent.
   7. Color: As selected by Architect from manufacturer's full range.

D. Light-Blocking Fabric: Opaque fabric, stain and fade resistant.

   1. Source: Roller-shade manufacturer.
   2. Type: Acrylic-coated fiberglass.
   3. Roll Width: 98 inches (249 mm).
   4. Orientation on Shadeband: Up the bolt.
   5. Features: Flame retardant and flame resistant.
   6. Color: As selected by Architect from manufacturer's full range.

2.5 ROLLER-SHADE FABRICATION

A. Product Safety Standard: Fabricate roller shades to comply with WCMA A 100.1, including requirements for flexible, chain-loop devices; lead content of components; and warning labels.

B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F (23 deg C):

   1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which shade is installed less 1/4 inch (6 mm) per side or 1/2-inch (13-mm) total, plus or minus 1/8 inch (3.1 mm). Length equal to head-to-sill or -floor dimension of opening in which shade is installed less 1/4 inch (6 mm), plus or minus 1/8 inch (3.1 mm).

2. Outside of Jamb Installation: Width and length as indicated, with terminations between shades of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.

C. Shadeband Fabrication: Fabricate shadebands without battens or seams to extent possible except as follows:

1. Vertical Shades: Where width-to-length ratio of shadeband is equal to or greater than 1:4 provide battens and seams at uniform spacing along shadeband length to ensure shadeband tracking and alignment through its full range of movement without distortion of the material.
2. Railroaded Materials: Railroad material where material roll width is less than the required width of shadeband and where indicated. Provide battens and seams as required by railroaded material to produce shadebands with full roll-width panel(s) plus, if required, one partial roll-width panel located at top of shadeband.
3. Blackout shadebands, when used in side channels, shall have horizontally mounted, roll-formed stainless steel or tempered-steel battens not more than 3 feet (115 mm) on center extending fully into the side channels. Battens shall be concealed in an integrally-colored fabric to match the inside and outside colors of the shadeband, in accordance with manufacturer's published standards for spacing and requirements.
    a. Battens shall be roll formed of stainless steel or tempered steel and concave to match the contour of the roller tube.
    b. Batten pockets shall be self-colored fabric front and back RF welded into the shadecloth. A self-color opaque liner shall be provided front and back to eliminate any see through of the batten pocket that shall not exceed 1-1/2 inches (38.1 mm) high and be totally opaque. A see-through moire effect, which occurs with multiple layers of transparent fabrics, shall not be acceptable.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, accurate locations of connections to building electrical system, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ROLLER-SHADE INSTALLATION

A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.

1. Opaque Shadebands: Located so shadeband is not closer than 2 inches (51 mm) to interior face of glass. Allow clearances for window operation hardware.

B. Electrical Connections: Connect motor-operated roller shades to building electrical system.

3.3 ADJUSTING

A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

A. Clean roller-shade surfaces after installation, according to manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer that ensure that roller shades are without damage or deterioration at time of Substantial Completion.

C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain motor-operated roller shades.

3.6 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 12 24 13

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SECTION 12 36 61 - SIMULATED STONE COUNTERTOPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This section includes the performance criteria, materials, production, and erection of simulated stone countertops for the project. The work performed under this Section consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all simulated stone countertops as required by this section, schedules, keynotes and drawings, including, but not limited to the following:

1. Solid-surface-material window sills and aprons

1.3 ACTION SUBMITTALS

A. Product Data: For sills.

B. Shop Drawings: For sills. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.

C. Samples for Initial Selection: For each type of material exposed to view.

D. Samples for Verification: For the following products:

1. Material, 6 inches (150 mm) square.

1.4 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions by field measurements before fabrication is complete.

1.5 COORDINATION

A. Coordinate locations of penetrations.

PART 2 - PRODUCTS

2.1 SOLID-SURFACE-MATERIAL

A. Sills: 3/4-inch- (19-mm-) thick, solid surface material

B. Apron: 3/4-inch- (19-mm-) thick, solid surface material.

C. Fabrication: Fabricate in one piece with shop-applied edges and backsplashes unless otherwise indicated. Comply with solid-surface-material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.

D. Adhesives: Adhesives shall not contain urea formaldehyde.

E. Solid Surface Material: Homogeneous solid sheets of filled plastic resin complying with ANSI SS1.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Corian- Basis of Design
   b. Dupont – “Zodiaq” Quartz
   c. Formica Corporation.
   d. Wilsonart International.
2. Colors and Patterns: As indicated by manufacturer's designations.

2.2 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 joints.
   a. Reinforce as required.
3. Provide factory cutouts for plumbing fittings and bath accessories as indicated on the drawings.
4. Rout and finish component edges with clean, sharp returns.
   a. Rout cutouts, radii and contours to template.
   b. Smooth edges.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install countertops level to a tolerance of 1/8 inch in 8 feet (3 mm in 2.4 m).

B. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Pre-drill holes for screws as recommended by manufacturer. Align adjacent surfaces and, using

adhesive in color to match sill, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

1. Install aprons to comply with manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
2. Seal edges of cutouts in particleboard subtops by saturating with varnish.

C. Keep components and hands clean during installation.
   1. Remove adhesives, sealants and other stains.
   2. Components shall be clean on date of substantial completion

3.2 WASTE MANAGEMENT

A. Coordinate with Division 01.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other metal scrap for recycling in designated area.

END OF SECTION 12 36 61

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SECTION 12 48 13 – ENTRANCE FLOOR MATS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This section includes the performance criteria, materials, production, and installation of entrance floor mats, including fibered roll goods, for the project. The work performed under this Section consists of the provision of all plant, materials, labor and equipment and the like necessary and/or required for the complete execution of all entrance floor mats as required by the this section.

B. Related Sections:
1. Division 3 Cast-In-Place Concrete and Self-Leveling Toppings
2. Division 9 Floor Finishes

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: Submit selection and verification samples of the floor mats.

C. Product Schedule: Use same designations indicated on Drawings.

1.4 INFORMATION SUBMITTALS

A. Test and Evaluation Reports

1. Product test reports: As required by Conditions of the Contract and Division 1 Regulatory Requirements Section, submit test certificates from an independent test laboratory showing compliance with specified performance characteristics and physical properties.

2. Compatibility and adhesion test reports: Submit test reports confirming adhesive's effectiveness with the product(s) specified.

3. Manufacturer Instructions: For specified products, submit latest editions of product supplier's installation and cleaning & maintenance instructions.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of floor mat to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer: Installer shall be highly experienced in performing work of this section, having previous done fiber roll goods installation work similar to that required for this project.

B. Testing Agency: Agency(ies) shall be independent and qualified to perform the specified product tests.

1.7 DELIVERY, STORAGE, AND HANDLING

A. General: Comply with Division 1 Product Requirements Section

B. Delivery and Acceptance Requirements: Comply with the product supplier's ordering and lead time requirements to avoid construction delays, and to allow material to acclimatize as required in the specified product's installation instructions. Accept delivery of materials only if they are in unopened, undamaged packaging that bears the name and brand of the manufacturer/product supplier, project identification, and shipping and handling instructions.

C. Storage and Handling Requirements: Store material -- including any adhesive and accessories -- in the original packaging (as delivered) in areas that are enclosed and weather tight with the permanent HVAC system set at a temperature of between 65°F and 80°F for a minimum of 48 hours prior to commencement of installation. In addition, comply with storage and handling requirements listed on product packaging, and described in the latest edition of the product's installation instructions

1.8 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 65 deg F (21 deg C) or more than 80 deg F (35 deg C) during the following time periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).

PART 2 - PRODUCTS

2.1 HEAVY TRAFFIC MATTING – RECESSED IN FRAME

A. Basis of Design: Subject to compliance with requirements, provide the product indicated on drawings or comparable product to the following:
1. 3M "Nomad Z-Web Extreme Traffic Scraper Matting 9100"

a. Construction: Vinyl nonwoven continuous filament bonded together to form a durable, resilient mat. Unbacked to allow dirt to fall through.

Thickness: ASTM D418-68 – 0.46 inches
Weight: ASTM D-418 – 15 lbs./sq. yard

b. Performance: Physical properties of the entrance matting shall conform to the following minimums:

Microbiological Properties: ASTM G-21-70 Passes- inhibiting to fungal growth in the mat
Electrical Properties: AATCC 134 Static Propensity 1.2 kilovolts
Extended Use Temperature: -10F to 150F
NFSI High Traction Certification

B. Colors: As selected by Architect. Sizes as shown on drawings.

2.2 ACCESSORY PRODUCTS

A. Aluminum frame, seaming tape, matting edging, and matting adhesives as supplied by floor mat manufacturer for complete installation.

PART 3 - EXECUTION

3.1 EXAMINATION

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

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installation.

B. Interface with Other Work: If transitions are required to and/or from the specified entrance matting, contact Mats Inc. for suitable transition material.

C. Sizes: Where not indicated otherwise, provide single unit for each mat installation, but do not exceed manufacturer's maximum size recommendation for units intended for removal and cleaning. Where possible, verify sizes by field measurement before shop fabrication.

D. Accessory selection: Where indicated for recessed or wall-to-wall applications provide aluminum framework as recommended by manufacturer.

E. Mats to be installed in recessed area. Ensure the space has the proper depth so that when the installation is complete, the top of the mat is flush with adjacent floor finish.

3.3 CLEANING AND PROTECTION

A. General: Clean up job site, including sweeping or dust mopping the floor to remove all dirt or grit, and put all waste in general contractor's dumpster. Follow overall cleaning guidelines described in Division 01.

B. Maintenance: Conduct a full initial maintenance following the latest edition of the manufacturer's maintenance instructions. Instruct owner's cleaning staff in proper maintenance procedures.

3.4 WASTE MANAGEMENT

A. Coordinate with Section 01 74 19.

1. Separate and recycle cut-offs and waste materials and material packaging in accordance with Waste Management Plan and to the maximum extent economically feasible and place in designated areas for recycling.
2. Set aside and protect materials suitable for reuse and/or remanufacturing.
3. Separate and fold up metal banding; flatten and place along with other scrap for recycling.

END OF SECTION 12 48 13

SECTION 14 42 00 – WHEELCHAIR LIFTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. The Work of this Section consists of the provision of all plant, labor, materials, equipment, testing and services necessary to complete the work of wheelchair lifts as shown on the schedules, keynotes, drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:
   1. Commercial Unenclosed Vertical Platform Lift.

B. Related Sections:
   1. Division 03 – Cast-in-place concrete existing floor/repair
   2. Division 04 – Unit Masonry
   3. Division 6 - Rough Carpentry
   4. Division 9 - Gypsum Board Assemblies.
   5. Division 9 - Resilient Flooring: Floor finish in cab.
   6. Division 9 - Paints
   7. Division 16 Sections for electrical service for elevators to and including disconnect and fused switches at machine room.
   8. Division 16 Sections for standby power source, transfer switch, and connection from auxiliary contacts in transfer switch to controller.
   9. Division 16 Section "Voice and Data Communication Cabling" for telephone service to elevators.

1.3 REFERENCES

A. ASME A18.1 - American Society of Mechanical Engineers - Safety Standard for Platform and Stairway Chair Lifts.

B. ASME A17.1 - Safety Code for Elevators and Escalators.

C. ASME A17.5 - Elevator and Escalator Electrical Equipment.

D. ICC/ANSI A117.1 - Accessible and Usable Buildings and Facilities.

E. ADAAG - U.S. Architectural & Transportation Barriers Compliance Board's “Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities”.

F. NFPA 70 - National Electric Code.

1.4 REQUIREMENTS OF REGULATORY AGENCIES

A. Fabrication and installation work in compliance with applicable jurisdictional authorities.

B. Provide wheelchair lifts in compliance with:
1. ASME A18.1 - Safety Standard for Platform Lifts and Stairway Chairlifts.
2. ASME A17.1 - Safety Code for Elevators and Escalators.
3. ASME A17.5 - Elevator and Escalator Electrical Equipment.
4. NFPA 70 - National Electric Code.

C. Seismic Design: In accordance with 2 seismic risk zone in accordance with CT State Building code.

D. File shop drawings and submissions with local authorities as the information is made available. Company pre-inspection and jurisdictional authority inspections and permits are to be made on timely basis as required.

1.5 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
1. Preparation instructions and recommendations including preparation, storage and handling requirements.
2. Include complete description of performance and operating characteristics.
3. Show maximum and average power demands.

C. Shop Drawings: Survey of existing conditions is required. Provide a complete layout of lift equipment detailing dimensions and clearances as required, erection and anchorage requirements.
1. Include wiring diagrams for power, control and signal systems.

D. Selection Samples: For each finish product specified requiring selection of color or finish, two complete sets of color charts representing manufacturer's full range of available colors and patterns.

E. Verification Samples: for each finished product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product color and pattern.

F. Minutes of preinstallation conference.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Firm with minimum 10 years experience in manufacturing of wheelchair lifts, with evidence of experience with similar installations of type specified.

B. Source Limitations: Obtain wheelchair lifts through one source from a single manufacturer.
1. Provide major lift components, controllers, signal fixtures, door operators, car frames, cabs, and entrances, manufactured by a single manufacturer.

C. Installer Qualifications:
1. Execute work of this section only by a company that has adequate product liability insurance and that can demonstrate to Owner’s satisfaction that, within previous five years, it has

successfully completed at least three projects similar in scope and type to work required on this Project.

2. Skilled tradesmen shall be employees of the installing contractor approved by the manufacturer, with demonstrated ability to perform the work on a timely basis.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store components off the ground in a dry covered area, protected from adverse weather conditions.

C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.8 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install systems under environmental conditions outside manufacturer's absolute limits.

B. Do not use wheelchair lifts for hoisting materials or personnel during construction period.

1.9 WARRANTY

A. Manufacturer shall warrant the wheelchair lift materials and workmanship for one year following Substantial Completion.

B. Extended Warranty: provide an extended manufacturer’s warranty for the entire warranty period covering the wheelchair lift materials and workmanship for the following additional extended period beyond the initial one year warranty:

1. Four additional years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design Product portable wheelchair lift: Subject to compliance with requirements, provide Ascension Virtuoso 5460P Model Series Vertical Portable Wheelchair Lift or comparable product by one of the following:

1. Ascension
2. Or approved equal

B. Requests for substitutions will be considered in accordance with provisions of Section 016000.

2.2 PORTABLE WHEELCHAIR LIFT

A. Capacity: 750 lbs (340 kg) rated capacity.

B. Weight of lift: 1025 pounds maximum [465 kg].

C. Vertical speed: seven (7) fpm (feet per minute) [2.1 m/min (meters per minute)].

D. Vertical travel: 12" to 60" [305 mm to 1524 mm], infinitely adjustable.

E. Standard platform gate configuration: the upper landing platform gate shall be left-hinged when facing the lift from the upper landing; the lower landing platform gate shall be right-hinged when facing the lift from the lower landing. Contact Ascension for custom platform gate configurations.

2.3 DIMENSIONS

A. Platform size: 36" x 54" with 43" high sidewalls and platform gates.

B. Space requirements (operational, storage, and transport): 44" high (in the down position), 66" long, 48" wide.

C. No part of the lift shall stand over 44” high when the platform is on the ground except when equipped with optional stage guard).

2.4 MATERIALS

A. The platform frame, base frame, and lifting device shall be constructed from ASTM A 36, AISI 1018, or AISI 1020 Steel.

B. The windows shall be fabricated from 1/4" thick high impact strength clear thermoplastic.

C. The safety skirt shall be constructed from rigid plastic.

2.5 FINISH

A. All metal components shall be thoroughly cleaned to remove any foreign substance. Exposed metal surfaces shall be finished with an oven-baked powder coating.

B. Standard color is black; contact Ascension for custom color selection.

2.6 DRIVE CONFIGURATION

A. Drive shall be direct-acting hydraulic.

B. Both sides of lift platform shall be supported evenly by means of synchronized hydraulic cylinders.

C. Hydraulic power unit shall be mounted on vibration-isolating supports designed to minimize vibration transmission and reduce frame-borne noise.

2.7 ELECTRICAL REQUIREMENTS

A. Electric power requirements shall be compatible with 120VAC, 60 hertz, single phase, 15 amp service (option: international electrical configurations available).

B. The lift shall be supplied with a three prong grounded electrical cord (20' in length).

C. The lift shall contain a Ground Fault Circuit Interrupter (GFCI).

D. Motor shall be 1/2 hp, 115V AC single phase (international configurations available).

E. Control circuits shall be 12 VDC.

F. Electrical components shall be UL listed and CSA registered.

G. Electrical system shall be certified to ASME A17.5 by an independent testing laboratory.

2.8 SAFETY DEVICES

The lift shall be constructed to meet the applicable requirements of ADAAG, ASME A17.1-1996 or older (PART XX, SECTION 2000), ASME A18.1, and ANSI A117.1 as they would apply to a portable lifting device. The lift shall include the following safety features for protection of the passenger and general public.

A. Grounded electrical system.

B. 12 VDC operating controls.

C. Constant pressure operating switches.

D. Emergency stop button at passenger control station.

E. Electro-mechanical interlock to prevent accidental opening of lower landing platform gate.

F. Gate switches to prevent platform movement if either platform gate is open.

G. Lift platform stop height switch.

H. Safety skirt that completely encloses and protects the area under the lift platform.

I. 43" [1092 mm] high sidewalls and platform gates.J. Unobstructed view through transparent sidewalls and platform gates.

K. Grab bar extending full length of inside wall.

L. Slip resistant surfaces on platform floor and dock plate.

M. Structural safety factors as specified in ASME A18.1.

N. Self-closing platform gates.

2.9 PORTABILITY

A. Casters shall be easily attached to the platform for portability and stored in the base frame when not in use. Casters shall be 3½" [89 mm] in diameter and fabricated from hard rubber. The casters shall be capable of being installed without tools. When the casters are installed, the lift shall roll easily over any hard, smooth, level surface. The lift shall be capable of being moved by fork lift or truck.

2.10 OPERATING CHARACTERISTICS

A. Lift shall include three (3) constant pressure “UP/DOWN” switches, located outside of the platform at both ends and inside the platform.

B. The passenger control station shall be provided with a separate “PUSH TO STOP” emergency button. The emergency stop button shall prevent any operation of the lift when actuated.

C. The platform stop height shall be adjustable without the use of tools.

D. Opening the upper landing platform gate shall deploy a dock plate that rests on the upper landing surface. The dock plate shall provide a smooth transition between the platform and the upper landing. Closing the upper landing platform gate shall retract the dock plate.

E. The lower landing platform gate shall be provided with a mechanical interlock that prevents the platform gate from being opened whenever the platform is more than 2" [50 mm] above the full down position.

2.11 COMPRESSION CAPABILITY

A. The lift shall be capable of being compressed to 33" wide to facilitate relocation through a 36" wide doorway. An additional tool kit from Ascension is recommended to facilitate compression of the lift.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Set up lift for operation as described in manufacturer’s operating manual.

B. If desired, lift may be anchored to floor surface using the 9/16” mounting holes provided in the base of the lift.

3.2 MAINTENANCE

A. Maintenance of the lift shall consist of regular cleaning as deemed necessary by the using facility. General inspection, maintenance, and lubrication shall be specified in the manufacturer’s service manual.

END OF SECTION 14 42 00

PART 1 GENERAL

1.1 SUMMARY

A. This section includes the following basic mechanical materials and methods to complement other Division 22 Sections.

1. Field-fabricated metal and wood equipment supports.
2. Water soluble flux.
3. Plumbing solder.
4. Installation requirements common to equipment specifications.
5. Firestopping (refer to specification section 078400).
6. Cutting and patching.
7. Touchup painting and finishing.
8. Demolition.

B. Pipe and pipe fitting materials are specified in piping system Sections.

1.2 DEFINITIONS

A. Pipe, pipe fittings, and piping include tube, tube fittings, and tubing.

B. Finished Spaces: Spaces other than mechanical and electrical equipment rooms furred spaces, pipe and duct shafts, unheated spaces immediately below the roof, spaces above ceilings, unexcavated spaces, crawl spaces and tunnels.

C. Exposed Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

D. Exposed Exterior Installations: Exposed to view outdoors, or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

E. Concealed Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.

F. Concealed Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants, but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

1.3 REFERENCES

A. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 1997.

B. ASTM E 814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops; 1994b.

C. FM P7825 - Approval Guide; Factory Mutual Research Corporation; current edition.

D. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.4 SUBMITTALS

A. Product Data: Provide product data for piping specialties.

B. Shop Drawings: Detailing fabrication and installation for metal and wood supports, and anchorage for plumbing materials and equipment.

C. Identification materials and devices.

D. Certificates: Welder certificates signed by the Contractor certifying that welders meet or exceed the requirements specified under the "Quality Assurance" Article.

E. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Nanuet Union Free School District 's name and registered with manufacturer.

1.5 QUALITY ASSURANCE

A. Perform work in accordance with the Building Code of New York State.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

C. Installer Qualifications: Company specializing in performing the work of this section with minimum three years of experience.

D. Equipment Selection: Equipment of greater or larger power, dimensions, capacities, and ratings may be furnished provided such proposed equipment is approved in writing and connecting mechanical and electrical services, circuit breakers, conduit, motors, bases and equipment spaces are increased. No additional costs will be approved for these increases, if larger equipment is approved. If minimum energy ratings or efficiencies of the equipment are specified, the equipment must meet the design requirements and commissioning requirements.

1.6 PIPING DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end-caps. Maintain end-caps through shipping, storage, and handling to prevent pipe-end damage and prevent entrance of dirt, debris, and moisture.

B. Protect stored pipes and tubes from moisture and dirt. Elevate above grade. When stored inside, do not exceed structural capacity of the floor.

C. Protect flanges, fittings, and piping specialties from moisture and dirt.

D. Protect stored plastic pipes from direct sunlight. Support to prevent sagging and bending.

1.7 SEQUENCING AND SCHEDULING

A. Coordinate equipment installation with other building components.

B. Arrange for chases, slots, and openings in building structure during progress of construction to allow for plumbing installations.

C. Coordinate the installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

D. Sequence, coordinate, and integrate installations of plumbing materials and equipment for efficient flow of the Work.

E. Coordinate connection of electrical services.

F. Coordinate connection of plumbing systems with utilities and services. Comply with requirements of governing regulations, landlord, franchised service companies, and controlling agencies.

G. Coordinate requirements for access panels and doors where plumbing items requiring access are concealed behind finished surfaces.

H. Coordinate installation of identifying devices after completing covering and painting where devices are applied to surfaces. Install identifying devices prior to installing acoustical ceilings and similar concealment.

PART 2 PRODUCTS

2.1 WATER SOLUBLE FLUX

A. Water Soluble Flux: Taramet Sterling(R) lead-free water soluble flux, conforming to ASTM B 813.

2.2 PLUMBING SOLDER

A. Plumbing Solder: Sterling® solder, ASTM B 32, Alloy Grade TC; 95 percent tin, 4.85 percent copper, 0.15 percent selenium.

1. Certified to comply with NSF 61.
2. Melting Temperature: 410 degrees F..
3. Tensile Strength: 7,130 psi.
4. Shear Strength: 5,979 psi.
5. Elongation Percent: 19.1.
6. Brinell Hardness: 15.1.
7. Burst Strength: 5,800 psi.

8. Pressure/Temperature Test Data on Copper Tube Assemblies comprised of 3 inch, 2 inch, 1 inch, 3/4 inch, and 1/2 inch Tubing with a Reducing Tee:

    a. No leaks at 180 degrees F., 200 psi, held for 2 minutes.

2.3 PIPE, PIPE FITTINGS, AND JOINING MATERIALS

A. Refer to individual piping system specification sections for pipe fitting materials and joining methods.

B. Pipe Threads: ASME B1.20.1 for factory threaded pipe and fittings.

C. Pipe Flange Gasket Materials: Suitable for thermal and chemical conditions of the contents of the piping system.

1. ASME B16.21, non-metallic, flat, asbestos-free, 1/8 inch maximum thickness, except where thickness or specific material is indicated

    a. Full-Face Type: For flat-face, Class 125 cast-iron and cast-bronze flanges.

    b. Narrow-Face Type: For raised-face, Class 250 cast-iron and steel flanges.

2. AWWA C110, rubber, flat-face, 1/8 inch thick, except where other thickness is indicated; and full-face or ring-type, except where type is indicated.

D. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, except where other material is specified.

E. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

2.4 PIPING SPECIALTIES

A. Escutcheons: Manufactured wall, ceiling, and floor plates; deep-pattern type where required to conceal protruding fittings and sleeves.

1. Inside Diameter: Closely fit around pipe, tube and insulation.

2. Outside Diameter: Completely cover opening.

3. Stamped Steel: One-piece, with set-screw and chrome-plated finish.

4. Cast-Iron Floor Plate: One-piece casting.

B. Dielectric Fittings: Assembly or fitting having insulating material isolating joined dissimilar metals to prevent galvanic action and stop corrosion.

1. Description: Combination of copper alloy and ferrous; threaded, solder, plain, and weld neck end types and matching piping system materials.

2. Insulating Material: Suitable for system fluid, pressure and temperature.

3. Dielectric Unions: Factory-fabricated, union assembly for 250-psig minimum working pressure at a 180 deg. F temperature.

PART 3 EXECUTION

3.1 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt on inside and outside before assembly.

C. Prepare piping connections to equipment with flanges or unions.

D. Keep open ends of pipe free from scale and dirt. Whenever work is suspended during construction protect open ends with temporary plugs or caps.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Route piping in orderly manner, plumb and parallel to building structure, and maintain gradient.

C. Install piping to conserve building space and avoid interference with use of space.

D. Sleeve pipe passing through partitions, walls, and floors.

E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

F. Inserts:

1. Provide inserts for placement in concrete formwork.

2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.

3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.

4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.

5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut above slab.

G. Pipe Hangers and Supports:

1. Install in accordance with ASME B31.9.

2. Support horizontal piping as scheduled.

3. Place hangers within 12 inches of each horizontal elbow.

4. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.

5. Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.

6. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.

7. Provide copper plated hangers and supports for copper piping.

8. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

H. Provide clearance for installation of insulation and access to valves and fittings.

I. Provide access where valves and fittings are not exposed.

J. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welds.

K. Install valves with stems upright or horizontal, not inverted.

3.3 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A. Install equipment to provide the maximum possible headroom where mounting heights are not indicated.

B. Install equipment according to approved submittal data. Portions of the Work are shown only in diagrammatic form. Refer conflicts to the Architect.

C. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, except where otherwise indicated.

D. Install plumbing equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. Connect equipment for ease of disconnecting, with minimum of interference with other installations. Extend grease fittings to an accessible location

E. Install equipment giving right-of-way to piping systems installed at a required slope.

3.4 ERECTION OF METAL SUPPORTS AND ANCHORAGE

A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor plumbing materials and equipment.

B. Field Welding: Comply with AWS D1.1 "Structural Welding Code--Steel."

3.5 CUTTING AND PATCHING

A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces necessary for plumbing installations. Perform cutting by skilled mechanics of the trades involved.

B. Repair cut surfaces to match adjacent surfaces.

3.6 DEMOLITION

A. Disconnect, demolish, and remove work specified under Division 22 and as indicated.

B. Where pipe, breeching, insulation, or equipment to remain is damaged or disturbed, remove damaged portions and install new products of equal capacity and quality.

C. Accessible Work: Remove indicated exposed pipe and breeching in its entirety.

D. Removal: Remove indicated equipment from the project site.

E. Temporary Disconnection: Remove, store, clean, reinstall, reconnect, and make operational, equipment indicated for relocation.

END OF SECTION

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Tags.

B. Pipe markers.

1.2 REFERENCE STANDARDS

A. ASME A13.1 - Scheme for the Identification of Piping Systems; 2023.

B. ASTM D709 - Standard Specification for Laminated Thermosetting Materials; 2017.

1.3 SUBMITTALS

A. List: Submit list of wording, symbols, letter size, and color coding for mechanical identification.

B. Chart and Schedule: Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.

PART 2 PRODUCTS

2.1 PLUMBING COMPONENT IDENTIFICATION GUIDELINE

A. Pipe Markers: 3/4 inch diameter and higher.

2.2 IDENTIFICATION APPLICATIONS

A. Piping: Tags and Pipe Markers.

B. Valves: Tags.

2.3 TAGS

A. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch diameter with smooth edges.

B. Valve Tag Chart: Typewritten letter size list in anodized aluminum frame.

2.4 PIPE MARKERS

A. Comply with ASME A13.1.

B. Plastic Pipe Markers: Factory fabricated, flexible, semi- rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.

C. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.

D. Identification Scheme, ASME A13.1:

1. Primary: External Pipe Diameter, Uninsulated or Insulated.

2. Secondary: Color scheme per fluid service.

   a. Water; Potable, Cooling, Boiler Feed, and Other: White text on green background.

PART 3 EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

3.2 INSTALLATION

A. Install tags with corrosion resistant chain.

B. Install plastic pipe markers in accordance with manufacturer's instructions.

C. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.

D. Use tags on piping 3/4 inch diameter and smaller.

1. Identify service, flow direction, and pressure.

2. Install in clear view and align with axis of piping.

3. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Piping insulation.

B. Jackets and accessories.

1.2 REFERENCE STANDARDS

A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 1998.

B. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2019, with Editorial Revision (2023).

C. ASTM C195 - Standard Specification for Mineral Fiber Thermal Insulating Cement; 2007 (Reapproved 2019).

D. ASTM C449 - Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement; 2007 (Reapproved 2019).

E. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2021.

F. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2022a.

G. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel; 2008 (Reapproved 2023).

H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023c.

I. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2022a, with Editorial Revision (2023).

J. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.3 SUBMITTALS

A. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

B. Manufacturer's Instructions: Indicate installation procedures that ensure acceptable workmanship and installation standards will be achieved.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified in this section with minimum 3 years of experience.

C. Code Compliance: All insulation products provided on the contract shall be fully in compliance with all material and installation requirements of the New York State Energy Conservation Construction Code, latest addition with all amendments. Insulation products shall meet all "k" values and thicknesses as described in the Code.

1.5 REGULATORY REQUIREMENTS

A. Conform to maximum flame spread/smoke developed rating of 25/50 in accordance with ASTM E 84.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

1.7 FIELD CONDITIONS

A. Maintain ambient conditions required by manufacturers of each product.

B. Maintain temperature before, during, and after installation for minimum of 24 hours.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84, UL 723, ASTM E84, or UL 723.

2.2 PLUMBING FIXTURE SAFETY COVERS

A. Provide products that comply with the following:

1. Americans With Disabilities Act (ADA), Article 4.19.4.

2. ANSI/ICC A117.1, American National Standard for Accessible Buildings and Facilities.

3. Requirements of applicable building code.

B. Piping Safety Covers: Truebro Lav-Guard.

1. Characteristics: Three-piece molded assembly, minimum 1/8 inch wall thickness, with internal ribs to provide air space between piping and piping insulation jacket, molded to receive manufacturer's snap-clip fasteners.

2. Vinyl Material: Impact-resistant and stain-resistant molded closed-cell anti-microbial vinyl compound, UV-stable, non-fading, non yellowing; having the following performance characteristics:

a. Burning Characteristics: 0 seconds Average Time of Burning (ATB), 0 mm Area of Burning (AEB), when tested in accordance with ASTM D 635.

b. Thermal Conductivity: K-value 1.17, when tested in accordance with ASTM C 177.

c. Indentation Hardness: 60, minimum, when tested in accordance with ASTM D 2240, using Type A durometer.

3. Trap Assembly Cover: Three-piece assembly, with removable clean-out nut enclosure.

4. Angle Stop Covers: Formed with hinged cap for access to valve without requiring cover removal.

5. Configurations: In accordance with manufacturer's product data for project piping configurations indicated on drawings.

6. Color: China White, gloss finish; paintable.

7. Fasteners: Manufacturer's standard re-usable snap-clip fasteners; wire-tie fasteners not permitted.

C. Lavatory Piping Enclosure: Truebro Lav-Shield.

1. Characteristics: One-piece rigid molded vinyl enclosure, minimum 1/8 inch wall thickness, factory-punched for manufacturer's wall fasteners.

2. Vinyl Material: Impact-resistant and stain-resistant molded closed-cell vinyl, having the following performance characteristics:

a. Burning Characteristics: 0 seconds Average Time of Burning (ATB), 0 mm Area of Burning (AEB), when tested in accordance with ASTM D 635.

b. Indentation Hardness: 69, minimum, when tested in accordance with ASTM D 2240, using Type A durometer.

3. Vinyl Color: China White, fine-textured finish; paintable.

4. Fasteners: Manufacturer's standard stainless steel wall fasteners with tamper-resistant heads.

2.3 GLASS FIBER

A. Insulation: ASTM C547and ASTM C795; semi-rigid, noncombustible, end grain adhered to jacket.

1. K Value: ASTM C177, 0.24 at 75 degrees F.

2. Maximum Service Temperature: 650 degrees F.

3. Maximum Moisture Absorption: 0.2 percent by volume.

B. Vapor Barrier Jacket: White Kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm-inches.

C. Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.

D. Vapor Barrier Lap Adhesive: Compatible with insulation.

E. Insulating Cement/Mastic: ASTM C195; hydraulic setting on mineral wool.

F. Fibrous Glass Fabric:

1. Cloth: Untreated; 9 oz/sq yd weight.

2. Blanket: 1.0 lb/cu ft density.

3. Weave: 5 by 5.

G. Indoor Vapor Barrier Finish:

1. Cloth: Untreated; 9 oz/sq yd weight.

2. Vinyl emulsion type acrylic, compatible with insulation, black color.

H. Insulating Cement: ASTM C449.

2.4 JACKETS

A. PVC Plastic.

1. Jacket: One piece molded type fitting covers and sheet material, off-white color.

a. Minimum Service Temperature: 0 degrees F.

b. Maximum Service Temperature: 150 degrees F.

c. Moisture Vapor Permeability: 0.002 perm inch, maximum, when tested in accordance with ASTM E96/E96M.

d. Thickness: 10 mil.

e. Connections: Brush on welding adhesive.

2. Covering Adhesive Mastic: Compatible with insulation.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that piping has been tested before applying insulation materials.

B. Verify that surfaces are clean and dry, with foreign material removed.

C. Verify that piping configurations are correct type for piping cover component configurations specified

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install in accordance with North American Insulation Manufacturers Association (NAIMA) National Insulation Standards.

C. Exposed Piping: Locate insulation and cover seams in least visible locations.

D. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, and expansion joints.

E. Glass fiber insulated pipes conveying fluids below ambient temperature:

1. Provide vapor barrier jackets, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.

2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.

F. For hot piping conveying fluids 140 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.

G. Glass fiber insulated pipes conveying fluids above ambient temperature:

1. Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure-sensitive adhesive. Secure with outward clinch expanding staples.

2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.

H. Inserts and Shields:

1. Application: Piping 1-1/2 inches diameter or larger.

2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.

3. Insert Location: Between support shield and piping and under the finish jacket.

4. Insert Configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.

5. Insert Material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.

I. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, see Section 078400.

J. Pipe Exposed in Mechanical Equipment Rooms, Electric rooms and Finished Spaces: Finish with PVC jacket and fitting covers.

3.3 PROTECTION OF INSTALLED PRODUCTS

A. Do not allow damage to installed products by subsequent construction activities; protect products until Substantial Completion.

3.4 SCHEDULES

A. Plumbing Systems

1. Domestic Hot Water Supply:

a. Pipe Sizes 1-1/4 inches and less: 1 inch thick fiberglass.

b. Pipe Sizes 1-1/2 inches and greater: 1-1/2 inch thick fiberglass.

2. Domestic Cold Water:

a. Pipe Sizes 1-1/4 inches and less: 1/2 inch thick fiberglass.

b. Pipe Sizes 1-1/2 inches and greater: 1/2 inch thick fiberglass.

3. Plumbing Vents Within 10 feet of the Exterior: 1 inch thick fiberglass.

4. Lavatories/Sinks: Provide insulation per Part 2.2 of this section.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Sanitary waste piping, buried within 5 feet of building.

B. Sanitary waste piping, above grade.

C. Pipe, pipe fittings, specialties, and connections for piping systems.

1. Domestic water.

2. Flanges, unions, and couplings.

3. Pipe hangers and supports.

4. Ball valves.

D. Backfill Materials.

1.2 REFERENCE STANDARDS

A. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2021.

B. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2021.

C. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2021.

D. ASME B31.1 - Power Piping; 2022.

E. ASME B31.9 - Building Services Piping; 2020.

F. ASME BPVC-IV - Boiler and Pressure Vessel Code, Section IV - Rules for Construction of Heating Boilers; 2023.

G. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators; 2023.

H. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2022.

I. ASTM B68/B68M - Standard Specification for Seamless Copper Tube, Bright Annealed; 2019.

J. ASTM B 68M - Standard Specification for Seamless Copper Tube, Bright Annealed (Metric); 2011.

K. ASTM B75/B75M - Standard Specification for Seamless Copper Tube; 2020.

L. ASTM B 75M - Standard Specification for Seamless Copper Tube (Metric); 1999 (Reapproved 2005).

M. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2022.

N. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2020.

O. ASTM B813 - Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube; 2016.

P. ASTM B828 - Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings; 2016.

Q. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems; 2020.

R. ASTM D2665 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings; 2020.

S. ASTM D2729 - Standard Specification for Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2021.

T. ASTM D2855 - Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets; 2020.

U. ASTM D3034 - Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2023.

V. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023c.

W. CISPI 310 - Specification for Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications; 2020.

X. ICC-ES AC01 - Acceptance Criteria for Expansion Anchors in Masonry Elements; 2018, with Editorial Revision (2020).

Y. ICC-ES AC106 - Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Masonry; 2018, with Editorial Revision (2020).

Z. ICC-ES AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements; 2017, with Editorial Revision (2020).

AA. ICC-ES AC308 - Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements; 2023.

BB. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2018, with Amendment (2019).

CC. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends; 2010, with Errata .

DD. NSF 61 - Drinking Water System Components - Health Effects; 2023.

EE. NSF 372 - Drinking Water System Components - Lead Content; 2022.

FF. PPI TR-4 - PPI HSB Listing of Hydrostatic Design Basis (HDB), Hydrostatic Design Stress (HDS), Strength Design Basis (SDB), Pressure Design Basis (PDB) and Minimum Required Strength (MRS) Ratings for Thermoplastic Piping Materials or Pipe; 2021.

GG. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.3 SUBMITTALS

A. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.

B. Sustainable Design Documentation: For soldered copper joints, submit installer's certification that the specified installation method and materials were used.

C. Piping Schedule: Provide schedule of piping applications and materials, indicating piping and fittings.

D. Piping Shop Drawings: Provide drawings of piping installation, indicating dimensioned locations, equipment, critical dimensions, elevations, sizes, systems, and valve locations.

1.4 QUALITY ASSURANCE

A. Perform work in accordance with New York State Building Code.

B. Perform work in accordance with New York State Plumbing Code.

C. Identify pipe with marking including size, ASTM material classification, ASTM specification, potable water certification, water pressure rating.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

B. Provide temporary protective coating on cast iron and steel valves.

C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

1.6 FIELD CONDITIONS

A. Do not install underground piping when bedding is wet or frozen.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Potable Water Supply Systems: Provide piping, pipe fittings, and solder and flux (if used), that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

B. Plenum-Installed Acid Waste Piping: Flame-spread index equal or below 25 and smoke-spread index equal or below 50 according to ASTM E84 or UL 723 tests.

2.2 SANITARY SEWER PIPING, BURIED WITHIN 5 FEET OF BUILDING

A. Cast Iron Pipe: ASTM A74 service weight.

1. All cast iron soil pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute (CISPI) and shall be listed by NSF International.

2. Fittings: Cast iron.

3. Joints: Hub-and-spigot, CISPI HSN compression type with ASTM C 564 neoprene gaskets.

B. PVC Pipe: ASTM D2665 or ASTM D3034.

1. Fittings: PVC.

2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.3 SANITARY SEWER PIPING, ABOVE GRADE

A. Cast Iron Pipe: CISPI 301, hubless, service weight.

1. All cast iron soil pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute (CISPI) and shall be listed by NSF International.

2. Fittings: Cast iron.

3. Joints: CISPI 310, neoprene gaskets and stainless steel clamp-and-shield assemblies.

B. PVC Pipe: ASTM D2729.

1. Fittings: PVC.

2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.4 PLUMBING VENT PIPING, ABOVE GRADE

A. Cast Iron Pipe: CISPI 301, hubless, service weight.

1. All cast iron soil pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute (CISPI) and shall be listed by NSF International.

2. Fittings: Cast iron.

3. Joints: CISPI 310, neoprene gaskets and stainless steel clamp-and-shield assemblies.

B. PVC Pipe: ASTM D 2665.

1. Fittings: PVC.

2. Joints: Solvent welded, with ASTM D 2564 solvent cement.

2.5 FLANGES, UNIONS, AND COUPLINGS

A. Unions for Pipe Sizes 3 Inches and Under:

1. Ferrous Pipe: Class 150 malleable iron threaded unions.

2. Copper Tube and Pipe: Class 150 bronze unions with soldered joints.

B. Flanges for Pipe Size Over 1 Inch:

1. Ferrous Pipe: Class 150 malleable iron threaded or forged steel slip-on flanges; preformed neoprene gaskets.

2. Copper Tube and Pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.

2.6 PIPE HANGERS AND SUPPORTS

A. Provide hangers and supports that comply with MSS SP-58.

1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.

2. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.

3. Trapeze Hangers: Welded steel channel frames attached to structure.

4. Vertical Pipe Support: Steel riser clamp.

5. Floor Supports: Concrete pier or steel pedestal with floor flange; fixture attachment.

B. Plumbing Piping - Drain, Waste, and Vent:

1. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Malleable iron, adjustable swivel, split ring.

2. Hangers for all pipe sizes: Carbon steel, adjustable, clevis.

3. Hangers for Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.

4. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.

5. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp.

6. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

7. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

C. Plumbing Piping - Water:

1. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Malleable iron, adjustable swivel, split ring.

2. Hangers for Cold Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.

3. Hangers for Hot Pipe Sizes 2 Inches to 4 Inches: Carbon steel, adjustable, clevis.

4. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.

5. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp.

6. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

7. Floor Support for Hot Pipe Sizes to 4 Inches: Cast iron adjustable pipe saddle, locknut, nipple, floor flange, and concrete pier or steel support.

8. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

2.7 BALL VALVES

A. 2-inch and smaller: 2-piece, full port, bronze:

1. Body: ASTM B-124 brass.

2. Body End Piece: ASTM B-124 brass.

3. Ball: Chrome plated ASTM B-584 cast red bronze.

4. Seat Ring: Reinforced TFE.

5. Packing: TFE.

6. Stem: ASTM B-371 silicon bronze.

7. Ends: Soldered or hydraulic press.

B. All materials used for installation related to the domestic water piping system shall be lead-free, including pipes, pipe fittings, plumbing fittings, and plumbing fixtures and conform to NSF/ANSI Standard 61, NSF/ANSI Standard 61 - Annex G, and NSF/ANSI Standard 372.

2.8 BACKFILL MATERIALS

A. Select Fill:

1. Select fill shall be crushed stone, crushed gravel, or run of bank gravel that is free of clay, organics, snow, ice and friable or deleterious particles and meet the requirements of NYSDOT Standard Specifications, Select Fill, Item 203.06, having the following gradation requirements:

a. Sieve Size:

1) 4": 100 percent finer by weight.

2) No. 40: 0-70 percent finer by weight.

3) No; 200: 0-15 percent finer by weight.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that excavations are to required grade, dry, and not over-excavated.

3.2 PREPARATION

A. Remove scale and dirt, on inside and outside, before assembly.

B. Prepare piping connections to equipment with flanges or unions.

3.3 EARTH EXCAVATION

A. All excavation work shall be executed to the lines and grades shown on the Drawings or as required to install the services as indicated on the drawings, unless directed otherwise by the Owner's Representative. All excavation shall be performed in such a manner as to minimize disturbance and maintain stability of subgrade soils and slopes. Special care shall be taken not to disturb the bottom of excavations and proposed bearing elevations and surfaces. Excavation to the final subgrade levels must be done by methods that minimize traffic on or disturbance to the subgrade.

B. The excavation equipment must be of such size and capacity sufficient to excavate the materials encountered and to the specified depths as shown.

C. The Contractor shall be responsible at all times for safe and prudent excavation operations so as to protect the workmen, utilities, structures, and adjacent property. The Contractor shall perform all excavation in accordance with OSHA standards. The Contractor shall observe all applicable local, state and federal requirements and acquire all necessary permits.

D. The Contractor shall bench or cut back excavated slopes, dewater and sheet, as necessary for stability, safety and protection of adjacent utilities, structures, and properties.

E. Subgrades and slopes which have been damaged or degraded as a result of Contractor's activities, or failure of the Contractor to properly protect them shall be repaired at the Contractor's expense as directed by the Owner's Representative.

F. Subgrades in which soft or unsuitable materials are encountered which are not a result of Contractor's operations or failure to protect subgrades shall be undercut and backfilled with appropriate fill as directed by the Owner's Representative.

G. All subgrades will be monitored and tested as determined necessary by the Owner's Representative. The Contractor, at the direction of the Owner's Representative, shall be required to proof roll subgrades. All proof rolling, if required, shall be done in the presence of the Owner's Representative.

H. No materials or fill shall be placed by the Contractor until the subgrades are observed and tested by the Owner's Representative.

3.4 FILLING AND BACKFILLING

A. The Contractor shall not place fill or backfill until underlying subgrades have been observed and tested as required by the Owner's Representative.

B. Materials shall be placed at the locations shown on the Drawings, and as directed by the Owner's Representative

C. Delivery and compaction of materials shall be made during the presence of the Owner's Representative and shall be subject to its review. This inspection by no means absolves the Contractor from responsibility to properly compact and test as specified.

D. Acceptance and/or rejection of materials placed and compacted shall be based upon in-place density test result requirements and other requirements as stated in these specifications.

E. Placement and Compaction:

1. Select fill shall be placed in maximum loose lift thicknesses of 9-inches. Select fill shall be compacted to a minimum of 95 percent of the maximum Modified Proctor density as determined by ASTM D1557.

2. Equipment used to compact select fill must be compatible with the material type, lift thickness, and constraints posed by size and configuration of excavated area being filled.

3.5 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.

D. Install piping to maintain headroom, conserve space, and not interfere with use of space.

E. Group piping whenever practical at common elevations.

F. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.

G. Provide access where valves and fittings are not exposed.

H. Install bell and spigot pipe with bell end upstream.

I. Provide rigid sway bracing at changes in direction greater than 45 degrees for pipe sizes 4 inches and larger.

J. Provide cleanouts at base of all vertical storm and sanitary risers.

K. Install valves with stems upright or horizontal, not inverted. See Section 220523.

L. Install water piping to ASME B31.9.

M. Copper Pipe and Tube: Make soldered joints in accordance with ASTM B828, using specified solder, and flux meeting ASTM B813; in potable water systems use flux also complying with NSF 61 and NSF 372.

N. PVC and CPVC Pipe: Make solvent-welded joints in accordance with ASTM D 2855.

O. Sleeve pipes passing through partitions, walls, and floors.

P. Inserts:

1. Provide inserts for placement in concrete formwork.

2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.

3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.

4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.

5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut above slab.

Q. Pipe Hangers and Supports:

1. Install in accordance with ASME B31.9.

2. Support horizontal piping as indicated.

3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.

4. Place hangers within 12 inches of each horizontal elbow.

5. Provide hanger below each P-trap on storm and sanitary piping systems.

6. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.

7. Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.

8. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.

9. Provide copper plated hangers and supports for copper piping.

R. When installing more than one piping system material, ensure system components are compatible and joined to ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.

3.6 EXCAVATING

A. Excavate to accommodate construction operations.

B. Notify Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

C. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.

D. Do not interfere with 45 degree bearing splay of foundations.

E. Cut utility trenches wide enough to allow inspection of installed utilities.

F. Hand trim excavations. Remove loose matter.

G. Correct areas that are over-excavated and load-bearing surfaces that are disturbed.

H. Grade top perimeter of excavation to prevent surface water from draining into excavation.

I. Remove excavated material that is unsuitable for re-use from site.

J. Stockpile excavated material to be re-used in area designated on site .

K. Remove excess excavated material from site.

3.7 FILLING

A. Fill to contours and elevations indicated or required using unfrozen materials.

B. Fill up to finish grade elevations unless otherwise indicated.

C. Employ a placement method that does not disturb or damage other work.

D. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

E. Maintain optimum moisture content of fill materials to attain required compaction density.

F. Soil Fill: Place and compact material in equal continuous layers not exceeding 12 inches compacted depth.

G. Correct areas that are over-excavated.

1. Other areas: Use general fill, flush to required elevation, compacted to minimum 97 percent of maximum dry density.

H. Reshape and re-compact fills subjected to vehicular traffic.

3.8 APPLICATION

A. Install unions downstream of valves and at equipment or apparatus connections.

B. Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.

3.9 TOLERANCES

A. Drainage Piping: Establish invert elevations within 1/2 inch vertically of location indicated and slope to drain at minimum of 1/4 inch per foot slope for 3 inch and larger, 1/4 inch per foot slope for sizes smaller than 3 inch.

3.10 FIELD TESTS AND INSPECTIONS

A. Verify and inspect systems according to requirements by the Authority Having Jurisdiction. In the absence of specific test and inspection procedures proceed as indicated below.

B. Test Results: Document and certify successful results, otherwise repair, document, and retest.

3.11 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A. Prior to starting work, verify system is complete, flushed, and clean.

B. Ensure acidity (pH) of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).

C. Inject disinfectant, free chlorine in liquid, powder, tablet or gas form, throughout system to obtain 50 to 80 mg/L residual.

D. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.

E. Maintain disinfectant in system for 24 hours.

F. If final disinfectant residual tests less than 25 mg/L, repeat treatment.

G. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.

H. Take samples no sooner than 24 hours after flushing, from 10 percent of outlets and from water entry, and analyze in accordance with AWWA C651.

3.12 FLUSHING AND DISINFECTING POTABLE WATER SYSTEMS

A. Flushing: The water service piping and distribution piping to all fixtures and outlets shall be flushed until the water runs clear and free of debris or particles. Faucet aerators or screens shall be removed during the flushing operations.

B. Disinfecting:

1. The water service piping and the hot and cold water distribution piping shall be disinfected after flushing and prior to use. The procedure used shall be as follows, or an approved equivalent:

a. All water outlets shall be posted to warn against use during disinfecting operations.

b. Disinfecting shall be performed by persons experienced in such work.

c. The water supply to the piping system or parts thereof being disinfected shall be valved-off from the normal water source to prevent the introduction of disinfecting agents into the well storage tank or portions of a system that are not being disinfected.

d. The piping shall be disinfected with a water-chlorine solution. During the injection of the disinfecting agent into the piping, each outlet shall be fully opened several times until a concentration of not less than 50 parts per million chlorine is present at every outlet. The solution shall be allowed to stand in the piping for at least 24 hours.

e. An acceptable alternate to the 50 ppm/24 hour procedure described above shall be to maintain a level of not less than 200 parts per million chlorine for not less than three hours. If this alternate procedure is used, the heavily concentrated chlorine shall not be allowed to stand in the piping system for more than 6 hours. Also, special procedures shall be used to dispose of the heavily concentrated chlorine in an environmentally acceptable and approved manner.

f. At the end of the required retention time, the residual level of chlorine at every outlet shall be not less than five parts per million. If the residual is less than five parts per million, the disinfecting procedure shall be repeated until the required minimum chlorine residual is obtained at every outlet.

g. After the required residual chlorine level is obtained at every outlet, the system shall be flushed to remove the disinfecting agent. Flushing shall continue until the chlorine level at every outlet is reduced to that of the incoming water supply.

h. Any faucet aerators or screens that were removed shall be reinstalled.

i. A certification of performance and laboratory test report showing the absence of coliform organisms shall be submitted to the Authority Having Jurisdiction upon satisfactory completion of the disinfecting operations.

2. The disinfecting procedures shall meet or exceed the requirements set forth in the American Water Works Association Standard C651-92, Disinfection of Water Mains.

3.13 TESTING OF DOMESTIC WATER PIPING

A. Preparation for Testing: Prepare piping as follows:

1. Leave joints uninsulated and exposed for examination during the test.

2. Flush system with clean water. Clean strainers.

3. Isolate equipment that is not to be subjected to the test pressure from the piping. If a valve is used to isolate the equipment, its closure shall be capable of sealing against the test pressure without damage to the valve.

4. Install relief valve set at a pressure no more than 1/3 higher than the test pressure, to protect against damage by expansion of liquid or other source of overpressure during the test.

B. Testing: Test domestic water piping as follows:

1. Leave joints uninsulated and exposed for examination during the test.

2. Test piping in accordance with New York State Building Code.

3. Test water service pipes and rough piping installations prior to covering or concealment.

4. Use ambient temperature water as the testing medium, except where there is a risk of damage due to freezing. Another liquid may be used if it is safe for the workmen and compatible with the piping system components.

5. Use vents installed at high points in the system to release trapped air while filling the system. Use drains installed at low points in the system for complete removal of the test liquid.

6. Examine system to ensure that equipment and components that cannot withstand test pressures are properly isolated. Examine test equipment to ensure tight connection and that low pressure filling lines have been disconnected.

7. Upon completion of a section of or the entire water supply system, the system, or portion completed, shall be tested and proved tight under a water pressure not less than the working pressure of the system; or by an air test of not less than 50 psi (344 kPa). The water utilized for tests shall be obtained from a potable source of supply. Isolate the system expansion tank from the tested system for the

hydrostatic system test. Isolate building plumbing fixtures from the tested system for the hydrostatic system test.

8. After the test pressure has been applied for at least 10 minutes, examine piping, joints, and connections for leakage. Eliminate leaks by tightening, repairing, or replacing components as appropriate, and repeat hydrostatic test until there are no leaks.

C. Testing: Test all Domestic Water connected Plumbing Fixtures as follows:

1. Prior to construction closeout, a lead test shall be done to the domestic water plumbing fixtures in accordance with the New York State Department of Health Codes, Rules and Regulations chapter 10 volume A-1a, subchapter G, Part 67. Draw samples shall be collected from all outlets, as defined in Subpart 67-4. Draw sample volume shall be 250 milliliters (mL), collected from each cold water outlet before any water is used. The water shall be motionless in the pipes for a minimum of 8 hours, but not more than 18 hours, before sample collection.

2. All draw samples shall be analyzed by a laboratory approved to perform such analyses by the New York State Department's Environmental Laboratory Approval Program (ELAP). A copy of the results shall be handed over the school's representative as well as included in any closeout documentation to the New York State Education Department.

3.14 TESTING DRAINAGE, WASTE AND VENT PIPING

A. Provide testing of the drainage, waste and vent piping of either air or water testing, as described below.

B. Preparation for Testing: Prepare piping as follows:

1. Leave joints uninsulated and exposed for examination during the test.

C. Test drainage, waste and vent piping as follows:

1. Test piping with either a water test in accordance with New York State Building Code, and as follows:

a. A water test shall be applied to the drainage system either in its entirety or in sections. If applied to the entire system, all openings in the piping shall be tightly closed, except the highest opening, and the system shall be filled with water to point of overflow. If the system is tested in sections, each opening shall be tightly plugged except the highest openings of the section under test, and each section shall be filled with water, but no section shall be tested with less than a 10-foot (3048 mm) head of water. In testing successive sections, at least the upper 10 feet (3048 mm) of the next preceding section shall be tested so that no joint or pipe in the building, except the uppermost 10 feet (3048 mm) of the system, shall have been submitted to a test of less than a 10-foot (3048 mm) head of water. The water shall be kept in the system, or in the portion under test, for at least 15 minutes before inspection starts. The system shall then be tight at all points.

D. Completed sanitary drainage and vent systems:

1. After all plumbing fixtures have been installed and all traps have been filed with water, every part of the sanitary drainage and vent systems within the building walls shall be subjected to a final test as prescribed herein. For the duration of testing, flow of water in the system shall be halted and the building drain shall be sealed adjacent to its point of entry inside the building. If requested by the authority of jurisdiction, remove any cleanout plugs to ascertain that the testing is effective in all parts of the system.

2. The final test of the completed drainage and vent system shall be visual and in sufficient detail to determine compliance with the provisions of this code except that the plumbing shall be subjected to a smoke test where necessary for cause. Where the smoke test is utilized, it shall be made by filling all traps with water and then introducing into the entire system a pungent, thick smoke produced by one or more smoke machines. When the smoke appears at stack openings on the roof, the stack openings shall be closed and a pressure equivalent to a 1-inch water column (248.8 Pa) shall be maintained for 15 minutes before inspection starts.

3.15 TESTING OF DRAINAGE AND VENT SYSTEMS

A. Rough Plumbing:

1. Except for outside leaders and perforated or open jointed drain tile, the piping of plumbing drainage and venting systems shall be tested upon completion of the rough piping installation by water or air and proved watertight. The Authority Having Jurisdiction may require the removal of any cleanout plugs to ascertain if the pressure has reached all parts of the system. The following test method shall be used:

a. The water test shall be applied to the drainage system either in its entirety or in sections after rough piping has been installed. If applied to the entire system, all openings in the piping shall be tightly closed, except the highest opening, and the system filled with water to point of overflow. If the system is tested in sections, each opening shall be tightly plugged except the highest opening of the section under test, and each section shall be filled with water, but no section shall be tested with less than a 10-foot head of water. In testing successive sections at least the upper 10 feet of the next preceding section shall be tested, so that no joint or pipe in the building (except the uppermost 10 feet of the system) shall have been submitted to a test of less than 10-foot head of water. The water shall be kept in the system or in the portion under test for at least 15 minutes before inspection starts; the system shall then be tight at all points.

B. Finished Plumbing

1. When the rough plumbing has been tested in accordance with the paragraphs above, a final test of the finished plumbing system may be required to insure that the final fixture connections to the drainage system are gas-tight.

2. After the plumbing fixtures have been set and their traps filled with water, their connections shall be tested and proved gas and watertight. A final smoke or peppermint test shall b required, except in the case of a previous or site-inspected water or air tested system. If a smoke or peppermint test is required, the following test methods shall be employed:

    a. A smoke test shall be made by filling all traps with water and then re introducing into the entire system a pungent, thick smoke produced by one or more smoke machines. When the smoke appears at stack openings on the roof, they shall be closed and a pressure equivalent to a one-inch water column shall be developed and maintained for the period of the inspection.

    b. Where the Authority Having Jurisdiction, due to practical difficulties or hardships, finds that a smoke test cannot be performed, a peppermint test shall be substituted in lieu thereof. Such peppermint test shall be conducted by the introduction of two ounces of oil of peppermint into the roof terminal of every line or stack to be tested. The oil of peppermint shall be followed at once by ten quarts of hot (140 degrees F) water whereupon all roof vent terminals shall be sealed. A positive test, which reveals leakage, shall be the detection of the odor of peppermint at any trap or other point on the system. Oil of peppermint or person or clothes have come in contact with oil of peppermint shall be excluded from the test area.

3.16 VALVE INSTALLATIONS

A. General Application: Use ball valves for shut-off duty; ball for throttling duty. Refer to piping system specification sections for specific valve applications and arrangements.

B. Locate valves for easy access and provide separate support where necessary.

C. Install valves and unions for each item of equipment arranged to allow equipment removal without system shutdown. Unions are not required on flanged devices.

D. Install valves in horizontal piping with stem at or above the center of the pipe.

E. Install valves in a position to allow full stem movement.

3.17 SOLDER CONNECTIONS

A. Cut tube square and to exact lengths.

B. Clean end of tube to depth of valve socket with steel wool, sand cloth, or a steel wire brush to a bright finish. Clean valve socket in the same manner.

C. Apply a proper soldering flux in an even coat to inside of valve socket and outside of tube.

D. Insert tube into valve socket, making sure the end rests against the shoulder inside valve. Rotate valve or tube slightly to ensure even distribution of the flux.

E. Apply heat evenly to outside of valve around joint until solder will melt upon contact. Feed solder until it completely fills the joint around the tube. Avoid hot spots

or overheating valve. Once the solder starts cooling, remove excess amounts around the joint with a cloth or brush.

3.18 THREADED CONNECTIONS

A. Note the internal length of threads in valve ends, and proximity of valve internal seat or wall, to determine how far pipe should be threaded into valve.

B. Align threads at point of assembly.

C. Apply appropriate tape or thread compound to the external pipe threads (except where dry seal threading is specified).

D. Assemble joint, wrench tight. Wrench on valve shall be on the valve end into which the pipe is being threaded.

3.19 PRESS FITTING CONNECTIONS FOR DOMESTIC WATER PIPING

A. Press connections: Copper and copper alloy press connections shall be made in accordance with the manufacturer's installation instructions. The tubing shall be fully inserted into the fitting and the tubing marked at the shoulder of the fitting. The fitting alignment shall be checked against the mark on the tubing to assure the tubing is fully engaged (inserted) in the fitting. The joints shall be pressed using the tool(s) approved by the manufacturer.

3.20 FLANGED CONNECTIONS

A. Align flange surfaces parallel.

B. Assemble joints by sequencing bolt tightening to make initial contact of flanges and gaskets as flat and parallel as possible. Use suitable lubricants on bolt threads. Tighten bolts gradually and uniformly with a torque wrench.

3.21 SCHEDULES

A. Pipe Hanger Spacing:

1. Cast Iron Piping: 5 feet maximum horizontal spacing, 15 feet maximum vertical spacing. Where 10 foot lengths of cast iron piping are installed, maximum horizontal spacing may be increased to 10 feet. All cast iron joints shall be supported.

2. Copper Piping:

a. 1-1/4 inch diameter and smaller: 6 feet maximum horizontal spacing, 10 feet maximum vertical spacing.

b. 1-1/2 inch diameter and larger: 10 feet maximum horizontal spacing, 10 feet maximum vertical spacing.

3. PVC Pipe or Tubing: 4 feet maximum horizontal spacing, 10 feet maximum vertical spacing.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Floor Drains.

B. Cleanouts.

C. Water hammer arrestors.

D. Mixing valves.

E. Floor drain trap seals.

1.2 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B. ASME A112.6.3 - Floor Drains; 2022.

C. ASME A112.21.2M - Roof Drains; The American Society of Mechanical Engineers; 1983.

D. ASSE 1011 - Performance Requirements for Hose Connection Vacuum Breakers; 2023.

E. NEMA MG 1 - Motors and Generators; 2021.

F. NSF 2 - Food Equipment; 2022.

G. NSF 61 - Drinking Water System Components - Health Effects; 2023.

H. NSF 372 - Drinking Water System Components - Lead Content; 2022.

1.3 SUBMITTALS

A. Product Data: Provide component sizes, rough-in requirements, service sizes, and finishes.

B. Sustainable Design Documentation: Submit appropriate evidence that materials used in potable water systems comply with the specified requirements.

C. Shop Drawings: Indicate dimensions, weights, and placement of openings and holes.

D. Manufacturer's Instructions: Indicate Manufacturer's Installation Instructions: Indicate assembly and support requirements.

E. Sustainable Design Documentation: Submit appropriate evidence that materials used in potable water systems comply with the specified requirements.

F. Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years documented experience.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Specialties in Potable Water Supply Systems: Provide products that comply with NSF 61 and NSF 372 for maximum lead content.

2.2 DRAINS

A. Floor Drain:

1. ASME A112.6.3; lacquered cast iron or stainless steel, two piece body with double drainage flange, weep holes, reversible clamping collar, and round, adjustable nickel-bronze strainer.

2.3 CLEANOUTS

A. Round Cleanouts at Interior Finished Floor Areas (DPCO):

1. Cast iron body with nickel bronze top, gasket seal, caulked outlet.

B. Cleanouts at Interior Finished Wall Areas (WCO):

1. Line type with lacquered cast iron body and round epoxy coated gasketed cover, and round stainless steel access cover secured with machine screw.

C. Cleanouts at Interior Unfinished Accessible Areas (CO): Calked or threaded type. Provide bolted stack cleanouts on vertical rainwater leaders.

2.4 WATER HAMMER ARRESTORS

A. Water Hammer Arrestors:

1. Stainless steel construction, bellows type sized in accordance with PDI-WH 201, precharged suitable for operation in temperature range minus 100 to 300 degrees F and maximum 250 psi working pressure.

2.5 MIXING VALVES

A. Point of Use, Fixture Thermostatic Mixing Valves

1. A Thermostatic Mixing Valve shall be installed on the hot water supply to the specified fixtures. The valve shall be ASSE Standard 1070 and IAPMO cUPC listed and control the temperature of the hot water. It shall have a Lead Free brass 4-port, “H” pattern body. Lead Free under counter thermostatic valves shall comply with state codes and standards, where applicable, requiring reduced lead content. The valve shall include integral check valves, integral screens and an

adjustment nut with locking feature. The valve shall be provided with 3/8" (10mm) male compression or Quickconnect fittings.

2. The thermostatic mixing valves shall maintain and limit hot water to desired selectable temperature between 80°F and 120°F (27°C and 49°C) with flow rates as low as 0.25 gpm and as high as 2.25 gpm.

3. Shall incorporate dual check valves to protect against cross-flow and integral screens to filter out debris.

   a. Lead Free Brass body construction.

   b. Shall Install easily between the stop valves and faucet.

   c. Shall Include tamper resistant locking nut to prevent accidental mis-adjustment.

   d. Built-in check valves shall prevent migration of hot water to cold and cold water to hot water piping.

   e. Shall be provided with cap for three port application.

   f. Provide with Integral strainer with 40 mesh stainless steel screens to filter out debris.

2.6 FLOOR DRAIN TRAP SEALS

A. Description: Push-fit EPDM or silicone fitting with a one-way membrane.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system.

C. Install floor cleanouts at elevation to accommodate finished floor.

D. Install water hammer arrestors complete with accessible isolation valve on hot and cold water supply piping to lavatory sinks or water closets and urinals.

END OF SECTION

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Dual flush water closets.

B. Urinals.

C. Lavatories.

D. Sinks.

E. Fixture Sealant.

1.2 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B. ASHRAE Std 18 - Methods of Testing for Rating Drinking-Water Coolers with Self-Contained Mechanical Refrigeration; 2008 (Reaffirmed 2013).

C. ASME A112.6.1M - Floor-Affixed Supports for Off-the-Floor Plumbing Fixtures for Public Use; 1997 (Reaffirmed 2017).

D. ASME A112.18.1 - Plumbing Supply Fittings; 2018, with Errata.

E. ASME A112.19.1 - Enamelled Cast Iron and Enamelled Steel Plumbing Fixtures; 2018.

F. ASME A112.19.2 - Ceramic Plumbing Fixtures; 2018, with Errata.

G. ASME A112.19.4M - Porcelain Enameled Formed Steel Plumbing Fixtures; 1994 (Reaffirmed 2009).

H. ASME A112.19.5 - Flush Valves and Spuds for Water Closets, Urinals, and Tanks; 2022.

I. ASSE 1070 - Performance Requirements for Water Temperature Limiting Devices; 2020.

J. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023c.

K. NSF 61 - Drinking Water System Components - Health Effects; 2023.

L. NSF 372 - Drinking Water System Components - Lead Content; 2022.

1.3 SUBMITTALS

A. Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.

B. Sustainable Design Documentation: Submit appropriate evidence that materials used in potable water systems comply with the specified requirements.

C. Sustainable Design Documentation: Submit appropriate evidence that materials used in potable water systems comply with the specified requirements.

D. Maintenance Data: Include fixture trim exploded view and replacement parts lists.

E. Warranty: Submit manufacturer warranty and ensure forms have been completed in Nanuet Union Free School District's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

B. Potable water system components intended to dispense water for human consumption, including pipe and joining materials, shall comply with the following:

1. A weighted average lead content of not more than 0.25 percent as determined by NSF/ANSI 372.

2. NSF/ANSI 61.

C. Acceptance product marking: NSF®-61 and NSF®-372 (or NSF®-61-G) or other accepted certifier marks emonstrating third party certification with these requirements.

1.5 WARRANTY

A. Provide five year manufacturer warranty for electric water cooler.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Potable Water Systems: Provide plumbing fittings and faucets that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

2.2 DUAL FLUSH WATER CLOSETS

A. WC-1/WC-2:

1. Dual Flush, wall mounted, back outlet Vitreous china with antimicrobial ceramic glaze

2. Elongated front rim

3. 2-1/8" fully glazed trapway

4. High efficiency siphon jet flush action

5. Shipping Weight: 40 lbs.

6. Flushometer:

a. Flush volume: 1.6/1.1 gpf

b. Power type: hard wired

c. Activation: Employs an infrared sensor with multiple-focused, lobular sensing fields for high and low target detection

d. Valve: Diaphragm

e. Fixture Connection: Top spud

f. Automatically initiates a 1.1 gpf or 1.6 gpf flush based on how long the user remains in sensor range

g. Buttons on top of the flush valve enable manual flushing with a full or reduced flush in case of power outage or at restroom visitor's discretion

h. Three-second flush delay High copper, low zinc brass castings for dezincification resistance Fixed metering bypass and no external volume adjustment to ensure water conservation

i. Valve body, Cover, Tailpiece and Control Stop shall be in compliance with ASTM Alloy Classification for Semi-Red Brass

j. Valve shall be in compliance to the applicable sections of ASSE 1037.

B. Water Closet Carriers:

1. Narrow Wall horizontal siphon jet water closet carrier system, with high performance Dura-coated cast iron main fitting with hydro-mechanically optimized sweep, 4" no-hub connections, and extended 2" vent. Corrosion resistant, adjustable 3" dia. X 6" coupling with integral test cap, designed to increase flow velocity and line carry, and labor saving "Neo-Seal" bonded gasket optimizes flow performance while reducing installation steps. Complete system includes an adjustable, gasketed faceplate; floor mounted foot supports; fixture bolts, trim, and stud protectors. Narrow wall system shall comply with all applicable requirements of ASME A112.6.1M up to a 500 lbs maximum static load.

2.3 WALL HUNG URINALS (UR-1/UR-2)

A. 0.125 gpf (gallons per flush)

1. Vitreous china

2. Siphon Jet Action

3. 4 1/8" Back Outlet Rough-in

4. 3/4" top spud

5. 2" I.P.S. outlet flange and rubber gasket with integral trap

B. Shipping Weight: 39 lbs

C. Flush Valve:

1. Power type: hardwired
2. Valve: Diaphragm
3. Finish: Polished chrome
4. Courtesy Flush Override button
5. Includes 18” electrical cable
6. Flex Tube Diaphragm designed for improved life and reduced maintenance
7. Rubber Diaphragm with twin linear filtered bypass and vortex cleansing action
8. Employs an infrared sensor with multiple-focused, lobular sensing fields for high and low target detection
9. Latching Solenoid Operator
10. High copper, low zinc brass castings for dezincification resistance
11. Engineered Metal Cover with replaceable Lens Window
12. High Back Pressure Vacuum Breaker Flush Connection with One-piece Bottom Hex Coupling Nut
13. ADA Compliant Electronic Infrared Sensor for automatic “No Hands” operation
14. Adjustable Tailpiece
15. Line Powered with 6 VAC Step Down Transformer
16. 3/4” I.P.S. Screwdriver Angle Stop
17. Initial Set-up Range Indicator Light (first 10 minutes)
18. Sweat Solder Adapter with Cover Tube and Cast Wall Flange with Set Screw
19. Infrared Sensor with Multiple-focused, Lobular Sensing Fields for high and low target detection
20. High Copper, Low Zinc Brass Castings for Dezincification Resistance
21. Spud Coupling and Flange for 3/4” Top Spud Free Spinning, Vandal Resistant Stop Cap
22. Fixed metering bypass and no external volume adjustment to ensure water conservation
23. Valve body, Cover, Tailpiece and Control Stop shall be in compliance with ASTM Alloy Classification for Semi-Red Brass
24. Valve shall be in compliance to the applicable sections of ASSE 1037

D. Carriers:

1. ASME A112.6.1M; cast iron and steel frame with tubular legs, lugs for floor and wall attachment, threaded fixture studs for fixture hanger, bearing studs.

2.4 LAVATORIES

A. LAV-1/LAV-2:

1. Constructed of vitreous china
2. 21-1/4"L x 18-1/8"W
3. Wall-mount installation
4. Includes wall hanger
5. Drilled for concealed arm carrier
6. Faucet:
   a. 0.5 GPM flow rate, aerated spray type, polished chrome finish, hardwired powered deck.
   b. Modular One-piece Construction with all Concealed Components above deck
   c. Automatic Self-adapting Sensor Technology
   d. Magnetic Solenoid Valve
   e. Water Supply Connection with Flexible High-pressure Hose and Strainer
   f. Appropriate Mounting Hardware included
   g. 6 Volt DC Plug-in Adapter
   h. Power supply: hardwired

2.5 ALL-IN-ONE LAVATORY SYSTEM (LAV-3)

A. The basin shall be designed to direct water to a trench drain and features a 300 series stainless steel drain cap. The basin shall be constructed of natural quartz surface, polished natural quartz surface made from a blend of bio-based resin, natural quartz, granite, and other exotic minerals, Basin Finish-Mykonos.

B. Access panel shall be composed of black, powder-coated stainless steel. Water supplies, valves, waste assembly, and other optional items are concealed within the panel.

C. Bracket design allows for flexible stud or wall blocking anchor locations. Eliminates the need for in-wall carriers. IAPMO certified to meet or exceed ANSI load requirements.

D. Faucet Finish- Brushed Black Stainless, 0.50 gpm (1.90 Lpm), includes soap dispenser and faucet in a single piece casting.

E. Strainer and drain assembly system comes complete with 300 series stainless steel trench drain cap, tailpiece, and polypropylene P-trap. The multi-station system is configured with one drain and one set of supplies to reduce the cost associated with individual drains.

F. Power Supply: 120V 15A 12V DC adapter that plugs directly into the electrical outlet.

2.6 SINKS

A. Single Compartment Bowl

1. ASME A112.19.3; 31 by 22 by 11-5/8 inch outside dimensions 20 gauge, 0.0359 inch thick, Type 304 stainless steel, self rimming and undercoated, with ledge back drilled for trim.

2. Kitchen Faucets:

a. Single Handle Faucet with Pulldown Spray Head:

1) Minimum Spout Height: 17-1/8 inch.

2) Minimum Spout Reach: 8-3/4 inch.

3) Type: Deck-mount, high arc faucet with mounting plate.

4) Spray Functions: aerated spray at 1.5 gpm, maximum.

5) ASME A112.18.1, ADA Standards, and NSF 61 compliant assembly.

6) Materials: Ceramic disc-cartridge valve on brass body with polished chrome finish.

3. Single Compartment Bowl: {rs#1}; _____ by _____ by _____ inch outside dimensions 20 gauge, 0.0359 inch thick, Type 302 stainless steel, self rimming and undercoated, with ledge back drilled for trim.

4. Trim: ASME A112.18.1M; chrome plated brass supply with high rise swing spout, vandal proof water economy aerator with maximum flow, indexed lever handles.

5. Drain: 1-1/2 inch chromed brass drain.

B. Sinks KSK-2

1. Acceptable Manufacturers:

a. Elkay LR25221 (Basis of Design)

b. Eljer.

c. Kohler Company.

2. Single Compartment Bowl: ASME A112.19.3; 25 by 21-1/4 by 7-3/4 inch outside dimensions 18 gage, 0.0478 inch thick, Type 304 stainless steel, self rimming and undercoated, with ledge back drilled for trim.

    a. Drain: 3-1/2 inch crumb cup and tailpiece.

3. Faucet: 1.5 GPM

    a. Deck Mount Low Flow, Satin Stainless Steel, Lever Handle

    b. Deck Clearance: 7-3/4"

    c. Spout Reach: 8"

    d. Spout Height: 13-3/4"

    e. Hole Drillings: 1

    f. Material: Stainless Steel

    g. Valve Type: Ceramic Disc

    h. Valve Connection: 3/8" Female Compression Hose Assembly

    i. Faucet Hole Size (min): 1-1/2"

    j. Countertop Thickness: 2-1/2

    k. Spout Swing Rotation: 360°

2.7 FIXTURE SEALANT

A. Bathtub/Tile Sealant: White silicone; ASTM C 920, Uses M and A; single component, mildew resistant.

1. Applications: Use for: Joints between plumbing fixtures and floor and wall surfaces.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.

B. Verify that electric power is available and of the correct characteristics.

C. Confirm that millwork is constructed with adequate provision for the installation of counter top lavatories and sinks.

3.2 PREPARATION

A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

3.3 INSTALLATION

A. Install each fixture with trap, easily removable for servicing and cleaning.

B. Provide chrome plated rigid or flexible supplies to fixtures with loose key stops, reducers, and escutcheons.

C. Install components level and plumb.

D. Install and secure fixtures in place with wall supports and bolts.

E. Seal fixtures to wall and floor surfaces with sealant, color to match fixture.

F. Install handicap accessible fixtures at elevations required by ADA.

G. Install non-handicap accessible fixtures at elevations recommended by the manufacturer. Coordinate with Nanuet School District for height of fixtures to be utilized by students.

H. Seal fixtures to wall and floor surfaces with one-part, mildew resistant silicone sealant; Dow Corning 786, Dow Corning Tub and Ceramic, Pecora 898 Sanitary Silicone, General Electric Sanitary SCS1700, or Bostik Silicone Rubber Bathroom Caulk.

I. Solidly attach water closets to floor with lag screws. Lead flashing is not intended hold fixture in place.

3.4 INTERFACE WITH WORK OF OTHER SECTIONS

A. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.

3.5 ADJUSTING

A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

3.6 CLEANING

A. Clean plumbing fixtures and equipment.

3.7 PROTECTION

A. Protect installed products from damage due to subsequent construction operations.

B. Repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. This section includes the following basic mechanical materials and methods to complement other Division 23 Sections.

1. Field-fabricated metal and wood equipment supports.
2. Water soluble flux.
3. Plumbing solder.
4. Installation requirements common to equipment specifications.
5. Firestopping (refer to specification section 078400).
6. Cutting and patching.
7. Touchup painting and finishing.
8. Demolition.
9. Mechanical System Commissioning
10. Mechanical Equipment Instruction

B. Pipe and pipe fitting materials are specified in piping system Sections.

1.2 DEFINITIONS

A. Pipe, pipe fittings, and piping include tube, tube fittings, and tubing.

B. Finished Spaces: Spaces other than mechanical and electrical equipment rooms furred spaces, pipe and duct shafts, unheated spaces immediately below the roof, spaces above ceilings, unexcavated spaces, crawl spaces and tunnels.

C. Exposed Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

D. Exposed Exterior Installations: Exposed to view outdoors, or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

E. Concealed Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.

F. Concealed Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants, but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

1.3 SUBMITTALS

A. General: Submit the following according to the conditions of the Contract and Division 1 Specification Sections.

1. Product Data: Provide product data for piping specialties.

2. Shop Drawings: Detailing fabrication and installation for metal and wood supports, and anchorage for mechanical materials and equipment.

3. Identification materials and devices.

4. Certificates: Welder certificates signed by the Contractor certifying that welders meet or exceed the requirements specified under the "Quality Assurance" Article.

5. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Nanuet Union Free School District's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

A. Perform work in accordance with the Building Code of New York State.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

C. Installer Qualifications: Company specializing in performing the work of this section with minimum three years of experience.

D. Qualify welding processes and operators for structural steel according to AWS D1.1 "Structural Welding Code--Steel."

E. Qualify welding processes and operators for piping according to ASME "Boiler and Pressure Vessel Code," Section IX, "Welding and Brazing Qualifications."

1. Comply with provisions of ASME B31 Series "Code for Pressure Piping."

2. Certify that each welder has passed AWS qualification tests for the welding processes involved and that certification is current.

F. Equipment Selection: Equipment of greater or larger power, dimensions, capacities, and ratings may be furnished provided such proposed equipment is approved in writing and connecting mechanical and electrical services, circuit breakers, conduit, motors, bases and equipment spaces are increased. No additional costs will be approved for these increases, if larger equipment is approved. If minimum energy ratings or efficiencies of the equipment are specified, the equipment must meet the design requirements and commissioning requirements.

1.5 SEQUENCING AND SCHEDULING

A. Coordinate mechanical equipment installation with other building components.

B. Arrange for chases, slots, and openings in building structure during progress of construction to allow for mechanical installations.

C. Coordinate the installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

D. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work.

E. Coordinate connection of electrical services.

F. Coordinate connection of mechanical systems with utilities and services. Comply with requirements of governing regulations, landlord, franchised service companies, and controlling agencies.

G. Coordinate requirements for access panels and doors where mechanical items requiring access are concealed behind finished surfaces.

H. Coordinate installation of identifying devices after completing covering and painting where devices are applied to surfaces. Install identifying devices prior to installing acoustical ceilings and similar concealment.

PART 2 PRODUCTS

2.1 CONCRETE FOR EQUIPMENT PADS

A. Reinforcement

1. Welded Steel Wire Fabric: ASTM A 185, plain type.

a. Flat Sheets.

b. Mesh Size: 6 x 12.

2. Reinforcing Steel: ASTM A 615/A 615M Grade 40 (300).

a. Galvanized in accordance with ASTM A 767/A 767M, Class I.

3. Reinforcement Accessories:

a. Tie Wire: Annealed, minimum 16 gage.

B. Concrete Materials

1. Cement: ASTM C 150, Type I - Normal or Type II - Moderate Portland type.

2. Fine and Coarse Aggregates: ASTM C 33.

3. Fly Ash: ASTM C 618, Class F.

4. Air Entraining: ASTM C 260.

5. Water: Clean and not detrimental to concrete.

6. Prohibited Admixtures: Calcium chloride, thiocyanates, and admixtures containing more than 0.05 percent water soluble chloride ions by weight of cement for more than 0.3 percent thiocyanates by weight of cement are not permitted.

C. Concrete Accessories

1. Bonding Agent: ASTM C 1059, Type II acrylic non-redispersable type.

2. Epoxy Bonding System: ASTM C 881, type as required by project conditions.

3. Vapor Retarder: 6 mil thick clear polyethylene film, type recommended for below grade application.

4. Non-Shrink Grout: ASTM C 1107; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.

   a. Minimum Compressive Strength at 48 Hours: 2,400 psi.

5. Moisture-Retaining Cover: ASTM C 171; regular curing paper, white curing paper, clear polyethylene, white polyethylene, or white burlap-polyethylene sheet.

D. Joint Devices and Materials

1. Waterstops: Rubber type, COE CRD-C 513.

2. Joint Filler: Nonextruding, resilient asphalt impregnated fiberboard or felt, complying with ASTM D 1751, 1/4 inch thick and 4 inches deep ; tongue and groove profile.

2.2 WATER SOLUBLE FLUX

A. Water Soluble Flux: Taramet Sterling(R) lead-free water soluble flux, conforming to ASTM B 813.

2.3 PLUMBING SOLDER

A. Plumbing Solder: Sterling® solder, ASTM B 32, Alloy Grade TC; 95 percent tin, 4.85 percent copper, 0.15 percent selenium.

1. Certified to comply with NSF 61.

2. Melting Temperature: 410 degrees F..

3. Tensile Strength: 7,130 psi.

4. Shear Strength: 5,979 psi.

5. Elongation Percent: 19.1.

6. Brinell Hardness: 15.1.

7. Burst Strength: 5,800 psi.

8. Pressure/Temperature Test Data on Copper Tube Assemblies comprised of 3 inch, 2 inch, 1 inch, 3/4 inch, and 1/2 inch Tubing with a Reducing Tee:

   a. No leaks at 180 degrees F., 200 psi, held for 2 minutes.

2.4 PIPING SPECIALTIES

A. Escutcheons: Manufactured wall, ceiling, and floor plates; deep-pattern type where required to conceal protruding fittings and sleeves.

1. Inside Diameter: Closely fit around pipe, tube and insulation.

2. Outside Diameter: Completely cover opening.

3. Stamped Steel: One-piece, with set-screw and chrome-plated finish.

4. Cast-Iron Floor Plate: One-piece casting.

B. Dielectric Fittings: Assembly or fitting having insulating material isolating joined dissimilar metals to prevent galvanic action and stop corrosion.

1. Description: Combination of copper alloy and ferrous; threaded, solder, plain, and weld neck end types and matching piping system materials.

2. Insulating Material: Suitable for system fluid, pressure and temperature.

3. Dielectric Unions: Factory-fabricated, union assembly for 250-psig minimum working pressure at a 180 deg. F temperature.

PART 3 EXECUTION

3.1 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt on inside and outside before assembly.

C. Prepare piping connections to equipment with flanges or unions.

D. Keep open ends of pipe free from scale and dirt. Whenever work is suspended during construction protect open ends with temporary plugs or caps.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Route piping in orderly manner, plumb and parallel to building structure, and maintain gradient.

C. Install piping to conserve building space and avoid interference with use of space.

D. Sleeve pipe passing through partitions, walls, and floors.

E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

F. Inserts:

1. Provide inserts for placement in concrete formwork.

2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.

3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.

4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.

5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut above slab.

3.3 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A. Install equipment to provide the maximum possible headroom where mounting heights are not indicated.

B. Install equipment according to approved submittal data. Portions of the Work are shown only in diagrammatic form. Refer conflicts to the Architect.

C. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, except where otherwise indicated.

D. Install mechanical equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. Connect equipment for ease of disconnecting, with minimum of interference with other installations. Extend grease fittings to an accessible location

E. Install equipment giving right-of-way to piping systems installed at a required slope.

3.4 PAINTING AND FINISHING

A. Damage and Touch Up: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish

3.5 CONCRETE BASES

A. Construct concrete equipment bases of dimensions indicated, but not less than 4 inches (100 mm) larger than supported unit in both directions. Follow supported equipment manufacturer's setting templates for anchor bolt and tie locations.

B. Concrete materials, reinforcement, forms, and earth which will be in contact with fresh concrete shall be free from frost at the time of concrete placement

C. Bonding To Existing Concrete Slabs

1. Where more than one pad is required for a single piece of equipment, install 2 dowels in existing slab for each pad. Drill existing slab as required to install dowels 3 inches into the existing concrete. Grout dowels in the drilled holes.

2. Prior to placing concrete, thoroughly roughen and clean existing concrete slab. Saturate existing concrete surface with clean water. Immediately prior to depositing concrete for pad, apply a coat of cement grout over the existing damp

concrete or allow existing concrete to dry and apply bonding agent (adhesive) over the existing concrete in accordance with manufacturer's printed instructions.

D. Installing Anchor Bolts and Sleeves

1. Install anchor bolts (with sleeves) for all bolt holes in equipment supports.

2. Accurately position and securely support anchor bolts and sleeves prior to placing concrete. Support head of bolt 1 inch above bottom of pad. Temporarily close open end of sleeves to prevent entry of concrete.

3. Grout anchor bolts in sleeves with cement grout or approved shrink-resistant grout after final positioning.

E. Reinforcing

1. Except where other reinforcement is shown on the Drawings, install welded wire fabric at mid-depth of each pad, extending to 1 inch from perimeter of pad.

F. Finishes

1. Formed Surfaces: Provide a smooth rubbed finish, with rounded or chamfered external corners, on all concrete surfaces exposed to view.

2. Unformed Surfaces: Provide a troweled finish on top surface of pads.

3.6 ERECTION OF METAL SUPPORTS AND ANCHORAGE

A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment.

B. Field Welding: Comply with AWS D1.1 "Structural Welding Code--Steel."

3.7 CUTTING AND PATCHING

A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces necessary for mechanical installations. Perform cutting by skilled mechanics of the trades involved.

B. Repair cut surfaces to match adjacent surfaces.

3.8 MECHANICAL EQUIPMENT COMMISSIONING

A. Provide startup and commissioning services by factory-trained representatives of the equipment manufacturer for the following equipment:

1. Variable Refrigerant Volume Heat Pump Systems.

2. Controls.

B. Commissioning shall include the following:

1. Provide commissioning services for the equipment included in the contract, in accordance with SMACNA HVAC Systems Commissioning Manual; 1994.

2. Start-up the equipment specified and provide all manufacturer-recommended tests for startup of new installations.

3. Verify equipment operation under normal operating conditions through a complete range of equipment conditions from minimum through maximum equipment capacity.

4. Check operating condition and capacity of all required maintenance items, including, but not limited to oil, refrigerant or other consumables.

3.9 MECHANICAL EQUIPMENT INSTRUCTION

A. Provide instruction of the Owner's representatives for the duration specified below in operation and maintenance of the following equipment:

1. Pumps (minimum 2 hours).

2. Unit Ventilators (minimum 2 hours).

3. Variable Air Volume Air Terminal Units (minimum 2 hours).

4. Air Cooled Condensing Units (minimum 2 hours).

5. Cabinet Unit Heaters (minimum 1 hour).

6. Blower Coils (minimum 2 hours).

7. Rooftop Energy Recovery Ventilators (minimum 2 hours).

8. Hydronic Radiant Panels (minimum 2 hours).

9. Variable Refrigerant Volume heat pump and fan coil unit systems (minimum 4 hours).

10. Heating only fan coil units (minimum 2 hours).

11. Controls (minimum 8 hours).

12. Exhaust Fans (minimum 2 hours).

13. Kitchen Grease Hoods and associated controls (minimum 2 hours).

3.10 DEMOLITION

A. Disconnect, demolish, and remove work specified under Division 23 and as indicated.

B. Where pipe, breeching, insulation, or equipment to remain is damaged or disturbed, remove damaged portions and install new products of equal capacity and quality.

C. Accessible Work: Remove indicated exposed pipe and breeching in its entirety.

D. Removal: Remove indicated equipment from the project site.

E. Temporary Disconnection: Remove, store, clean, reinstall, reconnect, and make operational, equipment indicated for relocation.

END OF SECTION

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Flexible pipe connectors.

B. Expansion Loops.

C. Expansion Compensators.

1.2 REFERENCE STANDARDS

A. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 2022.

B. EJMA (STDS) - EJMA Standards; Tenth Edition.

C. UL (DIR) - Online Certifications Directory; Current Edition.

1.3 SUBMITTALS

A. Product Data:

1. Flexible Pipe Connectors: Indicate maximum temperature and pressure rating, face-to-face length, live length, hose wall thickness, hose convolutions per foot and per assembly, fundamental frequency of assembly, braid structure, and total number of wires in braid.

2. Expansion Joints/Loops: Indicate maximum temperature and pressure rating, and maximum expansion compensation.

B. Design Data: Indicate selection calculations.

C. Manufacturer's Instructions: Indicate manufacturer's installation instructions, special procedures, and external controls.

D. Project Record Documents: Record installed locations of flexible pipe connectors, expansion joints, anchors, and guides.

PART 2 PRODUCTS

2.1 FLEXIBLE PIPE CONNECTORS

A. Corrugated stainless steel hose with single layer of stainless steel exterior braiding or bronze hose and braid, minimum 12" Live Length for piping 2-1/2" and less, minimum 18" Live Length for 3" and 4" piping and minimum 24" of Live Length for piping 5" and over; for maximum working pressure of 500 psi.

B. Flexible metal braided connectors shall be installed in a straight line without offsets or twists. Support pipe without any load on flexible connectors.

C. Connectors for pipe sizes 2" and below shall have threaded ends, and connectors for pipe sizes 2-1/2" and larger shall be flanged. Connectors for copper piping shall have

copper tube ends. Connectors shall be constructed of annular corrugations and butt-welded seams. Utilize connectors of 300 series stainless steel corrugated hose and braid and carbon steel welded-on end fittings for connection to steel piping. Connectors to be installed on copper piping shall be constructed of bronze hose and braid with copper end connections.

2.2 EXTERNALLY PRESSURIZED EXPANSION COMPENSATORS

A. The design shall incorporate a totally enclosed, externally pressurized 300 series stainless steel bellows that is protected from external damage by an external protective shroud designed for full line pressure.

B. On steel pipe models the bellows shall be isolated from flow impingement by an internal carbon steel sleeve. The internal sleeve for copper tube models shall be made of copper.

C. Steel pipe models shall have a 200 PSIG design operating pressure and 750 degrees F. Copper tube models shall have a 200 PSIG design operating pressure and 400 degrees F.

D. As a result of externally pressurized design, the operating pressure shall be transferred to the outside of the bellows through a gap in the internal guide flange and the housing (shroud).

E. Steel pipe models shall be supplied with male NPT threads and an internal anti-torque device. Cooper tube models are provided with female copper tube sweat ends.

F. The bellows shall be laminated (multi-ply) construction to provide a low spring rate with minimal stresses that assure extended life.

G. The externally pressurized design shall eliminate the need for one set of pipe guides on each side of the expansion compensator (4 pipe diameters from the expansion compensator) thus permitting the first set of guides to be at up to 14 pipe diameters from the expansion compensator.

H. Alternate end fittings may be provided based on application to mating piping, weld end or flanged ends.

2.3 EXPANSION JOINTS, HEATING WATER PIPING SYSTEMS

A. When indicated use flexible expansion "V" or "U" connectors of the size, type, and end fitting noted. "V" and "U" connectors shall be designed and constructed to accept motion in three planes (X, Y &Z), and to pass on no pressure thrust loads on the anchors. "V" and "U" connectors shall be installed in the neutral length listed on the manufacturer's diagrams, unless otherwise directed by the engineer. "V" and "U" connectors shall be positioned and supported per manufacturer's installation instructions. The "V" connectors shall consist of two flexible legs of metallic braided hose, two 45-degree elbows and a 90-degree return elbow. The "U" connectors consist of two flexible sections of hose and braid, two 90 degree elbows and a 180 degree return equaling a 360 degree pipe change.

B. Flexible "V" and "U" connectors are rated for a minimum of 150 PSIG working pressure in all sizes. Flanged, weld type, threaded, or copper tube end fittings to be provided to match connecting pipe. "V" connectors shall be rated for 2, 3, or 4 inches of motion, as indicated on project drawings.

C. In expansion compensation situations, the V and U connector can be installed pre-compressed or pre-extended, only if the full range of motion will be encountered in only one direction. Larger connectors are supplied with shipping bars attached. These bars are tack welded on to maintain the proper designed length. The shipping bars need to be removed from the V or U after installation.

D. At least one pipe alignment guide shal be used within four pipe diameters on each side of the "V" loop.

2.4 REFRIGERANT PIPING EXPANSION LOOPS

A. General

1. Provide flexible hose expansion loop(s) as indicated on the contract drawings to accommodate any thermal expansion or contraction.

2. Flexible hose expansion loops shall be manufactured complete with two parallel sections of corrugated metal house, compatible braid, 180º return bend, with inlet and outlet connections. Field fabricated loops shall not be acceptable.

3. Flexible hose expansion loops shall impart no thrust loads to system support, anchors or building structure.

B. Products

1. Flexible hose expansion loops to be "**VRFMetraloop**" as manufactured by The Metraflex Company, Chicago, IL. OR EQUAL.

2. Corrugated Hose shall be Type 321 stainless Steel.

3. Braid shall be double layer of type 304 Stainless Steel.

4. Fittings shall be Sch 40 Schedule Type 304 Stainless in accordance with ASTM A240.

5. Copper pipe systems, the VRF Metraloop shall be equipped with a stainless-steel to copper conversion fitting with XHP copper stub ends.

6. Flexible hose expansion loops shall have a factory supplied; hanger / support lug located at the bottom of the 180º return.

7. UL 207 LISTED.

C. Execution

1. Install and guide per manufacturers' installation instructions and Mechanical Contractors Association of America "Guidelines for Quality Piping Installations".

2. Flexible hose expansion loop return fitting shall be supported to allow movement.

2.5 ACCESSORIES

A. Pipe Alignment Guides:

1. Two piece welded steel with enamel paint, bolted, with spider to fit standard pipe, frame with four mounting holes, clearance for insulation thickness required, minimum 2 inches travel.

B. Anchor Clamps:

1. Carbon steel, light weight anchor that clamps to pipe and shall be either bolted or welded to the structure.

2. Approximate spring force (in pounds) required for anchors by pipe size:

3. Pipe size ranges:

1) 3/4" pipe size and less: 41 pounds.

2) 1" pipe size: 46 pounds.

3) 1-1/8"/1-1/4" pipe size: 65 pounds.

4) 1-1/2" pipe size: 68 pounds.

5) 2" pipe size: 82 pounds.

6) 2-1/2" pipe size: 160 pounds.

7) 3" pipe size: 160 pounds.

8) 4" pipe size: 165 pounds.

9) 5" pipe size: 186 pounds.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install in accordance with EJMA (Expansion Joint Manufacturers Association) Standards.

C. Install flexible pipe connectors on pipes connected to vibration isolated equipment. Provide line size flexible connectors.

D. Anchor pipe to building structure where indicated. Provide pipe guides so movement is directed along axis of pipe only. Erect piping such that strain and weight is not on cast connections or apparatus.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Pressure gauges and pressure gauge taps.

B. Thermometers and thermometer wells.

1.2 REFERENCE STANDARDS

A. ASME B40.100 - Pressure Gauges and Gauge Attachments; 2022.

B. ASTM E1 - Standard Specification for ASTM Liquid-in-Glass Thermometers; 2014 (Reapproved 2020).

C. ASTM E77 - Standard Test Method for Inspection and Verification of Thermometers; 2014 (Reapproved 2021).

D. UL 404 - Gauges, Indicating Pressure, for Compressed Gas Service; Current Edition, Including All Revisions.

1.3 QUALITY ASSURANCE

A. Provide meters and gages that are rated by the manufacturer for both the temperature and pressure of the duty for the intended systems.

1.4 SUBMITTALS

A. Product Data: Provide list that indicates use, operating range, total range and location for manufactured components.

B. Project Record Documents: Record actual locations of components and instrumentation.

PART 2 PRODUCTS

2.1 PRESSURE GAUGES

A. Pressure Gauges: ASME B40.100, UL 393 drawn steel case, phosphor bronze bourdon tube, rotary brass movement, brass socket, with front recalibration adjustment, black scale on white background.

1. Case: Steel with brass bourdon tube.

2. Size: 6 inch diameter.

3. Mid-Scale Accuracy: One percent.

4. Scale: Psi.

2.2 PRESSURE GAUGE TAPPINGS

A. Gauge Cock: Tee or lever handle, brass for maximum 150 psi.

B. Needle Valve: Brass, 1/4 inch NPT for minimum 150 psi.

C. Pulsation Damper: Pressure snubber, brass with 1/4 inch connections.

2.3 STEM TYPE THERMOMETERS

A. Thermometer: ASTM E 1, adjustable angle, mercury free, blue spirit fill, lens front tube, cast aluminum case with enamel finish, cast aluminum adjustable joint with positive locking device.

1. Size: 9 inch scale.

2. Window: Clear Lexan.

3. Stem: 3/4 inch NPT brass.

4. Accuracy: 2 percent per ASTM E77.

5. Calibration: Degrees F.

2.4 THERMOMETER SUPPORTS

A. Socket: Brass separable sockets for thermometer stems with or without extensions as required, and with cap and chain.

2.5 TEST PLUGS

A. Test Plug: 1/4 inch or 1/2 inch brass fitting and cap for receiving 1/8 inch outside diameter pressure or temperature probe with Nordel core for temperatures up to 350 degrees F.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide one pressure gauge per pump, installing taps before strainers and on suction and discharge of pump. Pipe to gauge.

C. Install pressure gauges with pulsation dampers. Provide gauge cock to isolate each gauge. Extend nipples to allow clearance from insulation.

D. Install gauges and thermometers in locations where they are easily read from normal operating level. Install vertical to 45 degrees off vertical.

E. Adjust gauges and thermometers to final angle, clean windows and lenses, and calibrate to zero.

3.2 SCHEDULE

A. Pressure Gauges, Location and Scale Range:

1. Pumps, 0 to 100 psi.

B. Pressure Gauge Tappings, Location:

1. Control valves 3/4 inch & larger - inlets and outlets.

2. In-duct hydronic reheat coils - inlets and outlets.

C. Stem Type Thermometers, Location and Scale Range:

1. Blower Coil and In-Duct heating water coil inlets and outlets, 30 to 240 degrees F.

D. Thermometer Sockets, Location:

1. Control valves 1 inch & larger - inlets and outlets.

END OF SECTION

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Vibration isolators.

1.2 REFERENCE STANDARDS

A. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

B. ASHRAE (HVACA) - ASHRAE Handbook - HVAC Applications; Most Recent Edition Cited by Referring Code or Reference Standard.

1.3 SUBMITTALS

A. Product Data:

1. Provide manufacturer's product literature documenting compliance with PART 2 PRODUCTS.

B. Shop Drawings:

1. Provide schedule of vibration isolator type with location and load on each.

C. Manufacturer's Instructions: Indicate installation instructions with special procedures and setting dimensions.

1.4 QUALITY ASSURANCE

A. Comply with applicable building code.

B. Perform design and installation in accordance with applicable codes.

C. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than 5 years of documented experience.

1. Member of Vibration Isolation and Seismic Control Manufacturers Association (VISCMA).

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Kinetics Noise Control, Inc: www.kineticsnoise.com.

B. Mason Industries: www.mason-ind.com.

C. Vibration Eliminator Company, Inc: www.veco-nyc.com.

2.2 PERFORMANCE REQUIREMENTS

A. General:

1. All vibration isolators to conform to all uniform deflection and stability requirements under all operating loads.

2. Steel springs to function without undue stress or overloading.

3. Lateral to vertical stiffness ratio to not exceed 0.08 with spring deflection at minimum 75 percent of specified deflection.

2.3 VIBRATION ISOLATORS

A. General Requirements:

1. Resilient Materials for Vibration Isolators: Oil, ozone, and oxidant resistant.

2. Spring Elements for Spring Isolators:

a. Color code or otherwise identify springs to indicate load capacity.

b. Lateral Stability: Minimum lateral stiffness to vertical stiffness ratio of 0.8.

c. Designed to operate in the linear portion of their load versus deflection curve over deflection range of not less than 50 percent above specified deflection.

d. Designed to provide additional travel to solid of not less than 50 percent of rated deflection at rated load.

e. Selected to provide designed deflection of not less than 75 percent of specified deflection.

f. Selected to function without undue stress or overloading.

B. Vibration Isolators for Nonseismic Applications:

1. Restrained Spring Isolators, Nonseismic:

a. Description: Isolator assembly consisting of single or multiple free-standing, laterally stable steel spring(s) within a metal housing designed to prevent movement of supported equipment above an adjustable vertical limit stop.

b. Bottom Load Plate: Steel with nonskid elastomeric isolator pad with provisions for bolting to supporting structure as required.

c. Furnished with integral leveling device for positioning and securing supported equipment.

d. Provides constant free and operating height.

2. Spring Isolator Hangers, Nonseismic:

a. Description: Isolator assembly designed for installation in hanger rod suspension system utilizing single or multiple free-standing, laterally stable steel spring(s) in series with an elastomeric element for the lower hanger rod connection.

b. Designed to accommodate misalignment of bottom hanger rod up to 30 degrees (plus/minus 15 degrees) without short-circuiting of isolation.

C. Non-Seismic Type:

1. Rubber Mount or Hanger: Molded rubber designed for 0.4 inch deflection with threaded insert.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install anchors and fasteners in accordance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.

C. Secure fasteners according to manufacturer's recommended torque settings.

D. Install flexible piping connections to provide sufficient slack for vibration isolation and/or seismic relative displacements as indicated or as required.

E. Vibration Isolation Systems:

1. Spring Isolators:

a. Position equipment at operating height; provide temporary blocking as required.

b. Lift equipment free of isolators prior to lateral repositioning to avoid damage to isolators.

c. Level equipment by adjusting isolators gradually in sequence to raise equipment uniformly such that excessive weight or stress is not placed on any single isolator.

2. Isolator Hangers:

a. Use precompressed isolator hangers where required to facilitate installation and prevent damage to equipment utility connection provisions.

b. Locate isolator hangers at top of hanger rods in accordance with manufacturer's instructions.

3. Clean debris from beneath vibration-isolated equipment that could cause short-circuiting of isolation.

4. Use elastomeric grommets for attachments where required to prevent short-circuiting of isolation.

5. Adjust isolators to be free of isolation short circuits during normal operation.

6. Do not overtighten fasteners such that resilient material isolator pads are compressed beyond manufacturer's maximum recommended deflection.

3.2 INSTALLATION - GENERAL

A. Install in accordance with manufacturer's instructions.

B. Prior to making piping connections to equipment with operating weights substantially different from installed weights, block up equipment with temporary shims to final height. When full load is applied, adjust isolators to load to allow shim removal.

C. Support piping connections to equipment mounted on isolators using isolators or resilient hangers as follows:

1. Up to 4 Inches Pipe Size: First three points of support.

2. 5 to 8 Inches Pipe Size: First four points of support.

3.3 SCHEDULE

A. Pipe Isolation Schedule (open spring isolators).

1. 1 Inch Pipe Size: Isolate 120 diameters from equipment.

2. 2 Inch Pipe Size: Isolate 90 diameters from equipment.

3. 3 Inch Pipe Size: Isolate 80 diameters from equipment.

4. 4 Inch Pipe Size: Isolate 75 diameters from equipment.

5. 6 Inch Pipe Size: Isolate 60 diameters from equipment.

6. Equipment includes hydronic pumps, blower coils, air handling units and rooftop air handling units.

B. Equipment Isolation Schedule.

1. Cabinet Unit Heaters: Rubber in shear hangers, minimum 1/4 inches static deflection.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Nameplates.

B. Tags.

C. Stencils.

D. Pipe markers.

1.2 REFERENCE STANDARDS

A. ASME A13.1 - Scheme for the Identification of Piping Systems; 2023.

B. ASTM D709 - Standard Specification for Laminated Thermosetting Materials; 2017.

1.3 SUBMITTALS

A. List: Submit list of wording, symbols, letter size, and color coding for mechanical identification.

B. Chart and Schedule: Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.

C. Product Data: Provide manufacturers catalog literature for each product required.

D. Manufacturer's Installation Instructions: Indicate special procedures, and installation.

PART 2 PRODUCTS

2.1 IDENTIFICATION APPLICATIONS

A. Rooftop Energy Recovery Ventilators: Nameplates.

B. Blower Coils: Nameplates.

C. Air Cooled Condensing Units: Nameplates

D. Exhaust Fans: Nameplates.

E. VAV Boxes: Nameplates.

F. Heat Pumps: Nameplates.

G. Unit Ventilators: Nameplates.

H. Ductwork: Stencilled painting.

I. Piping: Pipe markers.

J. Pumps: Nameplates.

2.2 NAMEPLATES

A. Letter Color: White.

B. Letter Height: 1/4 inch.

C. Background Color: Black.

D. Plastic: Comply with ASTM D709.

2.3 TAGS

A. Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inch diameter.

B. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch diameter with smooth edges.

C. Valve Tag Chart: Typewritten letter size list in anodized aluminum frame.

2.4 STENCILS

A. Stencils: With clean cut symbols and letters of following size:

1. Ductwork and Equipment: 2-1/2 inch high letters.

2.5 PIPE MARKERS

A. Color: Comply with ASME A13.1.

B. Plastic Pipe Markers: Factory fabricated, flexible, semi- rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.

C. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure-sensitive adhesive backing and printed markings.

PART 3 EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

3.2 INSTALLATION

A. Install nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.

B. Install tags with corrosion resistant chain.

C. Install plastic pipe markers in accordance with manufacturer's instructions.

D. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.

E. Use tags on piping 3/4 inch diameter and smaller.

1. Identify service, flow direction, and pressure.

2. Install in clear view and align with axis of piping.

3. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.

F. Install ductwork with stencilled painting. Identify with air handling unit identification number and area served. Locate identification at air handling unit, at each side of penetration of structure or enclosure, and at each obstruction.

END OF SECTION

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Testing, adjustment, and balancing of air systems.

B. Testing, adjustment, and balancing of hydronic and refrigerating systems.

C. Measurement of final operating condition of HVAC systems.

D. Sound measurement of equipment operating conditions.

E. Commissioning activities.

1.2 REFERENCE STANDARDS

A. AABC (NSTSB) - AABC National Standards for Total System Balance, 7th Edition; 2016.

B. NEBB (TAB) - Procedural Standard for Testing Adjusting and Balancing of Environmental Systems; 2019.

1.3 SUBMITTALS

A. Installer Qualifications: Submit name of adjusting and balancing agency and TAB supervisor for approval within 30 days after award of Contract.

B. Certification: All reports submitted, whether progress reports or final reports shall be certified and shall bear the seal of the certification agency.

C. TAB Plan: Submit a written plan indicating the testing, adjusting, and balancing standard to be followed and the specific approach for each system and component.

1. Submit to Engineer.

2. Submit to the Commissioning Authority, Construction Manager, and HVAC controls contractor.

3. Submit six weeks prior to starting the testing, adjusting, and balancing work.

4. Include certification that the plan developer has reviewed Contract Documents, the equipment and systems, and the control system with the Engineer and other installers to sufficiently understand the design intent for each system.

5. Include at least the following in the plan:

a. List of all air flow, water flow, sound level, system capacity and efficiency measurements to be performed and a description of specific test procedures, parameters, formulas to be used.

b. Copy of field checkout sheets and logs to be used, listing each piece of equipment to be tested, adjusted and balanced with the data cells to be gathered for each.

c. Identification and types of measurement instruments to be used and their most recent calibration date.

d. Discussion of what notations and markings will be made on the duct and piping drawings during the process.

e. Final test report forms to be used.

f. Detailed step-by-step procedures for TAB work for each system and issue, including:

1) Diffuser proportioning.

2) Total flow calculations.

3) Rechecking.

g. Expected problems and solutions, etc.

h. Details of how TOTAL flow will be determined; for example:

1) Air: Sum of terminal flows via control system calibrated readings or via hood readings of all terminals, supply (SA) and return air (RA) pitot traverse, SA or RA flow stations.

2) Water: Pump curves, circuit setter, flow station, ultrasonic, etc.

i. Proposed selection points for sound measurements and sound measurement methods.

j. Methods for making coil or other system plant capacity measurements, if specified.

k. Time schedule for TAB work to be done in phases (by floor, etc.).

l. Time schedule for deferred or seasonal TAB work, if specified.

m. False loading of systems to complete TAB work, if specified.

n. Procedures for field technician logs of discrepancies, deficient or uncompleted work by others, contract interpretation requests and lists of completed tests (scope and frequency).

o. Procedures for formal deficiency reports, including scope, frequency and distribution.

D. Field Logs: Submit at least twice a week to the Commissioning Authority.

E. Control System Coordination Reports: Communicate in writing to the controls installer all setpoint and parameter changes made or problems and discrepancies identified during TAB that affect, or could affect, the control system setup and operation.

F. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.

1. Submit to the the Commissioning Authority, Construction Manager, and HVAC controls contractor within two weeks after completion of testing, adjusting, and balancing.

2. Revise TAB plan to reflect actual procedures and submit as part of final report.

3. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Engineer and for inclusion in operating and maintenance manuals.

4. Include actual instrument list, with manufacturer name, serial number, and date of calibration.

5. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.

6. Units of Measure: Report data in I-P (inch-pound) units only.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

A. Perform total system balance in accordance with the following:

1. AABC (NSTSB), AABC National Standards for Total System Balance.

2. NEBB Procedural Standards for Testing Adjusting Balancing of Environmental Systems.

B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.

C. TAB Agency Qualifications:

1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.

2. Having minimum of three years documented experience.

3. Certified by the following:

a. AABC, Associated Air Balance Council: www.aabc.com/#sle; upon completion submit AABC National Performance Guaranty.

b. NEBB, National Environmental Balancing Bureau: www.nebb.org/#sle.

D. TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.

3.2 EXAMINATION

A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:

1. Systems are started and operating in a safe and normal condition.
2. Temperature control systems are installed complete and operable.
3. Proper thermal overload protection is in place for electrical equipment.
4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
5. Duct systems are clean of debris.
6. Fans are rotating correctly.
7. Fire, smoke, combination fire/smoke and volume dampers are in place and open.
8. Air coil fins are cleaned and combed.
9. Access doors are closed and duct end caps are in place.
10. Air outlets are installed and connected.
11. Duct system leakage is minimized.
12. Hydronic systems are flushed, filled, and vented.
13. Pumps are rotating correctly.
14. Proper strainer baskets are clean and in place.
15. Service and balance valves are open.

B. Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.

C. Beginning of work means acceptance of existing conditions.

3.3 PREPARATION

A. Hold a pre-balancing meeting at least one week prior to starting TAB work.

1. Require attendance by all installers whose work will be tested, adjusted, or balanced.

B. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Engineer to facilitate spot checks during testing.

C. Provide additional balancing devices as required.

3.4 ADJUSTMENT TOLERANCES

A. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.

B. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 5 percent of design.

C. Hydronic Systems: Adjust to within plus or minus 10 percent of design.

3.5 RECORDING AND ADJUSTING

A. Field Logs: Maintain written logs including:

1. Running log of events and issues.

2. Discrepancies, deficient or uncompleted work by others.

3. Contract interpretation requests.

4. Lists of completed tests.

B. Ensure recorded data represents actual measured or observed conditions.

C. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.

D. Mark on drawings the locations where traverse and other critical measurements were taken and cross reference the location in the final report.

E. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.

F. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

G. At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by the Nanuet Union Free School District.

3.6 AIR SYSTEM PROCEDURE

A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities at site altitude.

B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.

C. Measure air quantities at air inlets and outlets.

D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.

E. Use volume control devices to regulate air quantities only to extend that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.

F. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.

G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.

H. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.

I. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.

J. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.

K. Where modulating dampers are provided, take measurements and balance at extreme conditions. Balance variable volume systems at maximum air flow rate, full cooling, and at minimum air flow rate, full heating.

L. For variable air volume system powered units set volume controller to air flow setting indicated. Confirm connections properly made and confirm proper operation for automatic variable air volume temperature control.

M. At completion of fan balancing, replace the variable pitch fan sheaves with fixed sheaves sized to provide required air balance. Measure and record final air balance on the fan after installation of fixed sheaves.

3.7 WATER SYSTEM PROCEDURE

A. Adjust water systems to provide required or design quantities.

B. Use calibrated Venturi tubes, orifices, or other metered fittings and pressure gauges to determine flow rates for system balance. Where flow metering devices are not installed, base flow balance on temperature difference across various heat transfer elements in the system.

C. Adjust systems to provide specified pressure drops and flows through heat transfer elements prior to thermal testing. Perform balancing by measurement of temperature differential in conjunction with air balancing.

D. Effect system balance with automatic control valves fully open to heat transfer elements.

E. Effect adjustment of water distribution systems by means of balancing cocks, valves, and fittings. Do not use service or shut-off valves for balancing unless indexed for balance point.

F. Where available pump capacity is less than total flow requirements or individual system parts, full flow in one part may be simulated by temporary restriction of flow to other parts.

3.8 COMMISSIONING

A. Furnish to the Commissioning Authority, upon request, any data gathered but not shown in the final TAB report.

B. In the presence of the Commissioning Authority, verify that:

1. Final settings of all valves, splitters, dampers and other adjustment devices have been permanently marked.

2. The air system is being controlled to the lowest possible static pressure while still meeting design loads, less diversity; this shall include a review of TAB methods, established control setpoints, and physical verification of at least one leg from fan to diffuser having all balancing dampers wide open and that during full cooling of all terminal units taking off downstream of the static pressure sensor, the terminal unit on the critical leg has its damper 90 percent or more open.

3. The water system is being controlled to the lowest possible pressure while still meeting design loads, less diversity; this shall include a review of TAB methods, established control setpoints, and physical verification of at least one leg from the pump to the coil having all balancing valves wide open.

3.9 SCOPE

A. Test, adjust, and balance the following:

1. HVAC Pumps.

2. Air Cooled Condensing Units.

3. Variable Refrigerant Volume Heat Pump Systems.

4. Unit Ventilators.

5. Blower Coils.

6. Fan Coil Units.

7. Terminal Heat Transfer Units.

8. Rooftop Energy Recovery Ventilators

9. Kitchen Hoods

10. Fans.

11. Air Filters.

12. Air Inlets and Outlets.

3.10 MINIMUM DATA TO BE REPORTED

A. Electric Motors:

1. Manufacturer.
2. Model/Frame.
3. HP/BHP.
4. Phase, voltage, amperage; nameplate, actual, no load.
5. RPM.
6. Service factor.
7. Starter size, rating, heater elements.
8. Sheave Make/Size/Bore.

B. Pumps:

1. Identification/number.
2. Manufacturer.
3. Size/model.
4. Impeller.
5. Service.
6. Design flow rate, pressure drop, BHP.
7. Actual flow rate, pressure drop, BHP.
8. Discharge pressure.
9. Suction pressure.
10. Total operating head pressure.
11. Shut off, discharge and suction pressures.
12. Shut off, total head pressure.

C. Heat Pumps:

1. Identification/number.
2. Location.
3. Manufacturer.
4. Model number.

5. Serial number.
6. Entering DB air temperature, design and actual.
7. Leaving DB air temperature, design and actual.
8. Number of compressors.

D. Cooling Coils:

1. Identification/number.
2. Location.
3. Service.
4. Manufacturer.
5. Air flow, design and actual.
6. Entering air DB temperature, design and actual.
7. Entering air WB temperature, design and actual.
8. Leaving air DB temperature, design and actual.
9. Leaving air WB temperature, design and actual.
10. Saturated suction temperature, design and actual.
11. Air pressure drop, design and actual.

E. Heating Coils:

1. Identification/number.
2. Location.
3. Service.
4. Manufacturer.
5. Air flow, design and actual.
6. Water flow, design and actual.
7. Water pressure drop, design and actual.
8. Entering water temperature, design and actual.
9. Leaving water temperature, design and actual.
10. Entering air temperature, design and actual.
11. Leaving air temperature, design and actual.

12. Air pressure drop, design and actual.

F. Air Moving Equipment:

1. Location.
2. Manufacturer.
3. Model number.
4. Serial number.
5. Arrangement/Class/Discharge.
6. Air flow, specified and actual.
7. Return air flow, specified and actual.
8. Outside air flow, specified and actual.
9. Total static pressure (total external), specified and actual.
10. Inlet pressure.
11. Discharge pressure.
12. Fan RPM.

G. Return Air/Outside Air:

1. Identification/location.
2. Design air flow.
3. Actual air flow.
4. Design return air flow.
5. Actual return air flow.
6. Design outside air flow.
7. Actual outside air flow.
8. Return air temperature.
9. Outside air temperature.
10. Required mixed air temperature.
11. Actual mixed air temperature.
12. Design outside/return air ratio.
13. Actual outside/return air ratio.

H. Exhaust Fans:

1. Location.
2. Manufacturer.
3. Model number.
4. Serial number.
5. Air flow, specified and actual.
6. Total static pressure (total external), specified and actual.
7. Inlet pressure.
8. Discharge pressure.
9. Fan RPM.

I. Duct Traverses:

1. System zone/branch.
2. Duct size.
3. Area.
4. Design velocity.
5. Design air flow.
6. Test velocity.
7. Test air flow.
8. Duct static pressure.
9. Air temperature.
10. Air correction factor.

J. Duct Leak Tests:

1. Description of ductwork under test.
2. Duct design operating pressure.
3. Duct design test static pressure.
4. Duct capacity, air flow.
5. Maximum allowable leakage duct capacity times leak factor.
6. Test apparatus:

a. Blower.

b. Orifice, tube size.

c. Orifice size.

d. Calibrated.

7. Test static pressure.

8. Test orifice differential pressure.

9. Leakage.

K. Flow Measuring Stations:

1. Identification/number.

2. Location.

3. Size.

4. Manufacturer.

5. Model number.

6. Serial number.

7. Design Flow rate.

8. Design pressure drop.

9. Actual/final pressure drop.

10. Actual/final flow rate.

11. Station calibrated setting.

L. Terminal Unit Data:

1. Manufacturer.

2. Type, constant, variable, single, dual duct.

3. Identification/number.

4. Location.

5. Model number.

6. Size.

7. Minimum static pressure.

8. Minimum design air flow.

9. Maximum design air flow.
10. Maximum actual air flow.
11. Inlet static pressure.

M. Air Distribution Tests:

1. Air terminal number.
2. Room number/location.
3. Terminal type.
4. Terminal size.
5. Area factor.
6. Design velocity.
7. Design air flow.
8. Test (final) velocity.
9. Test (final) air flow.
10. Percent of design air flow.

N. Sound Level Reports:

1. Locations:
   a. High School:
      1) Art Classroom 110
      2) Music Room 105
      3) Band Room 107
      4) Conference Room 123
   b. Middle School:
      1) Music Room 58
      2) Resource Room 47
2. Octave bands - equipment off.
3. Octave bands - equipment on.

END OF SECTION

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Duct insulation.

B. Duct liner.

C. Insulation jackets.

1.2 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 C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2013 (Reapproved 2019).

C. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2014 (Reapproved 2019).

D. ASTM C916 - Standard Specification for Adhesives for Duct Thermal Insulation; 2020.

E. ASTM C1338 - Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings; 2008.

F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023c.

G. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2022a, with Editorial Revision (2023).

H. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2020.

I. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.3 SUBMITTALS

A. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

B. Manufacturer's Instructions: Indicate installation procedures necessary to ensure acceptable workmanship and that installation standards will be achieved.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section with not less than three years of documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified in this section, with minimum 3 years of experience and approved by manufacturer.

C. Code Compliance: All insulation products provided on the contract shall be fully in compliance with all material and installation requirements of the New York State Energy Conservation Construction Code, latest addition with all amendments. Insulation products shall meet all "k" values and thicknesses as described in the Code.

1.5 REGULATORY REQUIREMENTS

A. Materials: Flame spread/smoke developed rating of 25/50 in accordance with ASTM E 84.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.

B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.7 FIELD CONDITIONS

A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.

B. Maintain temperature during and after installation for minimum period of 24 hours.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84, UL 723, ASTM E84, or UL 723.

2.2 GLASS FIBER, FLEXIBLE

A. Manufacturer:

1. Knauf Insulation: www.knaufinsulation.com.

2. Johns Manville: www.jm.com.

3. Owens Corning Corporation: www.ocbuildingspec.com.

4. CertainTeed Corporation: www.certainteed.com.

B. Insulation: ASTM C553; flexible, noncombustible blanket.

1. K value: 0.36 at 75 degrees F, when tested in accordance with ASTM C518.

2. Maximum Service Temperature: 450 degrees F.

3. Maximum Water Vapor Absorption: 5.0 percent by weight.

4. Density: 1.50 pounds per cubic foot.

C. Vapor Barrier Jacket:

1. Kraft paper with glass fiber yarn and bonded to aluminized film.

2. Moisture Vapor Permeability: 0.029 ng/Pa s m (0.02 perm inch), when tested in accordance with ASTM E96/E96M.

3. Secure with pressure sensitive tape.

D. Vapor Barrier Tape:

1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.

E. Outdoor Vapor Barrier Mastic:

1. Vinyl emulsion type acrylic or mastic, compatible with insulation, black color.

F. Tie Wire: Annealed steel, 16 gauge, 0.0508 inch diameter.

2.3 GLASS FIBER, RIGID

A. Insulation: ASTM C612; rigid, noncombustible blanket.

1. K Value: 0.24 at 75 degrees F, when tested in accordance with ASTM C518.

2. Maximum Service Temperature: 450 degrees F.

3. Maximum Water Vapor Absorption: 5.0 percent.

4. Minimum Density: 3.0 lb/cu. ft.

5. Maximum Density: 8.0 lb/cu ft.

B. Vapor Barrier Jacket:

1. Kraft paper with glass fiber yarn and bonded to aluminized film.

2. Moisture Vapor Permeability: 0.029 ng/Pa s m (0.02 perm inch), when tested in accordance with ASTM E96/E96M.

3. Secure with pressure sensitive tape.

C. Vapor Barrier Tape:

1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.

D. Indoor Vapor Barrier Finish:

1. Cloth: Untreated; 9 oz/sq yd weight, glass fabric.

2. Vinyl emulsion type acrylic, compatible with insulation, black color.

2.4 JACKETS

A. Field Applied or Pre-Applied Vapor Barrier and Weather Proofing Jacket:

1. Field-applied or pre-applied protective finishing, operating within the range of -30°F (-23°C) and 300°F (149°C), will be jacketed with laminated, flexible, self-adhering, protective jacketing, vapor barrier and weather proofing membrane, having a high performance acrylic adhesive capable of installation with no additional mechanical attachment.

2. Material is to be VentureClad 1577CW (5ply) White finish selected based on availability and desired final appearance of insulated system.

3. Jacketing material is to have a maximum flame spread/smoke developed index of 10/20 per UL 723 test, a .0000 water vapor permeance rating per ASTM E-96, and mold inhibitors incorporated.

4. All products shall be UV stable.

2.5 GLASS FIBER DUCT LINER, RIGID

A. Insulation: ASTM C 612; rigid, noncombustible board with poly vinyl acetate polymer impregnated surface and edge coat.

1. 'K' value : ASTM C 1071 or ASTM C 518, maximum 0.27 at 75 degrees F.

2. Maximum service temperature: 250 degrees F.

3. Maximum Velocity on Coated Air Side: 5,000 fpm.

4. Minimum Noise Reduction Criteria: ASTM C 1071 0.45 for 1/2 inch thickness.

5. Minimum Noise Reduction Criteria: ASTM C 1071 0.70 for 1 inch thickness.

6. Minimum Noise Reduction Criteria: ASTM C 1071 0.85 for 1-1/2 inches thickness.

7. Minimum Noise Reduction Criteria: ASTM C 1071 0.90 for 2 inch thickness.

8. Fungus Resistance of Surface and Edge Coating: No visible growth, measured in accordance with ASTM G 21.

9. Density: 2.0 pounds per cubic foot.

B. Adhesive:

1. Waterproof, ASTM E 162 fire-retardant type.

C. Liner Fasteners: Galvanized steel, self-adhesive pad with integral head.

PART 3 EXECUTION

3.1 EXAMINATION

A. Test ductwork for design pressure prior to applying insulation materials.

B. Verify that surfaces are clean, foreign material removed, and dry.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install in accordance with NAIMA National Insulation Standards.

C. Insulated Ducts Conveying Air Below Ambient Temperature:

1. Provide insulation with vapor barrier jackets.

2. Finish with tape and vapor barrier jacket.

3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.

4. Insulate entire system, including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.

D. External Duct Insulation Application:

1. Secure insulation with vapor barrier with wires and seal jacket joints with vapor barrier adhesive or tape to match jacket.

2. Secure insulation without vapor barrier with staples, tape, or wires.

3. Install without sag on underside of duct. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift duct off trapeze hangers and insert spacers.

4. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.

5. Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.

E. Duct Liner Application:

1. Adhere insulation with adhesive for 100 percent coverage.

2. Secure insulation with mechanical liner fasteners. Refer to SMACNA (DCS) for spacing.

3. Seal and smooth joints. Seal and coat transverse joints.

4. Seal liner surface penetrations with adhesive.

5. Duct dimensions indicated are net inside dimensions required for air-flow. Increase duct size to allow for insulation thickness.

3.3 SCHEDULES

A. New Supply Ducts connected to Barr MS RTU-2 (interior, concealed): 1-1/2" thick fiberglass flexible duct wrap insulation.

B. All New EXPOSED Supply Ducts (interior): Un-Insulated.

C. New Supply Ducts connected to Miller Elementary School RTU-2 (interior, concealed): 1-1/2" thick fiberglass flexible duct wrap insulation.

D. New Supply Ducts connected to High School Blower Coil units BC-HS-5 and BC-HS-6 (interior, concealed): 1" thick fiberglass flexible duct wrap insulation.

E. Rectangular Outside Air Ducts (interior, exposed):1-1/2" thick rigid glass fiber board insulation with field applied weather proofing jacketing.

F. Rectangular Outside Air Ducts (interior, concealed): 2" thick fiberglass flexible duct wrap insulation.

G. Air transfer Ductwork (concealed): 1/2" thick rigid glass fiber liner.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Equipment insulation.

B. Flexible removable and reusable blanket insulation.

1.2 REFERENCE STANDARDS

A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.

B. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.

C. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.

D. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2019, with Editorial Revision (2023).

E. ASTM C449 - Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement; 2007 (Reapproved 2019).

F. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2021.

G. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2023.

H. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2013 (Reapproved 2019).

I. ASTM C1695 - Standard Specification for Fabrication of Flexible Removable and Reusable Blanket Insulation for Hot Service; 2022.

J. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023c.

K. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2022a, with Editorial Revision (2023).

L. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.3 SUBMITTALS

A. Product Data: Provide product description, thermal characteristics, list of materials and thickness for equipment scheduled.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with not less than three years of documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified in this section with minimum 3 years of experience.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.

B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.6 FIELD CONDITIONS

A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.

B. Maintain temperature during and after installation for minimum period of 24 hours.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84, UL 723, ASTM E84, or UL 723.

2.2 FLEXIBLE REMOVABLE AND REUSABLE BLANKET INSULATION

A. Insulation: ASTM C553 Type V; flexible, noncombustible.

1. Comply with ASTM C1695.

2. K Value: 0.37 at 100 degrees F, when tested in accordance with ASTM C177 or ASTM C518.

3. Minimum Service Temperature: 32 degrees F.

4. Maximum Service Temperature: 500 degrees F.

5. Maximum Water Vapor Absorption: Less than 5.0 percent by weight.

6. Color: Green.

7. Weight: 7.65 oz/sq ft.

8. Effective Thickness: 1.25 plus/minus 0.25 inch.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that equipment has been tested before applying insulation materials.

B. Verify that surfaces are clean and dry, with foreign material removed.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Factory Insulated Equipment: Do not insulate.

C. Exposed Equipment: Locate insulation and cover seams in least visible locations.

D. Apply insulation close to equipment by grooving, scoring, and beveling insulation. Fasten insulation to equipment with studs, pins, clips, adhesive, wires, or bands.

E. Fill joints, cracks, seams, and depressions with bedding compound to form smooth surface. On cold equipment, use vapor barrier cement.

F. For hot equipment containing fluids over 140 degrees F, insulate flanges and unions with removable sections and jackets.

G. Fiber glass insulated equipment containing fluids above ambient temperature; provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Finish with glass cloth and adhesive.

H. Finish insulation at supports, protrusions, and interruptions.

I. Equipment Requiring Access for Maintenance, Repair, or Cleaning: Install insulation so it can be easily removed and replaced without damage.

3.3 SCHEDULE

A. Heating Systems:

1. In-Duct Heating Coils: 1.5" thick flexible, removable blanket insulation.

END OF SECTION

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Piping insulation.

B. Jackets and accessories.

C. Engineered wall outlet seals and refrigerant piping insulation protection.

1.2 REFERENCE STANDARDS

A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.

B. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.

C. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.

D. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2019, with Editorial Revision (2023).

E. ASTM C195 - Standard Specification for Mineral Fiber Thermal Insulating Cement; 2007 (Reapproved 2019).

F. ASTM C449 - Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement; 2007 (Reapproved 2019).

G. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2021.

H. ASTM C533 - Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation; 2017 (Reapproved 2023).

I. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2023.

J. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2022a.

K. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2023.

L. ASTM C585 - Standard Practice for Inner and Outer Diameters of Thermal Insulation for Nominal Sizes of Pipe and Tubing; 2022.

M. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel; 2008 (Reapproved 2023).

N. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2016 (Reapproved 2021).

O. ASTM D570 - Standard Test Method for Water Absorption of Plastics; 2022.

P. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023c.

Q. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2022a, with Editorial Revision (2023).

R. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, with Editorial Revision (2021).

S. ASTM G153 - Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials; 2013 (Reapproved 2021).

T. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.3 SUBMITTALS

A. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

B. Manufacturer's Instructions: Indicate installation procedures that ensure acceptable workmanship and installation standards will be achieved.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified in this section with minimum 3 years of experience.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84, UL 723, ASTM E84, or UL 723.

2.2 GLASS FIBER, RIGID

A. Insulation: ASTM C547and ASTM C795; semi-rigid, noncombustible, end grain adhered to jacket.

1. Maximum Service Temperature: 650 degrees F.

2. Maximum Moisture Absorption: 0.2 percent by volume.

B. Vapor Barrier Jacket: White kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm-inches.

C. Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.

D. Vapor Barrier Lap Adhesive: Compatible with insulation.

E. Insulating Cement/Mastic: ASTM C195; hydraulic setting on mineral wool.

F. Fibrous Glass Fabric:

1. Cloth: Untreated; 9 oz/sq yd weight.

2. Blanket: 1.0 lb/cu ft density.

3. Weave: 5 by 5.

G. Indoor Vapor Barrier Finish:

1. Cloth: Untreated; 9 oz/sq yd weight.

2. Vinyl emulsion type acrylic, compatible with insulation, black color.

H. Insulating Cement: ASTM C449.

2.3 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

A. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1; use molded tubular material wherever possible.

1. Minimum Service Temperature: Minus 40 degrees F.

2. Maximum Service Temperature: 180 degrees F.

3. Connection: Waterproof vapor barrier adhesive.

B. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.

2.4 JACKETS

A. PVC Plastic.

1. Jacket: One piece molded type fitting covers and sheet material, off-white color.

a. Minimum Service Temperature: 0 degrees F.

b. Maximum Service Temperature: 150 degrees F.

c. Moisture Vapor Permeability: 0.002 perm inch, maximum, when tested in accordance with ASTM E96/E96M.

d. Thickness: 10 mil.

e. Connections: Brush on welding adhesive.

2. Covering Adhesive Mastic: Compatible with insulation.

2.5 ENGINEERED WALL OUTLET SEALS AND REFRIGERANT PIPING INSULATION PROTECTION

A. Basis of Design: Airex Manufacturing, Inc; www.airexmfg.com/#sle.

1. Pipe Penetration Wall Seal: Airex Titan Outlet.

2. Refrigeration Pipe Insulation Protection System: Airex E-Flex Guard.

3. Pipe Penetration Wall Seal and Insulation Protection System: Airex Pro-System Kit.

B. Insulation Protection System: Refrigerant piping insulation PVC protective cover.

1. PVC Insulation Cover Color: White with full-length velcro fastener.

2. Weatherization and Ultraviolet Exposure Protection: Comply with ASTM G153.

3. Water/Vapor Permeability: Comply with ASTM E96/E96M.

4. Anti-Fungal and Anti-Microbial Resistance: Comply with ASTM G21.

5. Flame Spread and Smoke Development Rating of 24/450: Comply with ASTM E84 or UL 723.

6. Carbon Arc Light Exposure: Comply with ASTM G153.

7. Tensile Strength After UV Exposure and Water Immersion: Comply with ASTM D412.

8. Water Absorption of Plastics: Comply with ASTM D570.

9. Adhesive free.

PART 3 EXECUTION

3.1 EXAMINATION

A. Test piping for design pressure, liquid tightness, and continuity prior to applying insulation materials.

B. Verify that surfaces are clean and dry, with foreign material removed.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install in accordance with NAIMA National Insulation Standards.

C. Exposed Piping: Locate insulation and cover seams in least visible locations.

D. Insulated Pipes Conveying Fluids Below Ambient Temperature:

1. Insulate entire system, including fittings, valves, unions, flanges, strainers, flexible connections, and expansion joints.

E. Glass Fiber Insulated Pipes Conveying Fluids Below Ambient Temperature:

1. Provide vapor barrier jackets, factory-applied or field-applied; secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.

2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.

F. For hot piping conveying fluids over 140 degrees F, insulate flanges and unions at equipment.

G. Glass Fiber Insulated Pipes Conveying Fluids Above Ambient Temperature:

1. Provide standard jackets, with or without vapor barrier, factory-applied, or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure-sensitive adhesive. Secure with outward clinch expanding staples.

2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.

H. Inserts and Shields:

1. Application: Piping 1-1/2 inches diameter or larger.

2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.

3. Insert location: Between support shield and piping and under the finish jacket.

4. Insert Configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.

5. Insert Material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.

I. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, refer to Section 078400.

J. Pipe Exposed in Mechanical Equipment Rooms, crawl spaces, piping tunnel areas, boiler rooms and Finished Spaces: Finish with PVC jacket and fitting covers.

3.3 SCHEDULE

A. Heating Systems:

1. Heating Hot Water:

a. Piping Size Range: Up to 1-1/4 inches: 1-1/2 inch thick glass fiber.

b. Piping Size 1-1/2 inches and larger: 2 inches thick glass fiber.

c. Run-outs to terminal units can be insulated with 1" thick glass fiber insulation for maximum length of 10-feet.

d. For heating water supply and return piping run-outs less than 1-1/2" in size routed within wall partitions, insulation shall be reduced to a thickness of 1 inch.

e. For heating water supply and return piping branches less than 1-1/2" in size routed above and below active fin tube elements within fin tube enclosure units, insulation shall be reduced to a thickness of 1/2 inch.

B. Cooling Systems:

1. Refrigerant:

a. Refrigerant Suction Piping:

1) Piping Size 1-1/2 inches and larger: 2 inches thick flexible elastomeric.

2) Piping Size Range: Up to 1-1/4 inches: 1-1/2 inch thick Piping Size Range.

b. Refrigerant Liquid Piping: 1 inch thick flexible elastomeric

c. Provide Airex EFlex Guard or equal refrigerant piping insulation protection system over each individual refrigerant liquid/refrigerant suction connection to each individual condensing unit system from the roof penetration to the Heat Pump Unit connection.

C. Other Systems:

1. Condensate Drain Piping: 1/2" thick glass fiber insulation.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. This section covers the Contractor's responsibilities for commissioning; each subcontractor or installer responsible for the installation of a particular system or equipment item to be commissioned is responsible for the commissioning activities relating to that system or equipment item.

B. The Commissioning Authority (CA) directs and coordinates all commissioning activities and provides Prefunctional Checklists and Functional Test Procedures for Contractor's use.

C. This Section specifies the Contractor’s responsibilities in the commissioning process. Commissioning requires the participation of the Contractor to ensure that all systems are operating in a manner consistent with the Contract Documents.

1. The commissioning process integrates the traditionally separate functions of system documentation, equipment startup, performance testing and training. Commissioning during the construction phase is intended to achieve the following specific objectives in accordance with the Contract Documents:

a. Verify and document that applicable equipment and systems are installed according to the manufacturer’s recommendations, contract requirements, and industry standards and that they receive adequate operational checkout by installing contractors.

b. Verify and document proper performance of equipment and systems.

c. Verify and document that O&M documentation is complete.

d. Verify and document that the Facility operating personnel are properly trained.

e. Verify and document proper installation of equipment according to contract documents and reviewed submittals.

2. The systems and equipment to be commissioned are listed in this Section. The Contractor’s general commissioning requirements and coordination are detailed in this Section. Specific requirements for commissioning of each system or piece of equipment are detailed in the specification Section for the individual systems or pieces of equipment. A detailed description of the overall commissioning process is included in the appendix.

3. The commissioning process does not reduce the responsibility of the Contractor to provide finished and fully functional systems and equipment.

D. The following HVAC equipment is to be commissioned, including commissioning activities for the following specific items:

1. Control system.

2. Piping systems and equipment.
3. Ductwork and accessories.
4. Terminal units.
5. Variable frequency drives.
6. Blower Coils.
7. Air Cooled Condensing Units.
8. Variable Air Volume Terminal Unit Boxes
9. Energy Recovery Units
10. Unit Ventilators
11. Fans
12. Variable Refrigerant Volume Heat Pump Systems
13. Temperature Control System
14. Testing and Balancing
15. Other equipment and systems explicitly identified elsewhere in Contract Documents as requiring commissioning.

E. The Prefunctional Checklist and Functional Test requirements specified in this section are in addition to, not a substitute for, inspection or testing specified in other sections.

1.2 DEFINITIONS

A. Acceptance Phase: Phase of construction after startup and initial checkout when functional performance tests, O&M documentation review and training occurs.

B. Approval: Acceptance that a piece of equipment or system has been properly installed and is functioning in the tested modes in accordance with the Contract Documents.

C. Commissioning authority (CA): An independent agent responsible for the direction and coordination of the commissioning activities. The CA responsible to the Director's Representative.

D. Commissioning Plan: An overall plan that provides the structure, schedule and coordination planning for the commissioning process.

E. Commissioning Team: The members of the commissioning team consist of the Commissioning Authority, the Director's Representative, the Contractor, the architect and design engineers. The owner and the building or plant operator/engineer also may be members of the commissioning team.

F. Deferred Functional Tests: Functional tests that are performed after substantial completion, due to partial occupancy, seasonal requirements, design or other site conditions that prevent the test from being performed prior to substantial completion.

G. Deficiency: A condition in the installation or function of a component, piece of equipment or system that is not in compliance with the Contract Documents.

H. Factory Testing: Testing of equipment on-site or at the factory by factory personnel.

I. Functional Performance Test (FPT): Test of the dynamic function and operation of equipment and systems using manual (direct observation) or monitoring methods. Functional testing is the dynamic testing of systems (rather than just components) under full operation. Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc. The CA develops the functional test procedures in sequential written form. The CA coordinates, oversees and documents the actual testing. The Contractor performs the functional tests. FTs are performed after prefunctional checklists and startup are complete.

J. Phased Commissioning: Commissioning that is completed in phases (by floors, for example) due to the size of the structure or other scheduling issues, in order to minimize the total construction time. Commissioning shall be provided for each phase according to the schedule for that phase. Some repetition and/or remobilization may be required.

K. Prefunctional Checklist (PFC): A list of items to inspect and component tests to conduct to verify proper installation of equipment prior to initiating functional testing.

L. Startup: The initial starting or activating of dynamic equipment, including executing prefunctional checklists.

1.3 COMMISSIONING PROCESS

A. Commissioning Plan. The commissioning plan provides guidance in the execution of the commissioning process. Following the initial commissioning scoping meeting the CA will update the plan which is then considered the “final” plan, although it may be revised as the project progresses.

B. Commissioning Process. The following narrative provides a brief overview of the typical commissioning tasks during construction and the general order in which they occur. A more detailed description of the commissioning process can be found in the Appendix.

1. Commissioning during construction begins with a scoping meeting conducted by the CA where the commissioning process is reviewed with the Commissioning Team.

2. Additional meetings will be required throughout construction, scheduled by the Construction Manager, to plan, scope, coordinate, and schedule future activities and to resolve problems. When possible, commissioning meetings will be scheduled immediately following construction meetings.

3. Equipment documentation is submitted to the CA during the submittal process, including detailed start-up procedures.

4. The CA works with the Contractor to develop startup activity lists and startup documentation. The CA provides prefunctional checklists to be completed by the Contractor during the startup process.

5. In general, the checkout and performance verification proceeds from simple to complex; from component level to equipment to systems and intersystem levels. In each case prefunctional checklists are completed, submitted, and approved before functional testing begins.

6. The Contractor executes and documents the prefunctional checklists, and provides notification to the Construction Manager and the CA. The Contractor performs startup and initial checkout. The CA documents that the checklists and startup were completed according to the approved plans.

7. The CA develops specific equipment and system functional performance test procedures. The Contractor reviews the procedures and submits suggestions or comments. Procedures are finalized by the CA.

8. The procedures are executed by the Contractor, under the direction of the CA.

9. Items of non-compliance in material, workmanship, or setup are corrected and retested at the Contractor's expense. The Contractor is responsible for providing all resources, manpower, and materials necessary to rectify deficiencies as per requirements of the approved schedule.

10. The O&M documentation prepared by the Contractor is reviewed for completeness by the CA.

11. Commissioning is completed before Substantial Completion.

12. The CA reviews, pre-approves and coordinates the training provided by the Contractor and verifies that is was completed.

13. Deferred testing is conducted, as specified or required.

1.4 CONTRACTOR'S RESPONSIBILITIES

A. The Contractor's commissioning responsibilities are as follows (all references apply to commissioned systems and equipment only):

1. Construction and Acceptance Phase:

a. Attend the commissioning scoping meeting and other necessary meetings scheduled by the Construction Manager to facilitate the commissioning process.

b. Facilitate the coordination of the commissioning work by the CA, and with the CA ensure that commissioning activities are being scheduled into the approved progress schedule.

c. Provide detailed manufacturer installation and start-up, operating, troubleshooting and maintenance procedures, factory test reports, and full warranty information, including all responsibilities of the Construction Manager to keep the warranty in force. The installation, start-up and checkout materials that are actually shipped with the equipment and the actual field checkout sheet forms to be used by the factory or field technicians shall be submitted to the CA. The CA may request further documentation necessary for the commissioning process.

d. In each purchase order or subcontract written, include requirements for submittal data, O&M data, commissioning tasks and training.

e. Ensure that all subcontractors execute their commissioning responsibilities according to the Contract Documents and approved progress schedule.

f. Review test procedures to ensure feasibility, safety and equipment protection and provide necessary written alarm limits to be used during the tests.

g. Develop a full start-up and testing plan using manufacturer’s start-up procedures and the prefunctional checklists from the CA for all commissioned equipment. Submit to the CA for review and approval prior to startup.

h. During the startup and initial checkout process, execute all portions of the prefunctional checklists for all commissioned systems and equipment. Verify that system installations include all ports, gages, thermometers, access doors, valves, etc., required for specified functional performance testing.

i. Provide all special tools and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment.

j. Perform and clearly document all completed startup and system operational checkout procedures, providing a copy to the CA.

k. Address incomplete Work and open deficiencies before functional performance testing.

l. Provide skilled technicians to execute startup of equipment and to execute the functional performance tests. Ensure that they are available and present during the agreed upon schedules and for sufficient duration to complete the necessary tests, adjustments and problem-solving.

m. Provide skilled technicians to perform functional performance testing under the direction of the CA for specified equipment. Provide Manufacturer's Representative as required and as specified in the Specification. Assist the CA in interpreting the monitoring data, as necessary.

n. Correct deficiencies (differences between specified and observed performance) as directed by the Director’s Representative.

o. Prepare O&M manuals according to the Contract Documents, including clarifying and updating the original sequences of operation to as-built

conditions. Provide a copy of the O&M manuals and submittals of commissioned equipment to the CA for review and approval.

p. Provide training as specified.

q. Coordinate with equipment manufacturers to determine specific requirements to maintain the validity of the warranty.

2. Warranty Period:

a. Execute seasonal or deferred functional performance testing in accordance with the specifications

b. Correct deficiencies and make necessary adjustments to O&M manuals and as-built drawings for applicable issues identified in any seasonal testing.

1.5 SUBMITTALS

A. Updated Submittals: Keep the Commissioning Authority informed of all changes to control system documentation made during programming and setup; revise and resubmit when substantial changes are made.

B. Draft Prefunctional Checklists and Functional Test Procedures for Control System: Detailed written plan indicating the procedures to be followed to test, checkout and adjust the control system prior to full system Functional Testing; include at least the following for each type of equipment controlled:

1. System name.

2. List of devices.

3. Step-by-step procedures for testing each controller after installation, including:

a. Process of verifying proper hardware and wiring installation.

b. Process of downloading programs to local controllers and verifying that they are addressed correctly.

c. Process of performing operational checks of each controlled component.

d. Plan and process for calibrating valve and damper actuators and all sensors.

e. Description of the expected field adjustments for transmitters, controllers and control actuators should control responses fall outside of expected values.

4. Copy of proposed log and field checkout sheets to be used to document the process; include space for initial and final read values during calibration of each point and space to specifically indicate when a sensor or controller has “passed” and is operating within the contract parameters.

5. Description of the instrumentation required for testing.

6. Indicate what tests on what systems should be completed prior to TAB using the control system for TAB work. Coordinate with the Commissioning Authority and TAB contractor for this determination.

C. Startup Reports, Prefunctional Checklists, and Trend Logs: Submit for approval of Commissioning Authority.

D. HVAC Control System O&M Manual Requirements. In addition to documentation specified elsewhere, compile and organize at minimum the following data on the control system:

1. Specific step-by-step instructions on how to perform and apply all functions, features, modes, etc. mentioned in the controls training sections of this specification and other features of this system. Provide an index and clear table of contents. Include the detailed technical manual for programming and customizing control loops and algorithms.

2. Full as-built set of control drawings.

3. Full as-built sequence of operations for each piece of equipment.

4. Full print out of all schedules and set points after testing and acceptance of the system.

5. Full as-built print out of software program.

6. Electronic copy on disk of the entire program for this facility.

7. Marking of all system sensors and thermostats on the as-built floor plan and HVAC drawings with their control system designations.

8. Maintenance instructions, including sensor calibration requirements and methods by sensor type, etc.

9. Control equipment component submittals, parts lists, etc.

10. Warranty requirements.

11. Copies of all checkout tests and calibrations performed by the Contractor (not commissioning tests).

PART 2 PRODUCTS

2.1 TEST EQUIPMENT

A. Provide all standard testing equipment required to perform startup and initial checkout and required functional performance testing; unless otherwise noted such testing equipment will NOT become the property of Nanuet Union Free School District.

B. Equipment-Specific Tools: Where special testing equipment, tools and instruments are specific to a piece of equipment, are only available from the vendor, and are required in order to accomplish startup or Functional Testing, provide such equipment, tools, and

instruments as part of the work at no extra cost to Nanuet Union Free School District; such equipment, tools, and instruments are to become the property of Nanuet Union Free School District.

C. Data logging equipment and software required to test equipment will be provided by the Contractor, but shall not become the property of the Director's Representative.

D. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Specifications. All equipment shall be calibrated according to the manufacturer's recommended intervals. Calibration tags shall be affixed or certificates readily available.

PART 3 EXECUTION

3.1 PREPARATION

A. Cooperate with the Commissioning Authority in development of the Prefunctional Checklists and Functional Test Procedures.

B. Furnish additional information requested by the Commissioning Authority.

C. Prepare a preliminary schedule for HVAC pipe and duct system testing, flushing and cleaning, equipment start-up and testing, adjusting, and balancing start and completion for use by the Commissioning Authority; update the schedule as appropriate.

D. Notify the Commissioning Authority when pipe and duct system testing, flushing, cleaning, startup of each piece of equipment and testing, adjusting, and balancing will occur; when commissioning activities not yet performed or not yet scheduled will delay construction notify ahead of time and be proactive in seeing that the Commissioning Authority has the scheduling information needed to efficiently execute the commissioning process.

E. Put all HVAC equipment and systems into operation and continue operation during each working day of testing, adjusting, and balancing and commissioning, as required.

F. Provide test holes in ducts and plenums where directed to allow air measurements and air balancing; close with an approved plug.

3.2 MEETINGS

A. Commissining Kick-off Meeting. Prior to the commencement of construction, the CA will schedule, plan and conduct a commissioning scoping meeting with the Commissioning Team.

B. Miscellaneous Meetings. Other meetings will be planned and conducted by the CA as construction progresses. These meetings will cover coordination, deficiency resolution and planning issues with the Contractor, appropriate sub-contractors and suppliers, the construction manager and the school district personnel.

3.3 START-UP, PREFUNCTIONAL CHECKLISTS, AND INITIAL CHECKOUT

A. Prefunctional checklists and initial checkout shall ensure that the equipment and systems are hooked up and operational. Each piece of equipment receives full prefunctional checkout. No sampling strategies are used. Prefunctional checklists are to be filled out on Jacobs Cx software, Facility Grid. The prefunctional testing for a given system must be successfully completed prior to formal functional performance testing of systems or equipment.

1. Start-up and Initial Checkout Plan. The CA shall assist the commissioning team members responsible for startup of any equipment in developing detailed start-up plans for all equipment. The primary role of the CA in this process is to ensure that there is written documentation that each of the manufacturer's recommended procedures have been completed.

2. Execution of Prefunctional Checklists and Startup.

   a. Four weeks prior to startup, the Contractor shall schedule startup and checkout with the Construction Manager.

   b. The Contractor shall execute startup and provide the CA with a signed and dated copy of the completed start-up and prefunctional tests and checklists.

3.4 FUNCTIONAL PERFORMANCE TESTING

A. Development of Test Procedures. Using the requirements in the specifications, contract documents, and DDC submittal, the CA shall develop specific test procedures and forms to verify and document proper operation of each piece of equipment and system. The Contractor shall provide assistance to the CA in developing the procedures. Prior to testing, the CA shall provide a copy of the test procedures to the Contractor who shall review the tests for feasibility, safety, equipment and warranty protection.

B. Functional performance testing shall document that each system is operating in accordance with the Contract Documents. During the testing process, areas of deficient performance shall be identified. Deficiencies shall be corrected by the Contractor and functional testing shall be re-scheduled. The Contractor shall be responsible for all costs associated with re-testing for functional performance.

C. Each system shall be operated through all modes of operation. Proper responses to such modes and conditions as power failure, freeze condition, low oil pressure, no flow, equipment failure, etc. shall also be tested.

D. Test Methods. Each function and test shall be performed under conditions that simulate actual conditions as closely as possible. The Contractor shall execute the test and shall provide all necessary materials, system modifications, etc. to produce the necessary flows, pressures, temperatures, etc. necessary to execute the test according to the specified conditions. At the completion of the test, the Contractor shall return all building equipment and systems affected by these temporary modifications to their pre-test condition.

3.5 INSPECTING AND TESTING - GENERAL

A. Submit startup plans, startup reports, and Prefunctional Checklists for each item of equipment or other assembly to be commissioned.

B. Perform the Functional Tests directed by the Commissioning Authority for each item of equipment or other assembly to be commissioned.

C. Provide two-way radios for use during the testing.

D. Valve/Damper Stroke Setup and Check:

1. For all valve/damper actuator positions checked, verify the actual position against the control system readout.

2. Set pump/fan to normal operating mode.

3. Command valve/damper closed; visually verify that valve/damper is closed and adjust output zero signal as required.

4. Command valve/damper open; verify position is full open and adjust output signal as required.

5. Command valve/damper to a few intermediate positions.

6. If actual valve/damper position does not reasonably correspond, replace actuator or add pilot positioner (for pneumatics).

7. Closure for Heating Coil Valves - Normally Open:

a. Set heating setpoint 20 degrees F above room temperature.

b. Observe valve open.

c. Remove control air or power from the valve and verify that the valve stem and actuator position do not change.

d. Restore to normal.

e. Set heating setpoint to 20 degrees F below room temperature.

f. Observe the valve close.

g. Restore to normal.

E. Coil Valve Leak Check:

1. Method 1 - Water Temperature With 2-Way Valve:

a. Calibrate water temperature sensors on each side of coil to be within 0.2 degree F of each other.

b. Turn off air handler fans, close outside air dampers. Keep pump running. Make sure appropriate coil dampers are open.

c. Normally closed valves will close.

d. Override normally open valves to the closed position.

e. After 10 minutes observe water delta T across coil. If it is greater than 2 degrees F (, leakage is probably occurring.

f. Reset valve stroke to close tighter.

g. Repeat test until compliance is achieved.

2. Method 2 - Air Temperature With 2 or 3-Way Valve: Water leak-by less than 10 percent will likely not be detected with this method.

a. Calibrate air temperature sensors on each side of coil to be within 0.2 degree F of each other.

b. Air handler fans should be on.

c. Change mixed or discharge air setpoint, override values or bleed or squeeze bulb pneumatic controller to cause the valve to close.

d. After 5 minutes observe air delta T across coil. If it is greater than one degree F (, leakage is probably occurring.

e. Reset valve stroke to close tighter.

f. Repeat test until compliance is achieved.

F. Isolation Valve or System Valve Leak Check: For valves not by coils.

1. With full pressure in the system, command valve closed.

2. Use an ultra-sonic flow meter to detect flow or leakage.

G. Deficiencies: Correct deficiencies and re-inspect or re-test, as applicable, at no extra cost to Nanuet Union Free School District.

3.6 TAB COORDINATION

A. TAB: Testing, adjusting, and balancing of HVAC.

B. Coordinate commissioning schedule with TAB schedule.

C. Review the TAB plan to determine the capabilities of the control system toward completing TAB.

D. Provide all necessary unique instruments and instruct the TAB technicians in their use; such as handheld control system interface for setting terminal unit boxes, etc.

E. Have all required Prefunctional Checklists, calibrations, startup and component Functional Tests of the system completed and approved by the Commissioning Authority prior to starting TAB.

F. Provide a qualified control system technician to operate the controls to assist the TAB technicians or provide sufficient training for the TAB technicians to operate the system without assistance.

3.7 CONTROL SYSTEM FUNCTIONAL TESTING

A. Prefunctional Checklists for control system components will require a signed and dated certification that all system programming is complete as required to accomplish the requirements of Contract Documents and the detailed Sequences of Operation documentation submittal.

B. Do not start Functional Testing until all controlled components have themselves been successfully Functionally Tested in accordance with Contract Documents.

C. Using a skilled technician who is familiar with this building, execute the Functional Testing of the control system as required by the Commissioning Authority.

D. Functional Testing of the control system constitutes demonstration and trend logging of control points monitored by the control system.

1. The scope of trend logging is partially specified; trend log up to 50 percent more points than specified at no extra cost to Nanuet Union Free School District.

2. Perform all trend logging specified in Prefunctional Checklists and Functional Test procedures.

E. Functionally Test integral or stand-alone controls in conjunction with the Functional Tests of the equipment they are attached to, including any interlocks with other equipment or systems; further testing during control system Functional Test is not required unless specifically indicated below.

F. Demonstrate the following to the Commissioning Authority during testing of controlled equipment; coordinate with commissioning of equipment.

1. Setpoint changing features and functions.

2. Sensor calibrations.

G. Demonstrate to the Commissioning Authority:

1. That all specified functions and features are set up, debugged and fully operable.

2. That scheduling features are fully functional and setup, including holidays.

3. That all graphic screens and value readouts are completed.

4. Correct date and time setting in central computer.

5. That field panels read the same time as the central computer; sample 10 percent of field panels; if any of those fail, sample another 10 percent; if any of those fail test all remaining units at no extra cost to Nanuet Union Free School District.

6. Functionality of field panels using local operator keypads and local ports (plug-ins) using portable computer/keypad; demonstrate 100 percent of panels and 10 percent of ports; if any ports fail, sample another 10 percent; if any of those fail, test all remaining units at no extra cost to Nanuet Union Free School District.

7. Power failure and battery backup and power-up restart functions.

8. Global commands features.

9. Security and access codes.

10. Occupant over-rides (manual, telephone, key, keypad, etc.).

11. O&M schedules and alarms.

12. Occupancy sensors and controls.

13. That points that are monitored only, having no control function, are reporting properly to the control system.

14. All control strategies and sequences not tested during controlled equipment testing.

15. Trend logging and graphing features that are specified.

16. Other integrated tests specified in Contract Documents

17. That control system features that are included but not specified to be setup are actually installed.

H. If the control system, integral control components, or related equipment do not respond to changing conditions and parameters appropriately as expected, as specified and according to acceptable operating practice, under any of the conditions, sequences, or modes tested, correct all systems, equipment, components, and software required at no additional cost to Nanuet Union Free School District.

3.8 OPERATION AND MAINTENANCE MANUALS

A. Add design intent documentation furnished by Engineer to manuals prior to submission to Nanuet Union Free School District.

B. Submit manuals related to items that were commissioned to Commissioning Authority for review; make changes recommended by Commissioning Authority.

C. Commissioning Authority will add commissioning records to manuals after submission to Nanuet Union Free School District.

3.9 DEFERRED TESTING

A. Unforeseen Deferred Tests. If any check or test cannot be completed due to project conditions, required occupancy condition or other deficiency, execution of checklists and functional testing may be delayed upon approval of the Director’s

Representative. These tests will be conducted in the same manner as the seasonal tests as soon as possible.

B. Seasonal Testing. Seasonal testing (tests delayed until weather conditions are closer to the system's design conditions) shall be completed as part of this contract. Make any final adjustments to the O&M manuals and as-builts resulting from information gained during testing.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE OF WORK

A. General:

1. The existing School District's DDC is manufactured by Siemens Industry, Inc, which is the building's certified temperature control system. The products, control equipment, software, hardware, programming, graphics, wiring and conduit specified in this section shall be provided by Siemens Industry, Inc. All control system requirements specified in this section shall connect to the existing Siemens Industries, Inc. network system that exists on the Nanuet Union Free School District campus. The Board of Education of the Nanuet Free Union School District has decided to purchase controls components, engineering, programming and project management labor from Siemens Industry, Indc. All work specified within specification section 230923, and all temperature control work outlined on the drawings shall be manufactured by Siemens.

2. The existing INSIGHT, Version 3.15, Graphical Control Software shall be upgraded to the latest version of new Desigo CC Graphical Software. The current version of DESIGO is V6.0.

   a. The Siemens BAS currently consists of approximately (30) networked BAS panels and (400) terminal unit controllers, one INSIGHT server with (1) concurrent user license.

   b. The new DESIGO software shall include (2) concurrent user licenses.

   c. The existing INSIGHT database shall be converted to new DESIGO formats

   d. All existing system Trends, Reports and User Accounts shall be recreated within the DESIGO format.

   e. Provide field panel firmware updates for (10) control panels with out-of-date firmware

   f. Siemens shall furnish a new BAS server, 40”+ monitor, keyboard, mouse, exceeding the minimum recommendations of performance for DESIGO

      1) Install and configure DESIGO on the new server

   g. Install converted Nanuet database on the new DESIGO server

   h. Install new DESIGO server in Facilities office and integrate it into the Siemens BAS network

3. The software upgrade shall include new Desigo graphics including:

   a. Floorplans for each School – indicating approximate locations of HVAC Temperature control zone (Unit ventilator, FCU, VAV, UH, AHU, etc.)

b. Representation of each school's AHUs and Rooftop Units integrated to the Siemens system or controlled by the Siemens BAS

c. Representation of the Heating Water systems, Pumps, variable refrigerant volume heat pump systems, Boilers and air-conditioning systems

d. Dashboard graphic of each schools' exhaust fans, including a graphic of each building's roof plan with all rooftop equipment shown.

e. Dashboard graphics to depict a summary of important HVAC system information

f. Up to (80) new graphics shall be included as part of the upgrade

g. The contractor shall consult with Nanuet representatives and obtain agreement on Graphics format and content

4. Provide and Install all new graphics on DESIGO server

5. Verify operation of all new DESIGO graphics

6. The contractor shall include tuition for (2) multi-day training classes for up to (1) student per class delivered a Siemens Training Center.

7. The entire system shall be computer driven and shall employ Direct Digital Control (DDC) processes for energy management, equipment monitoring and control, utilizing open communications capabilities as herein specified.

8. The Building Automation System (BAS) manufacturer's local corporate branch office shall furnish and install a fully integrated building automation system, incorporating direct digital control (DDC) for energy management, equipment monitoring and control, and subsystems with open communications capabilities as herein specified. To ensure the highest quality of long-term service, the use of an independent distributor, non-corporate branch office is not permissible.

9. Actuators for valves and dampers shall be electric.

10. Analog Outputs: All analog outputs referenced in the specifications or on the drawings shall be true modulating control signals activating devices with spring return features so that the end device fails into the normal position as described or indicated. Floating point type control accomplished by power-open and power-close signals using multiple digital outputs or pulse width modulation shall not be acceptable except for devices in which the sequences or the drawings specifically identify floating point operation. All devices indicated with normally open (NO) or normally closed (NC) positions shall feature spring return to the normal position upon loss of power or failure of signal.

11. Provide operator training to the Nanuet Union Free School District as described in Section 3.

12. Provide installation and calibration, supervision, adjustments, and fine tuning necessary for complete and fully operational system.

1.2 DDC SYSTEM DESCRIPTION

A. The entire Energy Management and Control System (EMCS) shall be comprised of a network of interoperable, stand-alone digital controllers communicating on an open protocol communication network. All information from the EMCS shall be available to local computers within the building via local Intranet and to remote computers or from multiple facilities via the Internet. The EMCS shall be capable of communicating to third party systems such as HVAC, lighting, energy metering, power management, clock displays, security, access control, fire-life safety systems and other building management related devices with open, interoperable communication capabilities.

B. All labor, material, equipment and software not specifically referred to herein or on the plans, that are required to meet the functional intent of this specification, shall be provided without additional cost to the Owner.

C. The intent of this specification is to provide open protocol field mounted Direct Digital controls. Open protocol, fully programmable, DDC controllers for each piece of mechanical equipment being controlled are mandatory. Controls that are “packaged” and supplied by the manufacturer are not acceptable. All systems as described in the sequence of operation shall be shown via dynamic Web based graphics with all pertinent system alarms for proper operation and maintenance.

D. Provide DDC controllers and all required field devices, sensors, and actuators, as specified herein, required for a complete and operating extension to the existing Apogee DDC System for the following equipment:

1. Integration to Unit Ventilator and Blower Coil Variable Refrigerant Volume (VRV) manufacturers furnished BACnet MS/TP compatible controls

2. Integration to kitchen grease hoood controls

3. Controls for VAV terminal units, heating coils, hydronic radiators/convectors, fan coil units, blower coil systems, air cooled condensing units, VRV heat pump systems, exhaust fans, unit ventilators

4. Representative Siemens zone temperature sensors as shown on the drawings

5. Integration into existing Insight Graphical Operators Workstation

E. To ensure installation of a product of the highest quality, the BAS manufacturer must be UL registered and ISO 9001:2000 registered under Automatic Controls for Regulating Commercial Environments and Appliances for The Design and Manufacture of Environmental Controls and Energy Management Products and ISO 14001:1996 Registered as an Energy Management System. Proof of ISO 9001:2000 and ISO 14001:1996 registration must be submitted prior to bid. Quality Management System Manual detailing the BAS manufacturer’s ISO registered Quality Management System must be submitted with the manufacturer’s submittal.

F. The installation of the control system shall be performed by the controls manufacturer’s corporate branch office with the shop drawings, flow diagrams, bill of materials,

component designation or identification number and sequence of operation all bearing the name of the manufacturer.

G. All materials and equipment used shall be standard components, regularly manufactured for this and/or other systems and not custom designed specially for this project. All systems and components shall have been thoroughly tested and proven in actual use for at least two years.

H. BAS manufacturer shall be responsible for all BAS and Temperature Control wiring for a complete and operable system. All wiring shall be done in accordance with all local and national codes. Systems shall be complete in all respects including thermostats, valves, dampers, relays, wiring, conduit, etc. to provide the functions described, regardless of whether or not thermostats, relays, etc., are specifically mentioned.

I. System Architecture:

1. Provide a twisted pair for DDC system communication with BACNet protocol between intelligent devices and controllers. All communications wiring shall be plenum rated.

2. Provide programming for graphical display of all contract control systems on the new DESIGO head end system.

1.3 CONTROL DIAGRAMS AND POINT SCHEDULES

A. The performance sequences described are provided to supplement the temperature control diagrams and point schedules as shown on the contract drawings. Where individual points are described in the diagrams and/or point schedules but are not required to meet the sequences specified, the points shall be included in the system as indicated on the drawings. All points shown on the drawings shall be provided whether or not they are required for the sequences. Additionally, provide all points which are required to meet the specified sequences, whether or not they are specifically identified on either the diagrams or the point schedules. The diagrams and point schedules are provided to enhance document clarity, and are not to be utilized to limit the hardware utilized in engineering the temperature control.

1.4 MANUFACTURER'S RECOMMENDATIONS

A. Where this specification does not describe installation procedures, or other equipment required to be in accordance with the recommendations of the manufacturer of the control system, provide those procedures and equipment without additional cost to the Owner as if it was explicitly specified in this contract. The contractor shall provide a complete and operable system which meets the recommendations of the equipment manufacturers.

1.5 REFERENCES

A. NFPA 70 - National Electrical Code; National Fire Protection Association; 2005.

B. UL-916 Energy Management Systems

C. ULC, UL Canadian Standards Association

D. FCC, Part 15, Subpart J, Class A Computing Devices

1.6 SUBMITTALS

A. Product Data: Provide data for each system component and software module.

B. Shop Drawings:

1. Indicate trunk cable schematic showing programmable control unit locations, and trunk data conductors.

2. List connected data points, including connected control unit and input device.

3. Indicate system graphics indicating monitored systems, data (connected and calculated) point addresses, and operator notations.

4. Show system configuration with peripheral devices, batteries, power supplies, diagrams, modems, and interconnections.

5. Indicate description and sequence of operation of operating, user, and application software.

6. Provide a complete point schedule demonstrating compliance with the point schedules included in the contract documents. Schedule format shall be such as to easily confirm that all the scheduled points are being provided.

7. Provide a copy of all proposed system graphics.

8. Schematics, sequences and flow diagrams.

9. Revised BAS architecture diagram indicating the new equipment.

10. Equipment data cut sheets

11. System schematics, including:

a. sequence of operations

b. point names

c. point addresses

d. interface wiring diagrams

e. panel layouts

f. system riser diagrams

12. Points schedule for each real point in the BAS, including: Tag, Point Type, System Name and Display Units.

13. Samples of Graphic Display screen types and associated menu penetrations to show hierarchy and functional interrelationships.

14. Detailed Bill of Material list for each Node, identifying quantity, part number, description, and optional features.

15. Control Damper Schedule including a separate line for each damper and a column for each of the damper attributes, including: Code Number, Fail Position, Damper Type, Damper Operator, Blade Type, Bearing Type, Seals, Duct Size, Damper Size, Mounting, and Actuator Type.

16. Control Valve Schedules including a separate line for each valve and a column for each of the valve attributes: Code Number, Configuration, Fail Position, Pipe Size, Valve Size, Body Configuration, Close off Pressure, Capacity, Valve CV, Calculated CV, Design Pressure, Actual Pressure, and Actuator Type.

17. Room schedue including a separate line for each unit ventilator indicating maximum airflow, minimum ventilation rate, and heating coil flow rate (where scheduled).

18. Room schedule including a separate line for each variable air volume terminal unit indicating maximum airflow, minimum airflow, minimum ventilation rate, and heating coil flow rate.

19. Details of all BAS interfaces and connections to the work of other trades.

20. Product data sheets for all products including software.

21. Training provided, including outlines for each session.

C. Manufacturer's Instructions: Indicate manufacturer's installation instructions for all manufactured components.

D. Project Record Documents: Record actual locations of control components, including control units, thermostats, and sensors.

1. Revise shop drawings to reflect actual installation and operating sequences.

2. Include submittals data in final "Record Documents" form.

E. Operation and Maintenance Data:

1. Include interconnection wiring diagrams complete field installed systems with identified and numbered, system components and devices.

2. Include keyboard illustrations and step-by-step procedures indexed for each operator function.

3. Include inspection period, cleaning methods, cleaning materials recommended, and calibration tolerances.

1.7 QUALITY ASSURANCE

A. Single Source Responsibility: The contractor shall be fully responsible for the proper operation of all control systems, including, but not limited to sensors and controls, and

peripheral devices. After the installation, the contractor shall be responsible for the calibration of the system. The control system manufacturer shall be fully responsible for providing and loading the specified software packages, to include the loading of all necessary operational parameters. Any debugging of software problems shall be performed solely by the control system manufacturer.

B. Electrical Work and Safety Requirements:

1. Electrical work shall be in strict accordance with applicable NFPA, ANSI and UL requirements. Fully enclose or properly guard electrical wiring, terminal blocks and other high voltage contacts and mark to prevent accidental injury to personnel.

2. All wiring associated with and required by the control system (including power circuits as indicated on the drawings) shall be the responsibility of the contractor.

3. Comply with all the latest federal, state and local rules, regulations, ordinances having jurisdiction over this work, including OSHA requirements. These codes and standards shall supersede the specifications and drawings. All work under this contract shall be in accordance with the latest editions of the National Electrical Code (NEC) and the electric codes in the locale in which the work is being performed.

4. The term "wiring" shall be construed to include furnishing of wire, conduit, miscellaneous materials and labor as required for mounting and connecting electrical control devices, and providing electrical interlocks between equipment. Low voltage sensor wiring shall be installed per NEC and local codes.

C. Perform work in accordance with NFPA 70 and NFPA 90A.

D. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

E. The BAS system components shall match existing system components.

F. The BAS system shall be designed and installed, commissioned and serviced by manufacturer employed, factory trained personnel. Manufacturer shall have an in-place support facility within 30 miles of the site with technical staff, spare parts inventory and necessary test and diagnostic equipment. Distributors or licensed installing contractors are not acceptable.

G. The manufacturer shall provide on site, experienced project manager for this work, responsible for direct supervision of the design, installation, start up and commissioning of the B.M.S.

H. Materials and equipment shall be the catalogued products of manufacturers regularly engaged in production and installation of automatic temperature control systems and shall be manufacturer's latest standard design that complies with the specification requirements.

I. All BAS peer-to-peer network controllers, central system controllers and local user displays shall be UL Listed under Standard UL 916, category PAZX; Standard ULC C100, category UUKL7; and under Standard UL 864, categories UUKL, UDTZ, and QVAX. and be so listed at the time of bid. All floor level controllers shall comply, at a minimum, with UL Standard UL 91 6category PAZX; Standard UL 864, categories UDTZ, and QVAX. and be so listed at the time of Bid.

J. DDC peer-to-peer controllers shall be compliant with the European EMC Directive, Standards EN 50081-2 and EN 50082-2, at the Industrial Levels. Additionally the equipment shall be compliant with the European LVD Directive and bear the CE mark in order to show compliance to both Directives.

K. All electronic equipment shall conform to the requirements of FCC Regulation, Part 15, Governing Radio Frequency Electromagnetic Interference and be so labeled.

L. The manufacturer of the building automation system shall provide documentation supporting compliance with ISO-9002 (Model for Quality Assurance in Production, Installation, and Servicing) and ISO-140001 (The application of well-accepted business management principles to the environment). The intent of this specification requirement is to ensure that the products from the manufacturer are delivered through a Quality System and Framework that will assure consistency in the products delivered for this project.

M. This system shall have a documented history of compatibility by design for a minimum of 15 years. Future compatibility shall be supported for no less than 10 years. Compatibility shall be defined as the ability to upgrade existing field panels to current level of technology, and extend new field panels on a previously installed network.

N. Compatibility shall be defined as the ability for any existing field panel microprocessor to be connected and directly communicate with new field panels without bridges, routers or protocol converters.

1.8 SYSTEM PERFORMANCE

A. Performance Standards. System shall conform to the following minimum standards over network connections. Systems shall be tested using manufacturer's recommended hardware and software for operator workstation (server and browser for web-based systems).

1. Graphic Display. A graphic with 20 dynamic points shall display with current data within 10 sec.

2. Graphic Refresh. A graphic with 20 dynamic points shall update with current data within 8 sec. and shall automatically refresh every 15 sec.

3. Multiple Alarm Annunciations. Each workstation on the network shall receive alarms within 5 sec of other workstations.

B. Coordination:

1. Coordinate location of temperature sensors, humidity sensors and other exposed control sensors with plans and room details before installation.

2. Coordinate installation of control dampers, taps, control valves, airflow stations, etc. with the mechanical contractor.

3. Coordinate BMS equipment with all relevant divisions including, but not limited to, Fire Alarm to achieve compatibility with equipment that interfaces with that system.

4. Coordinate BMS equipment to achieve compatibility with motor starters and annunciation devices.

5. Coordinate IP drops, network connections, user interfaces, firewall, etc. with Owner's IT representative.

6. Coordinate routing of network communication cabling with associated trades.

    a. Coordinate routing of network communication cabling with associated trades.

7. Controller shall support BACnet MS/TP or BACnet/IP.

C. The Application Specific Controller shall provide for control of each piece of equipment, including, but not limited to the following:

1. Variable Air volume (VAV)

2. Hot water and electric reheat Coils (RH)

3. Fan Coil Units (FCU)

4. Unit Ventilators

5. Heated ceiling panels

6. DX cooling coils

D. Each Application Specific Controller shall, at a minimum, be provided with:

1. Appropriate NEMA rated enclosure

2. Power supplies as required for all associated modules, sensors, actuators, etc.

3. Each controller measuring air volume shall include a differential pressure transducer

4. Approvals and standards: UL916 PAZX; CUL; FCC

E. Each Application Specific Controller shall continuously perform self-diagnostics on all hardware and secondary network communications. The Application Specific Controller shall provide both local and remote annunciation of any detected component failures or repeated failure to establish communication to the system.

F. Power Supply. The Application Specific controller shall be powered from a 24 VAC source and shall function normally under an operating range of -15% / +20%.

G. All controller configuration settings and programs shall be stored in non volatile memory. The controllers shall be able to return to full normal operation without user intervention after a power failure of unlimited duration.

H. Environment. The controllers shall function normally under ambient conditions of 23 to 122°F (-5 to 50°C) and 5% to 95% RH (non-condensing). Provide each controller with a suitable cover or enclosure to protect the circuit board assembly.

1.9 ALARM PROCESSING

A. Alarms shall be classified by their alarm type. The facility shall be provided for enabling and disabling each individual alarm on the system.

B. Once generated, the alarm shall be processed by its associated alarm type as defined in the I/O Point Schedules. The alarm types shall be as follows:

1. General Mismatch
2. Critical Mismatch
3. General Binary
4. Critical Binary
5. General Analog
6. Critical Analog
7. Alarm Inhibition

C. Consequential alarm suppression algorithms shall be provided to limit the alarms annunciated on the DDC System to those associated with the source of the initial alarm condition e.g. fire alarms shall not initiate mismatch alarms, restoration of power following a power failure shall not initiate mismatch alarms etc.

1.10 CONFIGURATION

A. Configuration data shall be stored in the DDC Controllers or the Terminal Unit Controllers. Configuration data shall include but not be limited to the following:

1. The unit applicable (deg F, GPM’s, inches, etc.).
2. The point identifier (minimum of 12 characters).
3. The point alarm message if applicable (minimum of 80 characters).
4. The point descriptor (minimum of 32 characters).

1.11 DDC STANDARD PROGRAMS

A. The device schedules included in this Specification provide details of inputs monitored and outputs controlled by the DDC System. All point types are described under Controllers elsewhere in this Specification. The DDC System shall allow for the following point functionality and standard programs to be available:

1. Point Override
2. Manual Start/Stop
3. Fixed Time Program
4. Optimum Start/Stop
5. Control Loops
6. Rotational Point
7. Run Time Totalization
8. KWH calculations
9. Anti-Short Cycling
10. Staggered Start
11. User Definable Software
12. General Control Requirements

1.12 INTEGRATIONS

A. The BMS shall utilize and be compatible with industry-standard integration protocols (BACnet and Modbus) for subsystem integration. Coordinate integration protocols with subsystem manufacturer.

B. In addition to the above, the BMS shall be integrated with all pump and fan VFDs via BACnet MS/TP or IP. All up to (20) software points shall be made available at the BMS for monitoring.

1.13 DELIVERY, STORAGE AND HANDLING

A. Provide factory-shipping cartons for each piece of equipment and control device. Maintain cartons through shipping, storage, and handling as required to prevent equipment damage. Store equipment and materials inside and protected from weather.

1.14 WARRANTY

A. Warranty the direct digital control system to be free from defects in workmanship and material for a period of one (1) year from completion of final commissioning. Warranty

shall cover all costs for parts, labor, associated travel, and expenses for a period of twelve (12) months from completion of system demonstration.

B. Hardware and software personnel supporting this warranty agreement shall provide on-site or off-site service in a timely manner after failure notification to the vendor. The maximum acceptable response time to provide this service at the site shall be twenty-four (24) hours.

1.15 SPECIFICATION NOMENCLATURE

A. Acronyms used in this specification are as follows:

1. BAS Building Automation System
2. EMCS Energy Management and Control System
3. DDC Direct Digital Control
4. NAC Network Area Controller
5. IBCI nteroperable BACNet Controller
6. ASC Application Specific Controller
7. FUI Full User Interface
8. BUI Browser User Interface
9. POT Portable Operator’s Terminal
10. PMI Power Measurement Interface
11. LAN Local Area Network
12. WAN Wide Area Network
13. OOT Object Oriented Technology
14. PICS Product Interoperability Compliance Statement

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. The BMS shall be an extension of the existing Siemens BAS. The existing Siemens INSIGHT operator software shall be upgraded to DESIGO as part of this project.

B. Basis of Design

1. Siemens Desigo CC
    a. Siemens Industry, Inc., local NY/NJ Factory Branch Office
    b. Contact: Bert Vecchiarelli

1) Email: bert.vecchiarelli@siemens.com

2) Phone: (201) 454-3842

2.2 MATERIALS

A. All products used in this project installation shall be new and currently manufactured and shall have been applied in similar installations. Do not use this installation as a product test site unless explicitly approved in writing by Owner or Owner's representative. Spare parts shall be available for at least five years after completion of this contract.

2.3 DDC CONTROLLER FLOOR LEVEL NETWORK

A. This level communication shall support a family of application specific controllers and shall communicate with the peer to peer network through DDC Controllers for transmission of global data.

2.4 TIE-IN TO EXISTING SIEMENS BMS

A. Provide a SEAMLESS tie-in to the existing Siemens BMS. The tie-in shall include Direct Digital Control (DDC), historical data collection, archiving and alarm, energy and information management for all control points specified herein.

B. Tie-in to existing site BMS of all DDC equipment and points as specified in this section and as required in all other referenced sections and as required to complete the sequences of operation outlined herein. Tie-in shall be made via an extension of the existing BMS.

C. Provide new color graphics for all new systems specified in this contract.

D. Revisions to all existing BMS workstations as required to incorporate the additional control components provided under this section. Revisions shall include, but are not limited to, revised graphics, update of additional firmware and/or software as required to accommodate new points.

2.5 SYSTEM FUNCTIONS AND PERFORMANCE

A. The BMS shall be capable of accepting inputs (analog, digital, pulsed digital, thermistor, and RTD) from field devices, and of producing analog and digital outputs (4 - 20 mA DC, pulse width modulation, and 0-10 VDC) for control and monitoring functions in order to:

1. Adjust control parameters for process-controlled variables.

2. Initiate, define and acknowledge audible alarms.

3. Start/stop motors and position valves and dampers.

4. Initiate shutdowns due to activation of safety devices.

5. Communicate with the servers and workstations.

2.6 SYSTEM ARCHITECTURE

A. The system architecture shall consist of a network of independent, standalone BACnet IP, BACnet MS/TP or Siemens P2/P1 based primary and unitary controllers. Each controller shall perform all specified control and monitoring functions independently. Failure of one (1) control unit shall have no effect upon any other unit in the network.

B. The system architecture shall be based on a modular PC network, utilizing industry standard operating systems, networks and protocols.

C. The system shall allow the distribution of system functions such as monitoring and control and graphical user interface etc. across the network to achieve maximum flexibility and performance.

D. Data communications protocol shall be BACnet and shall comply with ASHRAE 135.

E. Each DDC, unitary controller, server, and workstation shall communicate via TCP/IP or Siemens P1/P2.

F. Use fiber optic cabling for all Ethernet runs longer than 300 ft.

2.7 BUILDING AUTOMATION SYSTEM NETWORK - UTILIZE EXISTING SIEMENS BAS NETWORK.

A. The design of the BMS shall network the BMS server, operator workstations, primary control panels and secondary control panels. The network architecture shall consist of multiple network levels. Provide a peer-to-peer Primary Network to connect the existing server, operator workstation(s) and all primary control panels in the building for global system operation. Provide secondary networks to connect from each primary control panel to the secondary control panels of associated terminal equipment.

B. All networked control products provided for this project shall be comprised of an industry standard open protocol internetwork. Communication involving control components (i.e. all types of controllers and operator interfaces) shall conform to the ASHRAE 135 - BACnet standard. Networks and protocols proprietary to one company or distributed by one company are prohibited.

C. Controllers and software shall be BTL listed at the time of installation.

D. Primary control panels may be connected to the primary network via routers if this follows the standard architecture of a specified manufacturer. Provide additional controllers if required according to manufacturer’s standard architecture layout to achieve network functionality. Quantity and locations of routers, network controllers, and supervisory controllers to be coordinated with Engineer.

E. Access to system data shall not be restricted by the hardware configuration of the BMS. The hardware configuration of the BMS network shall be totally transparent to the user when accessing data or developing control programs.

F. The BMS design shall allow the co-existence of current and future primary control panels and personal computer operator workstations on the same primary network.

G. The BMS contractor shall provide new supervisory controllers/routers as required to connect to all new controllers being installed as part of this project, while still keeping with all requirements such as spare capacity requirements, etc.

2.8 OPERATOR SERVER/WORKSTATION HARDWARE – THE EXISTING SIEMENS INSIGHT OPERATOR SOFTWARE SHALL BE UPGRADED TO DESIGO AS PART OF THIS PROJECT. WORK INCLUDES A NEW SERVER AND OPERATOR WORKSTATION.

A. Provide one (1) new Server and (1) new operator workstation. Operator workstation shall be located as directed by the construction manager.

B. Workstation shall be provided for command entry, information management, network alarm management and database management functions. All real time control functions shall be resident in the DDC Controllers to facilitate greater fault tolerance and reliability.

C. Each server/workstation shall consist of the following, at a minimum:

1. Minimum sixteen (16) GB RAM

2. One (1) 500 GB SSD

3. Processor shall have a minimum speed of 3.0 GHz with no less than 4 cores

4. Mouse and 101-key enhanced keyboard.

D. Provide a monitor of flat panel type and shall support a minimum display resolution of no less than 1920 x 1080 pixels. The display shall have a minimum of 27-inch visible area in diagonal measurement. Separate controls shall be provided for color, contrasts and brightness. The screen shall be non-reflective.

E. Locate the Operator Workstations in a clean, secure, dry and temperature-controlled environment

F. Provide software licenses for interfacing to the BAS. Load software, configure and setup for viewing the BAS system.

G. Provide the PC with an operating system, such as Windows 10 Pro or other operating systems compatible with the BAS software.

H. Software: Provide the following application software licenses, preloaded on the workstation for the Owner: MS Office Professional, Internet Explorer or equal browser, MS Outlook, Acrobat Reader, CAD Viewer, Antivirus. Set up an icon on the desktop to take the Owner directly to the BAS system login page.

2.9 BUILDING MANAGEMENT SYSTEM SOFTWARE – DESIGO CC

A. General - The parameters of the DESIGO software implementation will mirror the configuration parameters of the existing INSIGHT software.

B. Provide software which includes the following capabilities. The parameters of the DESIGO software implementation will mirror the configuration parameters of the existing INSIGHT software.

1. Scheduling and override of building operations.

2. Collection and analysis of historical data.

3. Editing, programming, storage and downloading of controller databases, programs and parameters.

4. The latest version Microsoft Windows environment that allows the user to run several applications simultaneously. Other Windows applications shall run simultaneously with the BMS software including, but not limited to, Word, Excel, Access, etc.

5. Provide a user interface that shall minimize the use of a typewriter style keyboard through the use of a mouse or similar pointing device and "point and click" approach to menu selection.

6. The operator shall be able to drag and drop information between applications (e.g., click on a point in the alarm screen and drag it into the dynamic trend graph screen to initiate a dynamic trend).

7. Operator specific password access protection shall allow the user to limit workstation control, display and data base manipulation capabilities for each object in the system. An object shall be defined as any input or output point, setpoint, system program, etc. The operator privileges shall “follow” the operator to any workstation or primary control panel that the operator logs on to. Provide a minimum of 1000 passwords.

8. Operators will be able to perform only those commands on the objects available based on their respective passwords. Menu selections displayed shall be limited to only those items defined for the access level of the password used to log-on.

9. An audit trail report to track system object changes that shall record operator-initiated actions. These actions shall include, but not be limited to, changes made by a particular person, changes made to a specific piece of equipment and/or changes made during a designated time frame. The changes shall be printed and archived for future reference either on command or automatically, at the operator’s option. The operator activity tracking data shall be stored in a tamper proof buffer.

10. Software shall allow the operator to perform commands including, but not limited to:

    a. Start up and shutdown of equipment.

    b. Setpoint adjustment.

    c. Add/modify/delete time programming.

d. Enable/disable process execution.

e. Lock/unlock alarm reporting.

f. Enable/disable totalization and/or trending.

g. Override PID loop setpoints.

h. Enter temporary override schedules.

i. Define holiday schedules.

j. Change time/date.

k. Automatic daylight savings time adjustments.

l. Enter/modify analog warning and alarm limits.

C. Reporting. Reports in DESIGO will mirror the existing INSIGHT reports.

1. Reports shall be generated and directed to displays, printers or disk. As a minimum, the system shall allow the user to easily obtain the following types of reports:

a. A general listing of all points in the network.

b. List of all points currently in alarm.

c. List of all points currently in override status.

d. List of all disabled points.

e. List of all points currently locked out.

f. DDC Controller trend overflow warning.

g. List all weekly schedules.

D. Scheduling. Scheduling in DESIGO will mirror the existing INSIGHT schedules.

1. Provide a graphical spreadsheet-type format for simplification of time-of-day scheduling and overrides of building operations. Provide schedules for 365 days in advance.

2. Weekly schedules shall be provided for each building zone or piece of equipment with a specific occupancy schedule. Temporary overrides and associated times may be inserted into blocks for modified operating schedules. After overrides have been executed, the original schedule will automatically be restored.

3. Zone schedules shall be provided for each building zone as previously described. Each schedule shall include all points that can be commanded residing within the zone. Each point may have a unique schedule of operation relative to the zone's occupancy schedule, allowing for sequential starting and control of equipment

within the zone. Scheduling and rescheduling of points may be accomplished easily via the zone schedule graphic.

E. Password. New user passwords and access levels will need to be established.

1. Multiple-level password access protection shall be provided to allow the user/manager to limit workstation control, display, and database manipulation capabilities as he or she deems appropriate for each user, based on an assigned password.

2. Each user shall have the following: a user name (12 characters minimum); a password (12 characters minimum), and an access level (from 1 - 5).The system shall allow each user to change his or her password at will.

3. When entering or editing passwords, the system shall not echo the actual characters for display on the monitor.

4. A minimum of five levels of access shall be supported as follows.

a. Level 1 = Data Access and Display

b. Level 2 = Level 1 and Operator Overrides

c. Level 3 = Level 2 and Database Modification

d. Level 4 = Level 3 and Database Generation

e. Level 5 = All privileges, including Password Add/Modify

5. A minimum of 100 unique passwords, including user initials, shall be supported.

6. Operators shall be able to perform only those commands available for their respective passwords. Display of menu selections shall be limited to only those items defined for the access level of the password used to log-on.

7. The system shall automatically generate a report of log-on/log-off and system activity for each user. Any action that results in a change in the operation or configuration of the control system shall be recorded, including: modification of point values, schedules or history collection parameters, and all changes to the alarm management system, including the acknowledgment and deletion of alarms.

8. User-definable, automatic log-off timers of from 1 to 60 minutes shall be provided to prevent operators from inadvertently leaving the operator workstation logged on.

F. Collection and Analysis of Historical Data. Trend collection in DESIGO will mirror the existing INSIGHT trend schedules.

1. Provide trending capabilities that allow the user to easily monitor and preserve records of system activity over an extended period of time. Any system point may be trended automatically at time-based intervals or changes of value, both of

which shall be user-definable. Trend data shall be stored on hard disk for future diagnostics and reporting.

2. Trend data report graphics shall be provided to allow the user to view all trended point data. Reports may be customized to include individual points or pre-defined groups of at least 6 points. Provide additional functionality to allow any trended data to be transferred directly to an off-the-shelf spreadsheet package such as Excel. This shall allow the user to perform custom calculations such as energy usage, equipment efficiency and energy costs and shall allow for generation of these reports on high-quality plots, graphs and charts.

3. Provide additional functionality that allows the user to view trended data on trend graph displays. Displays shall be actual plots of both historical and/or real-time dynamic point data. A minimum of 10 points shall be viewed simultaneously on a single graph. The user may pause the graph and take "snapshots" of screens to be stored on the hard disk for future recall and analysis. Displays shall include an 'X' axis indicating elapsed time and a 'Y' axis indicating a range scale in engineering units for each point. The 'Y' axis shall have the ability to be manually or automatically scaled at the user's option. Different ranges for each point may be used with minimum and maximum values listed at the bottom and top of the 'Y' axis. All 'Y' axis data shall be color-coded to match the line color for the corresponding point.

4. Static graphs shall represent actual point data that has been trended and stored on disk. Exact point values may be viewed on a data window by pointing or scrolling to the place of interest along the graph. Provide capability to print any graph on the system printer for use as a building management and diagnostics tool.

5. Dynamic graphs shall represent real-time point data. Any point or group of points may be graphed, regardless of whether they have been predefined for trending. The graphs shall continuously update point values. At any time the user may redefine sampling times or range scales for any point. In addition, the user may pause the graph and take "snapshots" of screens to be stored on the workstation disk for future recall and analysis. As with static graphs, exact point values may be viewed and the graphs may be printed.

G. Dynamic Color Graphic Displays. The Existing INSIGHT graphics will be used as a template when creating the new DESIGO graphics. Approximately (80) system graphics are included. In addition - each terminal unit with a networked Siemens controller (Unit vent, fan-coil unit, etc.) shall have a dedicated graphic.

1. All workstation(s) shall be provided with color graphics. All workstation(s) software shall include a graphical viewing and control environment and definition and construction of dynamic color graphic displays.

2. Provide system color graphics for each HVAC system and for each electrical, plumbing and/or piping system that is monitored and/or controlled by the BMS. Provide scaled floor plans indicating equipment location, service and system data as required.

3. Provide color graphic floor plan displays and system schematics for each piece of mechanical equipment, including but not limited to air handling units, and hot water systems to optimize system performance analysis and speed alarm recognition.

4. The operator interface shall allow users to access the various system schematics and floor plans via a graphical penetration scheme, menu selection or text-based commands.

5. Dynamic temperature values, humidity values, flow values and status indication shall be shown in their actual respective locations and shall automatically update to represent current conditions without operator intervention.

6. The windowing environment of the PC operator workstation(s) shall allow the user to simultaneously view several graphics at a time to analyze total building operation or to allow the display of a graphic associated with an alarm to be viewed without interrupting work in progress.

7. Graphic generation software shall be provided to allow the user to add, modify, or delete system graphic displays via an off the shelf graphics package.

8. Provide libraries of pre-engineered screens and symbols depicting standard air handling unit components (e.g., fans, cooling coils, filters, dampers, etc.), complete mechanical systems (e.g., constant volume-terminal reheat, VAV, etc.) and electrical symbols.

9. Graphical displays can be created to represent any logical grouping of system points or calculated data based upon building function, mechanical system, building layout, or any other logical grouping of points that aids the operator in the analysis of the facility.

10. Graphical displays shall contain animation to assist the operator in determining status of the equipment being displayed (e.g., a fan that is energized shall rotate).

11. Provide an automatically updated, dynamic display of the site-specific BMS architecture indicating the status of primary and secondary controllers, PC workstation(s) and networks.

12. Provide a separate dynamic display page of each HVAC (AHU, RTU, heat pump, unit ventilator, blower coil, etc.), electrical and/or plumbing system connected to the BMS.

13. Provide a separate dynamic display page of each piece of terminal equipment (VAV box, fan coil unit, etc.) connected to the BMS.

14. Provide a separate dynamic display page for each floor, roof and zone of each building within the school district. At a minimum, each page shall display the associated space temperature readings and links to equipment located on the floor or in the zone.

15. Graphics shall incorporate all system integration points communicated via hardware or software gateways and/or interfaces. Origin of information shall be transparent to the operator and shall be controlled, displayed, trended, etc. as if the points were hardwired to the BMS.

H. System Configuration and Definition

1. All temperature and equipment control strategies and energy management routines shall be definable by the operator. System definition and modification procedures shall not interfere with normal system operation and control.

2. The system shall be provided complete with all equipment and documentation necessary to allow an operator to independently add, delete or modify any system object including primary control panel(s), operator workstations(s), secondary control panels, reporting definitions, control loops, energy management applications, time and calendar-based programming, totalization, historical data trending, custom control processes, graphic displays, operator passwords, alarm messages, etc.

3. Definition of operator device characteristics for individual points, applications and control sequences shall be performed using instructive prompting software.

4. Programming shall be performed with the BMS system online and shall not interfere with BMS system operation.

5. Inputs and outputs for any process shall not be restricted to a single primary control panel, but shall be able to include data from any and all other network panels to allow the development of network-wide control strategies. Processes shall also allow the operator to use the results of 1 process as the input to any number of other processes (cascading).

6. Provide the capability to backup and store all system databases on the workstation hard disk. In addition, all database changes shall be performed while the workstation(s) are on-line without disrupting other system operations. Changes shall be automatically recorded and downloaded to the appropriate primary control panel. Similarly, changes made at the primary control panels shall be automatically uploaded to the workstation, ensuring system continuity. The user shall also have the option to selectively download changes as desired.

7. Provide context-sensitive help menus to provide instructions appropriate with operations and applications currently being performed.

I. External Data Access

1. The software shall provide the ability to expose configuration properties and real-time values through CSV files, OPC DA, OPC UA, or REST-based Web Services.

2. The software shall provide the ability for external applications to change configuration and real-time values through OPC DA, OPC UA, or REST-based Web Services.

3. The software shall provide the ability for external applications to access historical Trend data through CSV files or REST-based Web Services.

4. External data access must be secured using the level of permissions configured for users and operator workstations.

5. Web service interfaces must allow for exchanging data (object's values, events and trend series) between workstation and external applications such as facility management systems, enterprise applications, mobile applications or other value-added services.

6. Documentation describing web services interfaces must be included to allow external developers to write applications that leverage the data exchange.

J. Data Security

1. The BAS software must allow that all communication paths between clients and the server are encrypted and protected against replay attacks as well as data manipulation.

2. Any runtime data transfer between the system server and Web Server (IIS) must be allowed to be encrypted by Desigo CC.

3. Communication between any Web Server (IIS) and the Web Clients must be allowed to be encrypted.

4. Passwords must be handled with encrypted storage and transmission

5. The software must support the use of public domain algorithms for cryptographic functions, including AES, DiffieHellmann, RSA, and SHA-2. No self-coded algorithms shall be allowed.

6. All symmetrical encryption must use 256 bit AES or stronger.

7. All asymmetrical encryption must use 2048 bit or stronger.

8. The software must support the use of commercial certificates for securing client-server communications.

9. The software must support the use of self-signed certificates to allow local deployments without the overhead of obtaining commercial certificates.

10. When using self-signed certificates, the owner of the Desigo CC system is responsible for maintaining their validity status, and for manually adding them to and removing them from the list of trusted certificates.

11. The BAS software shall be compatible with the following Virus Scanners:

    a. Kaspersky

    b. Avira

    c. McAfee

d. Bitdefender

e. TrendMicro Office Scan

2.10 BUILDING CONTROLLER HARDWARE (B-BC)

A. If available, existing P2/P1 or BACnet building controllers may be utilized. For new controllers, utilize the below specification requirements.

B. Provide all necessary hardware for a complete operating system as required. The Building Controller shall be able to operate as a standalone panel and shall not be dependent upon any higher-level computer or another controller for operation.

C. Basis of Design: Siemens PXC Series.

D. This controller shall have the BTL listing and meet the BACnet device profile of a Building Controller (B-BC).

1. Controller shall support BACnet MS/TP and BACnet/IP.

E. This level of controller shall be used for the following types of systems:

1. Hot water systems.

2. Air handling units.

3. Rooftop Unit systems.

4. Heat Pump systems.

F. Computing power and memory minimum:

1. A stand-alone, multi-tasking, multi-user, real-time 1.2GHz digital control microprocessor module.

2. Inputs shall be 16-bit minimum analog-to-digital resolution

3. Outputs shall be 10-bit minimum digital-to-analog resolution

4. Memory module (2GB, minimum) to accommodate all Primary Control Panel software requirements, including but not limited to, its own operating system and databases (see Controllers Software section), including control processes, energy management applications, alarm management applications, historical/trend data for points specified, maintenance support applications, custom processes, operator I/O, dial-up communications.

5. Real time clock and battery

6. Data collection/ Data Trend module sized for 10,000 data samples.

7. Flash Memory Firmware: Each Building Level Control Panel shall support firmware upgrades without the need to replace hardware.

G. Communication

1. 2-Port Ethernet switch cabling compatible with star, bus or daisy chain topology.
2. WLAN connection for service, commissioning and firmware upgrade.
3. Web user interface is accessible over HTTP or securely over HTTPS.
4. Individual 3rd Ethernet port for local service/tools connection.

H. Input and Output Points Hardware

1. Input/output point expansion modules shall be installed as required to include 20% spare capacity of points.
2. Input/output point modules shall have removable terminal blocks.
3. Monitoring of the status of all hand-off-auto switches.
4. Monitoring of all industry standard types of analog and digital inputs and outputs, without the addition of equipment to the primary control panel.
5. Local status indication for each digital input and output for constant, up-to-date verification of all point conditions without the need for an operator I/O device. Each primary control panel shall perform diagnostics on all inputs and outputs and a failure of any input or output shall be indicated both locally and at the operator workstation.
6. Graduated intensity LEDs or analog indication of value for each analog output.
7. Optional HOA (hand-off-auto module) with software configurability and LED status indicators.

I. Code compliance

1. Approvals and standards: UL916; CE; FCC
2. Provide UL864-UUKL where called for in the sequences of operations.

J. Accessories:

1. Appropriate NEMA rated metal enclosure.
2. Power supplies as required for all associated modules, sensors, actuators, etc.

K. The operator shall have the ability to manually override automatic or centrally executed commands at the primary control panels via local, point discrete, on-board hand/off/auto operator override switches. If on board switches are not available, provide separate control panels with HOA switches. Mount panel adjacent to primary control panel. Provide hand/off/auto switch for each digital output, including spares.

L. Panel setup, point definitions and sequencing diagrams shall be backed up on EEPROM memory.

M. Power loss. In the event of the loss of power, there shall be an orderly shutdown of all Building Controllers to prevent the loss of database or operating system software. Non-volatile memory shall be incorporated for all critical controller configuration data and battery backup shall be provided to support the real-time clock and all volatile memory for a minimum of 30 days.

N. Building Level Controllers shall have the capability to serve as a gateway between Modus subnetworks and BACnet objects. Provide software, drives and programming.

O. Spare Capacity: Provide enough inputs and outputs to handle the equipment shown to be “future” on drawings and 20% more of each point type. Provide all hardware modules, software modules, processors, power supplies, communication controllers, etc. required to ensure adding a point to the spare point location only requires the addition of the appropriate sensor/actuator and field wiring/tubing.

P. Environment:

1. Controller hardware shall be suitable for the anticipated ambient conditions.

2. Controllers used outdoors and/or in wet ambient conditions shall be mounted within waterproof enclosures and shall be rated for operation at 0°C to 49°C (32°F to 120°F).

3. Controllers used in conditioned space shall be mounted in dust-proof enclosures and shall be rated for operation at 0°C to 49°C (32°F to 120°F).

4. Controller hardware shall be optionally suitable for rooftop environments.

2.11 BACNET APPLICATION SPECIFIC CONTROLLERS (B-ASC)

A. Each Application Specific Controller shall operate as a stand alone controller capable of performing its user selectable control routines independently of any other controller in the system. Each Application Specific Controller shall provide standard applications and programmability to provide both reliability and flexibility. Each application specific controller shall be a microprocessor based, multi tasking, digital control processor.

B. Basis of Design: Siemens DXR.

C. Configurable control applications. Each Application Specific Controller model must have a set of pre-loaded, selectable and field-adjustable control applications appropriate for the secondary HVAC equipment that the controller model is intended to control. Specific applications must be configurable to meet the user's control strategy requirements, allowing for additional system flexibility.

D. Programmability: Application Specific Controllers shall be programmable. Program language shall be graphical.

E. The Application Specific Controller shall include all point inputs and outputs necessary to perform the specified HVAC control sequences. The controller shall accept input and provide output signals that comply with industry standards. Controllers utilizing proprietary control output signals shall not be acceptable. Controllers shall provide

outputs utilized either for two-state, modulating floating, or proportional control, allowing for additional system flexibility.

1. Analog inputs shall be software configurable to accept sensors using 0-10v (such as RH or CO2 sensors), NTC3k, NTC10k, NTC100k, Ni1000, PT1K 385, and resistance sensors of 1000Ω, 2500 Ω, 10K Ω, and 100k Ω . 24vDC power to drive active sensors shall be an option available from the controller.

2. Digital input

3. Analog Outputs shall support 0-10v HVAC control signals.

4. Digital outputs shall be AC 24V high-side switching triacs, able to switch loads of 250 mA / 6 VA per output.

5. Every installed Application Specific Controller shall be prepared for the addition of occupancy, CO2 and humidity sensors

6. Additional sensors and output modules for occupancy, lighting and shade control within the same space as the HVAC control shall be connected as needed via a sub-network connection on each Application Specific Controller

7. The Application Specific Controller shall be compatible with a Siemens Room Unit which combines a display with CO2, temperature and humidity sensing in 1 wall device.

8. The Application Specific Controller shall be compatible with a Siemens Room Unit which combines a display with temperature sensing and configurable switches for lighting, shade and scene control in 1 wall device.

F. Application Specific Controller communication

1. Communication over floor level network shall be BACnet MS/TP or BACnet IP over Ethernet unless otherwise required by the application.

2. Each controller that uses BACnet IP shall provide at least two Ethernet ports allowing the controllers to be wired in a daisy-chain configuration of up to at least 20 controllers per chain, utilizing standard Ethernet cables of up to 300ft in length between each controller.

G. The Application Specific Controller shall have the BTL listing and meet the BACnet device profile of an Application Specific Controller (B-ASC) as specified in ANSI/ASHRAE 135.

1. Controller shall support BACnet MS/TP or BACnet/IP.

H. The Application Specific Controller shall provide for control of each piece of equipment, including, but not limited to the following:

1. Variable Air volume (VAV)

2. Hot water and electric reheat Coils (RH)

3. Fan Coil Units (FCU)
4. Unit Ventilators
5. Baseboard radiator
6. Chilled/heated ceiling panels
7. DX cooling coils

I. Each Application Specific Controller shall, at a minimum, be provided with:

1. Appropriate NEMA rated enclosure
2. Power supplies as required for all associated modules, sensors, actuators, etc.
3. Each controller measuring air volume shall include a differential pressure transducer
4. Approvals and standards: UL916 PAZX; CUL; FCC

J. Each Application Specific Controller shall continuously perform self-diagnostics on all hardware and secondary network communications. The Application Specific Controller shall provide both local and remote annunciation of any detected component failures or repeated failure to establish communication to the system.

K. Power Supply. The Application Specific controller shall be powered from a 24 VAC source and shall function normally under an operating range of -15% / +20%.

L. All controller configuration settings and programs shall be stored in non volatile memory. The controllers shall be able to return to full normal operation without user intervention after a power failure of unlimited duration.

M. Environment. The controllers shall function normally under ambient conditions of 23 to 122°F (-5 to 50°C) and 5% to 95% RH (non-condensing). Provide each controller with a suitable cover or enclosure to protect the circuit board assembly.

2.12 ALARM PROCESSING

A. Alarms shall be classified by their alarm type. The facility shall be provided for enabling and disabling each individual alarm on the system.

B. Once generated, the alarm shall be processed by its associated alarm type as defined in the I/O Point Schedules. The alarm types shall be as follows:

1. General Mismatch
2. Critical Mismatch
3. General Binary
4. Critical Binary

5. General Analog

6. Critical Analog

7. Alarm Inhibition

C. Consequential alarm suppression algorithms shall be provided to limit the alarms annunciated on the DDC System to those associated with the source of the initial alarm condition e.g. fire alarms shall not initiate mismatch alarms, restoration of power following a power failure shall not initiate mismatch alarms etc.

2.13 CONFIGURATION

A. Configuration data shall be stored in the DDC Controllers or the Terminal Unit Controllers. Configuration data shall include but not be limited to the following:

1. The unit applicable (deg F, GPM's, inches, etc.).

2. The point identifier (minimum of 12 characters).

3. The point alarm message if applicable (minimum of 80 characters).

4. The point descriptor (minimum of 32 characters).

2.14 DDC STANDARD PROGRAMS

A. The device schedules included in this Specification provide details of inputs monitored and outputs controlled by the DDC System. All point types are described under Controllers elsewhere in this Specification. The DDC System shall allow for the following point functionality and standard programs to be available:

1. Point Override

2. Manual Start/Stop

3. Fixed Time Program

4. Optimum Start/Stop

5. Control Loops

6. Rotational Point

7. Run Time Totalization

8. KWH calculations

9. Anti-Short Cycling

10. Staggered Start

11. User Definable Software

12. General Control Requirements

2.15 INTEGRATIONS

A. The BMS shall utilize and be compatible with industry-standard integration protocols (BACnet and Modbus) for subsystem integration. Coordinate integration protocols with subsystem manufacturer.

B. In addition to the above, the BMS shall be integrated with all pump and fan VFDs via BACnet MS/TP or IP. All up to (20) software points shall be made available at the BMS for monitoring.

2.16 CONTROL PANELS

A. Fully enclosed, steel-rack-type cabinet with locking doors or locking removable backs.

B. Field equipment panels located indoors shall be NEMA 1. Field equipment panels located outdoors or subject to outdoor air conditions shall be minimum of NEMA 3R, provided with internal electric heater and cooling fan.

C. Coordinate installation of the control panels with the engineer/architect.

D. Coordinate power for the panels with the electrical contractor.

E. All control panels shall be provided with DIN Rail mounted screw terminal blocks. Field wiring shall be connected to the screw terminal blocks. It is not acceptable to terminate any field wiring directly to the DDC controller or any panel devices such as relay and transducers. The screw terminal blocks located/attached to the DDC controller alone does not comply with this requirement.

F. All control devices such as relays, transformers, transducers, power supplies, associated I/O devices, etc. shall be installed inside the panel, not at the starter or electrical junction box.

2.17 SENSORS

A. Input/output sensors and devices shall be closely matched to the requirements of the DDC for accurate, responsive, noise-free signal input/output. Control input response shall be high sensitivity and matched to the loop gain requirements for precise and responsive control. Thermistors are acceptable for VAV terminal applications.

B. Temperature Sensors

1. Provide the following instrumentation as required by the monitoring, control, and optimization functions. All temperature sensors shall use platinum RTD elements only, nickel or silicon RTD’s and thermistors are not acceptable.

2. Temperature Transmitter Assembly – Airstream averaging type

   a. The assembly shall consist of a capillary type 1000-ohm platinum RTD housed in a flexible sheath contained in housing suitable for duct mounting.

3. Temperature Transmitter Assembly – Airstream non-averaging type

a. The assembly shall consist of an insertion type 1000-ohm platinum RTD mounted on a 12-inch probe (or duct diameter) contained in a housing suitable for duct mounting.

4. For outside air application mount with weather protection and sun shield.

5. Low Temperature Limit Switch (Freezestat) – Airstream

a. The low temperature limit switch shall be of the automatic reset type with Double Pole/Single Throw snap acting contacts rated for 16 amps at 120VAC.

b. The sensing element shall be a minimum of 15 feet in length and shall react to the coldest 18-inch section. Element shall be mounted horizontally across duct in accordance with manufacturers recommended installation procedures.

c. Provide one freezestat per coil section or a maximum of 18 square feet whichever is more provides more coverage.

6. Temperature Transmitter – Space

a. The assembly shall consist of a 1000-ohm platinum RTD contained in a decorative ventilated enclosure similar in appearance to room thermostats.

b. Temperature transmitters for terminal unit applications (such as VAVs, FCUs, etc.) may utilize industry-standard KNX protocol.

c. Cover type (i.e. indicating, adjustable, blank), colors, and final installation locations shall be as reviewed approved by the architect, owner, and engineer. In general, occupied spaces (i.e. offices, conference rooms, etc.) shall be provided with indicating temperature display (LCD) and setpoint adjustment (±3°F); transient spaces (i.e. open office area, hallways, etc.) shall be provided with blank non-indicating and non-adjustable sensors. Note: All adjustable sensors are subject to ADA requirements.

7. Temperature Transmitter – Liquid Immersion

8. Sensing element RTD

a. Temperature range Suitable for application

b. Output signal 4-20 mA

c. Accuracy ±0.15°F

d. Provide Type 304 stainless steel thermowell for each liquid immersion temperature sensing element.

e. Siemens Q series Sensors

C. Humidity Sensors, Siemens Q Series Sensors

1. Relative Humidity – Space

    a. Sensor Humidity range 0 to 100%

    b. Accuracy ±4% RH (20-80% RH).

    c. Sensing element Digital Sensor IC (capacitive)

    d. Provide with readable LCD display where indicated in the sequences or drawings

    e. For rooms with temperature sensing as well, provide a combined temperature/humidity sensor or provide units with matching cover.

2. Relative Humidity – Duct

    a. Sensor humidity range 0 to 100%

    b. Accuracy ±2%

    c. Sensing element Digital Sensor IC (capacitive)

    d. Output signal 4-20 mA/0-5V/0-10V selectable

    e. Calibration adjustment adjustable to ±5% RH

3. Outside-Air Sensors: Provide duct-mounted sensor with element guard and mounting plate.

D. Carbon Dioxide Transmitters

1. Carbon Dioxide – Space

    a. Sensor range 0-2000 ppm

    b. Accuracy ±(30 ppm + 4% of measured value)

    c. Provide with readable LCD display where indicated in the sequences or drawings

    d. For rooms with temperature sensing as well, provide a combined temperature/humidity sensor or provide units with matching cover.

2. Carbon Dioxide – Duct

    a. Sensor range 0-2000 ppm

    b. Accuracy ±(50 ppm + 2% of measured value)

    c. Output signal 4-20 mA/0-5V/0-10V selectable

E. Pressure Sensors/Switches

1. Airside Differential Pressure Transmitter

a. Non-directional sensor with suitable range for expected input, and temperature compensated.

b. Assembly to include integral mounting bracket

c. Accuracy ±1% of Full Scale

d. Output 4 to 20 mA or 0-10 VDC (selectable)

e. Static Pressure Ranges

1) Building 0 to 0.25 inches wg.

2) Duct 0 to 5 inches wg.

3) AHU Filter 0 to 1 inch wg. (Coordinate with manufacturer)

2. Airside Static Pressure Switches

a. Diaphragm type air differential pressure switches with die cast aluminum housing, adjustable setpoint, minimum 5 amp switch rating at 120VAC, SPDT switches. Switch pressure range and set point shall be suitable for the application. High and low ports shall be 1/8 inch NPT connected to angle type tips designed to sense pressure.

b. Reset-type based on applications:

1) Fan status Automatic Reset

2) Hi/Lo Static Safety Manual Reset

c. Provide AFS Series as manufactured by Siemens, Cleveland Controls or pre-approved equal.

F. Water Differential Pressure Transmitter

1. Wet-to-wet differential pressure transmitter shall be direct acting for gas or liquid service. Pressure range shall be suitable for system and applications.

2. Transmitter shall meet the following criteria:

a. Supply Voltage 15 - 30 VDC

b. Output 2-wire proportional output, 4 to 20 mA

c. Housing NEMA 4 with LCD Display

d. Operating Temp -4ºF - 185ºF

e. Accuracy ±1.0% FS

3. Transmitter shall be furnished with factory-assembled 5-valve manifold.

4. Provide Siemens QBE series or Setra Model 231, or approved equal.

G. Water Differential Pressure Switch

1. Differential pressure switch shall contain brass bellows which shall operate snap-acting SPDT contacts.

2. High- and low-sensing ports shall be 1/4 inch NPT.

3. Adjustable operating range shall be capable of sustaining 75 psig in either direction.

H. Current-Sensing Relays

1. Relay shall be field-adjustable for detecting AC current levels in equipment served. Relay shall be non-latching and shall have no time delay. Nominal input voltage and current-sensing range shall be selected based on electrical characteristics of equipment served. Relay shall be installed on one (1) lead of the load side of motor feed. Relay contacts shall be Form C-rated for 5A at 120 VAC.

I. Electromagnetic In-line Flow Meter

1. Flow meter shall be an inline electromagnetic flowmeter complete with NIST traceable, wet calibrated flow-measuring element, transmitter, visual display, ANSI Class 150 or 300 mounting flanges, and calibration certificate.

2. Flowmeter shall be constructed, calibrated and scaled for the intended application in terms of pipe size, pipe material, installation requirements, expected flow rate, ambient conditions and fluid characteristics which include but are not limited to pressure, temperature, conductivity and viscosity.

3. Flow meter shall meet the following criteria:

a. Sensing Technology — Electromagnetic velocity-measuring element

b. Accuracy — ±0.2% for 1.6 to 33.0 ft/s, ±0.0033 ft/s for <1.6 ft/s

c. Power Supply — 20-28 VAC @ 50/60 Hz or 120-240 VAC @ 50-60Hz

d. Display

1) Three (3) Button programming keys

2) 16-character, 8-line graphic LCD display

e. Outputs

1) Two (2) digital outputs.

f. Two (2) analog outputs

4. Flow meter shall meet the following material construction specifications:

a. Enclosure Rating — IP67

b. Outer Body — Epoxy-painted carbon steel

c. Flow tube — 304 stainless steel

d. Integral liner — Based on operating temperature/fluid

e. Maximum Pressure — 580 psig

f. Maximum Temperature — 266°F

g. End connections — ANSI Class 150 (or as per application)

5. Provide remote mounting of display at eye level for applications where flow sensor is located above 10 ft. For all other locations, transmitter shall be mounted to flow sensor assembly.

6. Flow meter shall be Onicon Model FT-3000 Series, or approved equal.

J. Electromagnetic Insertion Flow Meter

1. Flow meter shall be an insertion electromagnetic flowmeter complete with NIST traceable, wet calibrated flow-measuring element, integral transmitter, installation valves, installation depth gage and calibration certificate. Flowmeter shall be wet tappable, allowing insertion and removal from the flow stream without system shutdown.

2. Flowmeter shall be constructed, calibrated and scaled for the intended application in terms of pipe size, pipe material, installation requirements, expected flow rate, ambient conditions and fluid characteristics which include but are not limited to pressure, temperature, conductivity and viscosity.

3. Flow meter shall meet the following criteria:

a. Sensing Technology — Electromagnetic velocity-measuring element

b. Accuracy — ±1.0% for 2.0 to 20.0 ft/s, ±0.02 ft/s for <2.0 ft/s

c. Power Supply — 20-28 VAC @ 50/60 Hz or 120-240 VAC @ 50-60Hz

d. Outputs

1) One (1) scalable pulsed output.

2) One (1) analog output, field selectable 4-20 mA or 0-10 V.

4. Flow meter shall meet the following material construction specifications:

a. Wetted components — 316 stainless steel

b. Maximum Pressure — 400 psig

c. Enclosure — NEMA 4

d. End connections 1” Male NPT Hot Tap Adapter fitting

e. Installation shall be through 1” full port isolation valve.

5. Flow meter shall be Onicon Model F-3500 Series, or approved equal.

K. Turbine Insertion Flow Meter – Utilize only for closed piping systems

1. Flow meter shall be insertion turbine flowmeter complete with NIST traceable, wet calibrated flow-measuring element, integral transmitter, installation valves, depth gage and calibration certificate. Flowmeter shall be wet tappable, allowing insertion and removal from the flow stream without system shutdown.

2. Flowmeter shall be constructed, calibrated, and scaled for the intended application in terms of pipe size, pipe material, installation requirements, expected flow rate, ambient conditions and fluid characteristics which include but are not limited to pressure, temperature, conductivity, and viscosity. Flow meter shall meet the following criteria:

a. Sensing Technology Dual axial turbine flow-measuring element

b. Accuracy ±1% for 3 to 30 ft/s, ±2% for 0.4 to 20 ft/s

c. Power Supply 20-28 VAC @ 50/60 Hz

d. Outputs

1) One (1) scalable pulsed output.

2) One (1) analog output, field selectable 4-20 mA or 0-10 V.

3. Flow meter shall meet the following material construction specifications:

a. Wetted components 316 stainless steel

b. Maximum Pressure 400 psig

c. Enclosure NEMA 4

d. End connections 1” Male NPT Hot Tap Adapter fitting with 1” full port isolation valve.

4. Flow meter shall be Onicon Model F-1000 Series, or approved equal.

2.18 FIELD DEVICES

A. General

1. Specified in this section are the following hard-wired input/output devices connected to the Networked Primary DDC Controller or ASC.

a. Automatic Control Valves

b. Binary Temperature Devices

c. Temperature Sensors

d. Differential Pressure Switches

e. Relays

f. Current Switches

B. ELECTRIC DAMPER ACTUATORS

1. General

a. The actuator shall have mechanical or electronic stall protection to prevent damage to the actuator throughout the rotation of the actuator.

b. Where shown, for power-failure/safety applications, an internal mechanical, spring-return mechanism shall be built into the actuator housing. Alternatively, an uninterruptible power supply (UPS) may be provided.

c. Proportional actuators shall accept a 0 to 10 VDC or 4 to 20 mA control signal.

d. All 24 VAC/VDC actuators shall operate on Class 2 wiring

e. All actuators shall have an external manual gear release to allow manual positioning of the damper when the actuator is not powered. Spring-return actuators with more than 7 Nm (60 in.-lb) torque capacity shall have a manual crank for this purpose.

C. AUTOMATIC CONTROL VALVES.

1. General:

a. Control valves shall be two-way or three-way type single seated globe type for two-position or modulating service as shown. Valves shall meet ANSI Class IV leakage rating.

b. Body pressure rating and connection type construction shall conform to pipe, fitting and valve schedules. Where pressure and flow combinations exceed ratings for commercial valves and operators, industrial class valves and operators shall be provided.

c. Valve operators shall be of electric type.

d. The valves shall be quiet in operation and fail-safe in either normally open or normally closed position in the event of power failure.

e. Provide valves 2" and smaller with screwed end bronze bodies and stainless-steel trim. Provide valves 2-1/2" and larger with flanged ends, cast iron body and stainless-steel trim.

f. Valves shall have sufficient stuffing box protection to ensure against leakage at hydrostatic head involved. Control valve operators shall be sized to close

against differential pressure equal to the design pump head plus 10 percent. Valve leakage shall meet or exceed ANSI Class IV leakage (0.01% of rated valve capacity).

g. Two-way Modulating Control Valves – 2-1/2" and larger

1) Two-way modulating control valves shall be globe-style with equal percentage flow characteristic for water service and linear flow characteristic for steam service.

(a) Performance:

(1)	Pressure Rating	ANSI 125 or 250
(2)	Close-off Pressure	Pump head plus 10%
(3)	Leakage	ANSI Class IV
(4)	Temperature Range	34 to 250°F
(5)	Rangeability	100:1

(b) Material construction:

(1)	Body	Cast Iron
(2)	End Connection	ANSI Flanged
(3)	Trim	Bronze
(4)	Stem	Stainless Steel

(c) Input power voltage shall be 24VAC.

(d) Control signal to valves shall be via hardwired analog output (0-10 VDC).

(e) Valves shall be Siemens Flanged Iron Two-Way Globe Valves, or approved equal.

h. Three-way Modulating Control Valves – 2-1/2" and larger

1) Three-way modulating control valves shall be globe-style with equal percentage flow characteristic.

(a) Performance:

(1)	Pressure Rating	ANSI 125 or 250
(2)	Close-off Pressure	Pump head plus 10%

(b) Leakage ANSI Class IV

(1)	Temperature Range	34 to 250°F

(2) Rangeability 100:1

(c) Material construction:

(1) Body Cast Iron

(2) End Connection ANSI Flanged

(3) Trim Bronze

(4) Stem Stainless Steel

(d) Input power voltage shall be 24VAC.

(e) Control signal to valves shall be via hardwired analog output (0-10 VDC).

(f) Valves shall be Siemens Flanged Iron Three-Way Globe Valves, or approved equal.

i. Motorized Isolation Valves – Up to 2”

1) Valve shall be suitable for hot water service. Isolation valve shall be line-sized, full-port ball valve.

2) Performance:

3) Pressure Rating 360 psig

(a) Close-off pressure 200 psi

(b) Temperature Range 35 to 250°F

(c) Valves shall meet the following material construction specifications:

4) Body Forged brass

5) End Connection NPT female

6) Ball Stainless steel

7) Stem Stainless steel

8) Ball Seats Teflon PTFE

9) Stem Seal EPDM O-rings

10) Input power voltage shall be 24VAC.

11) Valves shall be two-position (on/off) and provided with open and closed endswitches.

12) Valves shall be as manufactured by Belimo, Siemens, or approved equal.

j. High Performance Motorized Butterfly Valves for Isolation – 2-1/2" and larger

1) Valve shall be suitable for chilled and hot water service. Valve shall be line-sized.

2) Performance:

(a) Pressure Rating ANSI Class 200, 740 psig

(b) Close-off pressure Suitable for application

3) Temperature Range -62 to 500°F

4) Valves shall meet the following material construction specifications:

(a) Body Carbon steel

(b) End Connection Lugged

(c) Disc Stainless steel

5) Stem Stainless steel

(a) Seat PTFE

6) Valve Actuator

(a) Input Power 120 VAC or 24 VAC

(b) Signal Two position (on/off)

(c) Enclosure Rating NEMA 4 or greater

(d) Limit Switches Integral opened and closed

(e) Torque Suitable for application close-off

(f) Manual Override Handwheel

(g) Valve and actuator shall be as manufactured by Siemens, Bray, or approved equal.

D. RELAYS.

1. Control relays shall be UL listed plug-in type with dust cover and LED "energized" indicator. Contact rating, configuration, and coil voltage shall be suitable for application.

2. Time delay relays shall be UL listed solid-state plug-in type with adjustable time delay. Delay shall be adjustable ±200% (minimum) from set point shown on plans. Contact rating, configuration, and coil voltage shall be suitable for application. Provide NEMA 1 enclosure when not installed in local control panel.

E. CURRENT SWITCHES.

1. Current-operated switches shall be self-powered, solid-state with adjustable trip current. The switches shall be selected to match the current of the application and output requirements of the DDC system.

2.19 AIRFLOW MEASURING DEVICES

A. Small Duct Air Measuring Devices:

1. Airflow Measurement Device (AMD) with Temperature Output and Integral Airflow Alarming

a. General

1) Provide one AMD with an integral airflow alarm for each measurement location provided on the plans, schedules and/or control diagrams to determine the average airflow rate and temperature at each measurement location.

2) Each AMD shall be provided with a remotely mounted microprocessor-based transmitter and one or two sensor probes.

(a) Devices that have electronic signal processing components in the sensor probe are not acceptable.

3) Airflow measurement shall determine the average actual airflow rate.

4) Temperature measurement shall determine the velocity weighted average temperature by factory default or the arithmetic average by manual field selection.

b. Sensor Probe Design

1) Sensor probes shall be constructed of 6063 extruded aluminum alloy tube.

2) Sensor probe mounting brackets shall be constructed of 304 stainless steel.

3) Probe internal wiring between the connecting cable and sensor nodes shall be Kynar coated copper.

(a) PVC jacketed internal wiring is not acceptable.

4) Probe internal wiring connections shall consist of solder joints and spot welds.

(a) Connectors of any type within the probe are not acceptable.

(b) Printed circuit boards within the probe are not acceptable.

5) Each sensor node shall be provided with two bead-in-glass, hermetically sealed thermistors potted in a marine grade waterproof epoxy.

(a) Devices that use epoxy or glass encapsulated chip thermistors are not acceptable.

6) Each thermistor shall be individually calibrated at a minimum of 3 temperatures to NIST-traceable temperature standards.

7) Each sensor node shall be calibrated to volumetric standards at a minimum of 7 calibration points.

8) The number of independent sensor nodes provided shall be as follows:

(a) 4" diameter - 1 sensor node

(b) greater than 4" diameter up to 16" diameter - 2 sensor nodes

9) Probe to transmitter cables shall be FEP jacketed, plenum rated CMP/CL2P and UL/cUL Listed, -67° to 392° F (19.4° C to 200° C) and UV tolerant. Cables shall include a terminal plug for connection to the remotely mounted transmitter. PVC jacketed cables or PVC insulated conductors are not acceptable with ducted sensor probes.

c. Transmitter

1) An integral microprocessor-based transmitter shall be provided for each measurement location.

2) All printed circuit board interconnects and test points shall be gold plated.

3) All printed circuit boards shall be electroless nickel immersion gold (ENIG) plated.

4) All integrated circuitry shall be temperature rated as ‘industrial-grade’. Submissions containing ‘commercial-grade’ integrated circuitry are not acceptable.

5) The transmitter shall be capable of determining the average actual airflow rate and temperature of the sensor nodes in the array.

6) The transmitter shall be capable of identifying an AMD malfunction and ignore a sensor node that is in a fault condition, while simultaneously indicating a fault visually and over the network.

7) The transmitter shall be provided with one of the following:

(a) Two scalable, protected and field selectable analog output signals (0-5 / 1-5 VDC or 0-10 / 2-10 VDC, choose one), or

(b) One non-isolated RS-485 network connection (field selectable BACnet MS/TP or Modbus RTU protocol). Provide individual 24 VAC transformers at each network transmitter requiring isolated RS-485 connection.

8) One analog output shall be airflow (AO1), while the second output (AO2) shall be configurable as average temperature (default), adjustable airflow alarm or system alarm.

   (a) When the alarm is active, the alarm condition shall be indicated on the LCD display.

   (b) Alarm reset shall be manual or automatic.

   (c) Alarm set points shall be adjustable by type, tolerance, delay, disable/enable, and analog signal indication for AO2.

9) RS-485 network communications shall provide the average airflow rate, average temperature, system status alarm, Hi-Lo airflow alarm, individual sensor node airflow rates and individual sensor node temperatures.

10) Each transmitter shall provide one dry contact relay with onboard jumper to drive a remote LED. The relay shall be rated for no less than 30 VDC or 24 VAC @ 3 amp max and user configurable as N.O. or N.C. during set up.

11) The transmitter shall have a built-in field adjustment wizard for one or two point output adjustments to the factory calibration, when required.

12) The transmitter shall be powered by 24 VAC (22.8 to 26.4 under load) @8 V-A.

13) The transmitter shall provide an integral LCD display for display of airflow, temperature and alarms; and a pushbutton user interface for configuration and diagnostics.

14) The transmitter shall be mounted in an environment protected from direct contact with water.

15) The transmitter shall independently process the airflow and temperature of each sensor node prior to averaging and output.

16) The transmitter shall use a “watchdog” timer circuit to ensure continuous operation in the event of brown-out and/or power failure.

d. Performance and calibration

1) Each sensing node shall have an airflow accuracy of ±3% of reading (typical) ±4% max. from 0 to 3,000 FPM (15.24 m/s) over a temperature range of 0° F to 160° F (-18° to 71° C). Airflow accuracy shall be maintained at lower operating temperatures of -20° F to 160° F (-29° C to 71° C) but the velocity range shall be limited to 0 - 2,000 FPM (10.2 m/s).

   (a) Accuracy shall include the combined uncertainty of the sensor nodes and transmitter.

(b) Devices whose overall performance at the host controller input terminals is the combined accuracy of the transmitter and sensor probes shall demonstrate that the total accuracy meets the performance requirements of this specification throughout the measurement range.

2) Each sensor node shall be factory calibrated at a minimum of 7 airflow rates including zero (still air), to to NIST Traceable standards.

3) Each thermistor shall be individually calibrated at a minimum of 3 temperatures to standards that are traceable to the National Institute of Standards and Technology (NIST).

4) Each sensing node shall have a temperature accuracy of ± 0.15° F (± 0.08° C) over a calibrated range of -20° F to 160° F (-28.9° C to 71.1° C).

5) Minimum calibrated and operating temperature range for the sensor probes shall be -20° F to 160° F (-28.9° C to 71.1° C).

6) Operating temperature range for the transmitter shall be -20° F to 120° F (-28.9° C to 48.9° C).

e. Listings and Certifications

1) The AMD shall be UL 60730-1 and 60730-2-9 Listed as an assembly and subscribed to the UL Follow-up Services.

(a) Devices claiming compliance with the UL Listing based on individual UL component listings are not acceptable.

B. Large Ducts and Intakes Air Measuring Devices:

1. Airflow Measurement Devices (AMD) with Temperature Output and Airflow Alarming Capability

a. General

1) Provide one AMD for each measurement location provided on the plans, schedules and/or control diagrams to determine the average airflow rate and temperature at each measurement location.

2) Each AMD shall be provided with a microprocessor-based transmitter and one or more sensor probes.

(a) Devices that have electronic signal processing components on or in the sensor probe are not acceptable.

3) Airflow measurement shall be field configurable to determine the average Actual or Standard mass airflow rate.

(a) Actual airflow rate calculations shall have the capability of being corrected by the transmitter for altitudes other than sea level.

4) Temperature measurement shall be field configurable with velocity weighted average as the default, or manual selection of arithmetic average temperature.

b. Sensor Probes

1) Sensor probes shall be constructed of gold anodized, 6063 aluminum alloy tube.

2) Sensor probe mounting brackets shall be constructed of 304 stainless steel.

3) Probe internal wiring between the connecting cable and sensor nodes shall be Kynar coated copper.

(a) PVC jacketed internal wiring is not acceptable.

4) Probe internal wiring connections shall consist of solder joints and spot welds.

(a) Internal wiring connections shall be sealed and protected from the elements. They shall be capable of direct exposure to water without affecting instrument operation.

(b) Connectors of any type within the probe are not acceptable.

(c) Printed circuit boards within the probe are not acceptable.

5) Each sensor probe shall be provided with an integral, FEP jacket, plenum rated CMP/CL2P, UL/cUL Listed cable rated for exposures from -67° F to 392° F (-55° C to 200° C) and continuous and direct UV exposure.

(a) Plenum rated PVC jacket cables are not acceptable.

6) Each sensor probe cable shall be provided with a connector plug with gold plated pins for connection to the transmitter.

7) Each sensor probe shall contain one or more independently wired sensing nodes.

8) Sensor node airflow and temperature calibration data shall be stored in a serial memory chip in the cable connecting plug and not require matching or adjustments to the transmitter in the field.

9) Each sensor node shall be provided with two bead-in-glass, hermetically sealed thermistors potted in a marine grade waterproof epoxy with sensor housings constructed of glass-filled polypropylene. Upon request, the manufacture shall provide a written independent laboratory

test result of 100% survival rate in a 30 day saltwater and acid vapor test.

(a) Devices that use epoxy or glass encapsulated chip thermistors are not acceptable.

(b) Devices with exposed leads are not acceptable.

10) Each thermistor shall be individually calibrated at a minimum of 3 temperatures to NIST-traceable temperature standards.

11) Each sensor node shall be individually calibrated at 16 measurement points to airflow standards directly calibrated at NIST to the NIST Laser Doppler Anemometer (LDA) primary velocity standard and have an accuracy of ±2% of reading over the entire calibrated airflow range of 0 to 5,000 FPM (25.4 m/s).

(a) Upon request the manufacture shall submit for AMD approval a copy of the NIST report of calibration used for the reference standard used.

(b) Devices claiming NIST traceability to third party laboratories and not directly to NIST are not acceptable

(c) Devices calibrated against standards other than the NIST LDA are not acceptable.

12) Accuracy shall include the combined uncertainty of the sensor nodes and transmitter.

13) The installed airflow accuracy shall be:

(a) Ducts - ±3% of reading when installed in accordance with the manufactures recommended placement guidelines.

(b) Non-ducted Outdoor Air intakes - better than or equal to ±5% of reading when installed in accordance with the manufactures recommended placement guidelines.

14) Devices whose overall accuracy is based on individual accuracy specifications of the sensor probes and transmitter shall demonstrate compliance with this requirement over the entire operating range.

15) Each sensing node shall have a temperature accuracy of ±0.15° F (0.08° C) over an operating range of -20° F to 160° F. (-28.9° C to 71.1° C) and humidity range of 0 to 100% RH.

16) Sensor nodes provided shall be as follows:

(a) The number of sensor housings provided for each location shall be as follows:

(b) Area (sq.ft.) Sensors

(c) 1 or less 2

(d) > 1 to < 4 4

(e) 4 to <8 6

(f) 8 to <12 8

(g) 12 to <16 12

(h) 16 or more 16

(i) A total of 4 probes shall be required for openings with an aspect ratio less than or equal to 1.5 and with an area greater than or equal to 25 ft2.

17) Fan Inlet Sensor Probe Assemblies

(a) Sensor housings shall be mounted on 304 stainless steel blocks.

(b) Mounting rods shall be field adjustable to fit the fan inlet and constructed of nickel plated steel.

(c) Mounting feet shall be constructed of 304 stainless steel.

(d) The operating airflow range shall be 0 to 10,000 FPM unless otherwise indicated on the plans.

c. Transmitter

1) A remotely located microprocessor-based transmitter shall be provided for each measurement location.

2) The transmitter shall be comprised of a main circuit board and interchangeable interface card.

3) All printed circuit board interconnects, edge fingers, receptacle plug pins and PCB test points shall be gold plated.

4) All printed circuit boards shall be electroless nickel immersion gold (ENIG) plated.

5) All integrated circuitry shall be temperature rated as ‘industrial-grade’. Submissions containing ‘commercial-grade’ integrated circuitry are not acceptable.

6) The transmitter shall be capable of determining the airflow rate and temperature average of all connected sensor nodes in an array for a single location.

(a) Separate integration buffers shall be provided for display airflow output, airflow signal output (analog and network) and individual sensor output (IR-interface).

7) The transmitter shall be capable of providing a high and/or low airflow alarm with user-defined set point and % of set point tolerance. Alarm shall be capable of being manually or automatically reset and low-limit cutoff value may be selected to disable the alarm. An alarm delay function shall also be field defined.

8) The transmitter shall be capable of identifying an AMD malfunction via the system status alarm and ignore any sensor node that is in a fault condition.

9) The transmitter shall be capable of field configuration, diagnostics and include Field Output Adjustment Wizard that allows for a one or two point field adjustment to factory calibration for installations that require adjustment.

10) The transmitter shall be provided with a 16-character, alpha-numeric, LCD display.

11) The transmitter shall be provided with two field selectable (0-5/0-10 VDC or 4-20mA), scalable, isolated and over-current protected analog output signals (AO1=airflow, AO2=temperature or alarm), in combination with:

(a) one isolated RS-485 (field selectable BACnet MS/TP or Modbus RTU) network connection

12) The analog signal capability shall include two output terminals: the first (AO1), shall provide the total airflow rate and the second output (AO2) shall be field configurable to provide one of the following:

(a) temperature

(b) low and/or high airflow user-defined set point alarm, or

(c) system status alarm

13) The transmitter shall also be available with a single isolated LonWorks Free Topology network interface. Transmitters shall be available alternatively with one USB connection for thumb-drive data logging of sensor data. Neither of these options shall include analog output signals.

14) The network communications RS-485 (BACnet MS/TP or Modbus RTU) or Ethernet (BACnet Ethernet or BACnet IP, Modbus TCP and TCP/IP) shall provide: the average airflow rate, temperature, hi and/or low airflow set point alarm, system status alarm, individual sensor node airflow

rates and individual sensor node temperatures. Individual node airflow rates and temperatures shall NOT be available via the network with Lon.

15) The transmitter shall have an on-off power switch. Isolation transformers shall not be required.

16) The transmitter shall be powered by 24 VAC (22.8 to 26.4 under load) @20 V-A maximum and use a switching power supply that is over-current and over-voltage protected.

17) The transmitter shall use a “watchdog” timer circuit to ensure automatic reset after power disruption, transients and brown-outs.

18) Each transmitter shall have an operating temperature range of -20° F to 120° F (-28.9° C to 48.9° C) and humidity range of 5 to 95% RH.

d. Listings and Certifications

1) The AMD shall be UL/cUL 873 Listed as an assembly.

(a) Devices claiming compliance with the UL Listing based on individual UL component listing are not acceptable.

2) All network-capable AMD models supplied with RS-485 interface and BACnet protocol shall be BTL Listed.

3) The AMD shall be tested for compliance with the EMC Directive’s requirements and be certified to carry the CE Mark for European Union Shipments.

C. Rooftop Energy Recovery Unit Outside Air Intake Measuring Devices:

1. Airflow Measurement Device (AMD) with Temperature Output and Integral Airflow Alarming

a. General

1) Provide one AMD with temperature output and an integral airflow alarm for each measurement location provided on the plans, schedules and/or control diagrams to determine the average airflow rate and temperature at each measurement location.

2) Each AMD shall be provided with a remotely mounted microprocessor-based transmitter and one or two sensor probes.

(a) Devices that have electronic signal processing components in the sensor probe are not acceptable.

3) Airflow measurement shall determine the average actual airflow rate.

4) Temperature measurement shall determine the velocity weighted average temperature (factory default) or the arithmetic average (field selection).

b. Sensor Probe Design

1) Sensor probes shall be constructed of 6063 extruded aluminum alloy tube.

2) Sensor probe mounting brackets shall be constructed of 304 stainless steel.

3) Probe internal wiring between the connecting cable and sensor nodes shall be Kynar coated copper.

(a) PVC jacketed internal wiring is not acceptable.

4) Probe internal wiring connections shall consist of solder joints and spot welds.

(a) Connectors of any type within the probe are not acceptable.

(b) Printed circuit boards within the probe are not acceptable.

5) Each sensor node shall contain one hermetically sealed ‘bead-in-glass’ thermistor sensor and one high performance parylene-coated chip thermistor, in a structural sensor housing. The airflow rate and temperature shall be independently determined at each measurement node prior to averaging.

6) Each preselected probe shall be adjustable insertion or stand-off bracket type, and choice of probes in lengths of 6, 8, or 16 in. [152.4, 203.2, or 406.4 mm]

7) The maximum number of independent sensor nodes/probe provided shall be 1 each x 2 probes total.

8) Probe to transmitter cables shall be FEP jacketed, plenum rated CMP/CL2P and UL/cUL Listed, -67° to 392° F (19.4° C to 200° C) and UV tolerant. Cables shall include a terminal plug for connection to the remotely mounted transmitter. PVC jacketed cables or PVC insulated conductors are not acceptable with ducted sensor probes.

c. Transmitter

1) An integral microprocessor-based transmitter shall be provided for each measurement location.

(a) All printed circuit board interconnects and test points shall be gold plated.

(b) All printed circuit boards shall be electroless nickel immersion gold (ENIG) plated.

2) All integrated circuitry shall be temperature rated as 'industrial-grade'. Submissions containing 'commercial-grade' integrated circuitry are not acceptable.

3) The transmitter shall be capable of determining the average airflow rate and temperature at each of the sensor nodes in the array.

4) The transmitter shall be capable of identifying an AMD malfunction and ignore any sensor node that is in a fault condition.

5) The transmitter shall be provided with one of the following:

(a) Two scalable, protected and field selectable analog output signals (0-5 / 1-5 VDC or 0-10 / 2-10 VDC, choose one), or

(b) One non-isolated RS-485 network connection (field selectable BACnet MS/TP or Modbus RTU).

6) One analog output shall be airflow (AO1), while the second output (AO2) shall be configurable as airflow (independent of AO1 for dual outputs), average temperature (default), adjustable airflow alarm or system alarm.

(a) When the alarm is active, the alarm condition shall be indicated on the LCD display.

(b) Alarm reset shall be manual or automatic.

(c) Alarm set points shall be adjustable by type, tolerance, delay, disable/enable, and analog signal indication for AO2.

7) RS-485 network communications shall provide the average airflow rate, average temperature, Hi-Lo airflow alarm, system status alarm, individual sensor node airflow rates and individual sensor node temperatures.

8) Each transmitter shall provide one dry contact relay with onboard jumper to drive a remote LED. The relay shall be rated for no less than 30 VDC or 24 VAC @ 3 amp max.

9) The transmitter shall have a built-in field adjustment wizard for one or two point output adjustments to the factory calibration, when required.

10) The transmitter shall be powered by 24 VAC (22.8 to 26.4 under load) @8 V-A.

11) The transmitter shall provide an integral LCD for the display of airflow, temperature and alarms; and a pushbutton user interface for configuration and diagnostics.

12) The transmitter shall be mounted in an environment protected from direct contact with water.

13) The transmitter shall independently process the airflow and temperature of each sensor node prior to averaging and output.

14) The transmitter shall use a “watchdog” timer circuit to ensure continuous operation in the event of brown-out and/or power failure.

d. Performance and Calibration

1) Each sensing node shall have an airflow accuracy of ±3% of reading (typical) ±4% max. from 0 to 3,000 FPM (15.24 m/s) over a temperature range of 0° F to 160° F (-18° to 71° C). Airflow accuracy shall be maintained at lower operating temperatures of -20° F to 160° F (-29° C to 71° C) but the velocity range shall be limited to 0 - 2,000 FPM (10.2 m/s)

(a) Accuracy shall include the combined uncertainty of the sensor nodes and transmitter.

(b) Devices whose overall performance at the host controller input terminals is the combined accuracy of the transmitter and sensor probes shall demonstrate that the total accuracy meets the performance requirements of this specification throughout the measurement range.

2) Each sensor node shall be individually calibrated at 7 measurement points to NIST traceable airflow standards.

(a) Submissions for AMD approval shall include a copy of the actual NIST report of calibration for the reference standard used.

(b) Devices claiming NIST traceability to third party laboratories and not directly to NIST are not acceptable

(c) Devices calibrated against standards other than the NIST LDA or against NIST temperature standards only are not acceptable.

3) Each sensing node shall have a temperature accuracy of ± 0.36° F (± 0.2° C) over a range of -20° F to 160° F (-28.9° C to 71.1° C).

4) Minimum calibrated and operating temperature range for the sensor probes shall be -20° F to 160° F (-29° C to 71° C).

5) Operating temperature range for the transmitter shall be -20° F to 120° F (-29° C to 49° C).

e. Listings and Certifications

1) The AMD shall be UL 60730-1 and 60730-2-9 Listed as an assembly and subscribe to the UL Follow-up Services.

(a) Devices claiming compliance with the UL Listing based on individual UL component listings are not acceptable.

2.20 AIR SUPPLY

A. Control and Instrumentation Tubing:

1. Copper Tube: ASTM B 819 Type K, or ASTM B 88 (ASTM B 88M) Type K, seamless, drawn or annealed.

a. Fittings: ASME B16.22, wrought copper.

b. Joints: Solder, lead free, ASTM B 32, HB alloy (95-5 tin-antimony), or tin and silver.

2. Polyethylene Tubing: Black, flame retardant, virgin polyethylene, resistant to environmental stress-cracking when tested in accordance with ASTM D 1693. All poly tubing shall be installed in conduit or NEMA 1 boxes. No poly tubing shall be run exposed.

a. Fittings: UL labeled, rod or forged brass rated to 200 psig at 100 degrees F.

b. Joints: Compression or barbed type.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that conditioned power supply is available to the control units and to the operator work station. Verify that field end devices, wiring, and pneumatic tubing is installed prior to installation proceeding.

3.2 INSTALLATION

A. Install control units and other hardware in position on permanent walls where not subject to excessive vibration.

B. Install software in control units and in operator work station. Implement all features of programs to specified requirements and appropriate to sequence of operation.

C. For all thermostats and temperature sensors shown to be installed on outside walls, provide insulated backs.

D. Install all thermostats, sensors and other wall mounted end device input control equipment at elevations in conformance with ADA requirements.

E. PROJECT MANAGEMENT

1. Provide a designated project manager who will be responsible for the following:

a. Construct and maintain project schedule

b. On-site coordination with all applicable trades, subcontractors, and other integration vendors

c. Authorized to accept and execute orders or instructions from owner/architect

d. Attend project meetings as necessary to avoid conflicts and delays

e. Make necessary field decisions relating to this scope of work

f. Coordination/Single point of contact

3.3 ELECTRICAL WIRING AND MATERIALS

A. Install, connect and wire the items included under this Section. This work includes providing required conduit, wire, fittings, and related wiring accessories.

B. Provide wiring between thermostats, aqua-stats, and unit heater/cabinet unit heater motors.

C. 120 Volt power provided to BMS Panels and Local Transformer Panels shall be included by BAS contractor.

D. Provide status function conduit and wiring for equipment covered under this Section.

E. Low voltage wiring exposed to view shall be installed in conduit. Low voltage wiring exposed to view within Mechanical rooms shall be installed in conduit. Open plenum rated cable is acceptable in concealed for low voltage wiring only. All wiring to be compliant to local building code and the NEC.

F. Conceal cable, except in mechanical rooms and areas where other conduit and piping are exposed.

G. Install exposed cable in EMT raceways.

H. Install concealed cable in enclosed vertical chases and within furred walls as open plenum rated cable.

I. Install outdoor cabling in water-tight EMT or galvanized rigid conduit.

J. Bundle and harness multiconductor instrument cable in place of single cables where several cables follow a common path.

K. Install wire and cable with sufficient slack and flexible connections to allow for vibration of piping and equipment.

L. Plenum Rated Cable to be used in accessible locations above ceilings (i.e. open ceilings and drop-ceilings).

M. Install, connect and wire the items included under this Section. This work includes providing required conduit, wire, fittings, and related wiring accessories.

1. Provide wiring for thermostats, aquastats, and all control and alarm devices for all Sections of the Specifications and wiring for all break-glass stations furnished under this Section.

2. Power for each direct digital control unit, field equipment panel, workstation, server, controller, shall be taken from dedicated power circuits as indicated on the electrical drawings. Power type (normal, emergency, life-safety, etc.) shall be determined on Electrical Drawings. If no guidance is included on the electrical drawings all power wiring shall be 'normal' power or match that of the associated mechanical equipment. Wiring and conduit between the electrical junction boxes and all direct digital control units, field equipment cabinets, workstation, server and unitary controllers, etc., shall be furnished and installed by this Section of the Specifications.

3. Provide conduit and control wiring for devices specified in this Section.

4. Provide control and signal wiring between the DDC system and equipment provided by other Sections such as pumps, variable frequency drives, etc.

5. Provide all control wiring for variable air volume and constant air volume terminal units.

N. All wiring in Mechanical Equipment Rooms, communications or electrical closets shall be in approved raceways (cable tray, conduit, EMT, etc.). Open wiring strung above accessible ceilings shall be plenum-rated cable, bundled together and protected from mechanical damage. Wiring shall be independently supported from the building structure with bridal rings and clips. The supporting of wiring from mechanical ductwork or piping shall not be acceptable. Provide individual supports for conduit. Where conduit is required, this Contractor shall be responsible for providing all conduit serving DDC system. DDC system wiring (i.e. power, control, communication, sensor or interlock) shall not be installed in conduits, provided under another section of the specification unless noted otherwise. DDC system wiring shall not "share" conduits with any other system unless noted otherwise.

O. 120 VAC circuits used for control and instrumentation shall be taken from panelboards provided under the Electrical Section. The electrical section shall provide junction boxes local to the BMS devices and equipment. Final connection between junction box and BMS devices shall be furnished by this Contractor.

P. RS-485 Cabling

1. RS-485 cabling shall be used for BACnet MS/TP networks.

2. RS-485 shall use low capacitance, 20-24 gauge, twisted shielded pair.

3. The shields shall be tied together at each device.

4. The shield shall be grounded at one end only and capped at the other end.

5. Provide end of line (EOL) termination devices at each end of the RS-485 network or subnetwork run, to match the impedance of the cable, 100 to 120 Ohm.

Q. Ethernet Cabling

1. Ethernet shall not be run with any Class 1 or low voltage Class 2 wiring.

2. CAT6, unshielded twisted pair (UTP) cable shall be used for BAS Ethernet.

3. Solid wire shall be used for long runs, between mechanical rooms and between floors. Stranded cable can be used for patch cables and between panels in the same mechanical room up to 50 feet away.

4. When the BAS Ethernet connects to an Owner's network switch, document the port number on the BAS As-builts.

R. Fiber-Optic Cabling

1. All fiber optic cabling shall be 50/125-micrometer, laser-optimized (multi-mode OM3/OM4), duplex (2-strand) fiber, optical fiber cable with plenum-rated jackets. Minimum bend radius shall be 7.5mm. Industry standard LC style connectors shall be usedFiber optic cabling shall be manufactured by Corning.

2. Maximum pulling tensions as specified by the cable manufacturer shall not be exceeded during installation. Post-installation residual cable tension shall be within cable manufacturer's specifications.

3. All cabling and associated components shall be installed in accordance with manufacturers' instructions. Minimum cable and unjacketed fiber bend radii, as specified by cable manufacturer, shall be maintained.

4. All terminations shall be made into a patch panel, designed for such use. Free air terminations with patch panels are prohibited.

3.4 INSTALLATION OF SENSORS

A. General:

1. Install sensors in accordance with the manufacturer's recommendations.

2. Mount sensors rigidly and adequately for the environment within which the sensor operates.

3. Room temperature sensors shall be installed on concealed junction boxes properly supported by the wall framing.

4. All wires attached to sensors shall be air sealed in their raceways or in the wall to stop air transmitted from other areas affecting sensor readings.

5. Sensors used in mixing plenums shall be of the averaging type.

6. All pipe-mounted temperature sensors shall be installed in wells. Install all liquid temperature sensors with heat-conducting fluid in thermal wells.

B. Room Instrument Mounting

1. Room instruments, including but not limited to wall mounted thermostats and sensors located in occupied spaces shall be mounted 48 inches above the finished floor unless otherwise shown.

C. Instrumentation Installed in Piping Systems

1. Thermometers and temperature sensing elements installed in liquid systems shall be installed in thermowells.

2. Gauges in piping systems subject to pulsation shall have snubbers.

D. Duct Smoke Detectors

1. Duct smoke detectors will be provided by the Fire Alarm System Contractor in supply and return air ducts in accordance with Division 26

2. Contractor shall connect the DDC System to the auxiliary contacts provided on the Smoke Detector as required for system safeties and to provide alarms to the DDC system.

E. Temperature Limit Switch

1. A temperature limit switch (Low Temperature Detector) shall be provided to sense the temperature.

2. A sufficient number of temperature limit switches shall be installed to provide complete coverage of the duct section.

3. Manual reset limit switches shall be installed in approved, accessible locations where they can be reset easily.

4. The temperature limit switch sensing element shall be installed in a serpentine pattern and in accordance with the manufacturer's installation instructions.

5. Each bend shall be supported with a capillary clip. Provide 3 m of sensing element for each 1 m2 (1 ft of sensing element for each 1 ft2) of coil area.

F. Averaging Temperature Sensing Elements

1. Sensing elements shall be installed in a serpentine pattern.

2. Averaging sensors shall be installed in a serpentine manner vertically across the duct. Each bend shall be supported with a capillary clip.

G. Differential air static pressure.

1. Supply Duct Static Pressure: Pipe the high-pressure tap to the duct using a pitot tube. Pipe the low-pressure port to a tee in the high-pressure tap tubing of the corresponding building static pressure sensor (if applicable) or to the location of the duct high-pressure tap and leave open to the plenum.

2. The piping to the pressure ports on all pressure transducers shall contain a capped test port located adjacent to the transducer.

3. All pressure transducers, other than those controlling VAV boxes, shall be located in field device panels, not on the equipment monitored or on ductwork.

4. Mount transducers in a location accessible for service without use of ladders or special equipment.

3.5 ACTUATORS

A. Mount and link control damper actuators according to manufacturer's instructions.

1. To compress seals when spring-return actuators are used on normally closed dampers, power actuator to approximately 5° open position, manually close the damper, and then tighten the linkage.

2. Check operation of damper/actuator combination to confirm that actuator modulates damper smoothly throughout stroke to both open and closed positions.

3. Provide all mounting hardware and linkages for actuator installation.

B. Electric/Electronic

1. Dampers: Actuators shall be direct-mounted on damper shaft or jackshaft unless shown as a linkage installation. For low-leakage dampers with seals, the actuator shall be mounted with a minimum 5° available for tightening the damper seals. Actuators shall be mounted following manufacturer's recommendations.

2. Valves: Actuators shall be connected to valves with adapters approved by the actuator manufacturer. Actuators and adapters shall be mounted following the actuator manufacturer's recommendations.

3.6 WARNING LABELS AND IDENTIFICATION TAGS

A. Permanent warning labels shall be affixed to all equipment that can be automatically started by the DDC system.

1. Labels shall use white lettering (12-point type or larger) on a red background.

2. Warning labels shall read as follows: “C A U T I O N This equipment is operating under automatic control and may start or stop at any time without warning. Switch disconnect to “Off” position before servicing.”

B. Permanent warning labels shall be affixed to all motor starters and all control panels that are connected to multiple power sources utilizing separate disconnects.

1. Labels shall use white lettering (12-point type or larger) on a red background.

2. Warning labels shall read as follows: “C A U T I O N This equipment is fed from more than one power source with separate disconnects. Disconnect all power sources before servicing.”

C. Equipment and Device labeling:

1. Labels and tags shall be keyed to the unique identifiers shown on the As-Built drawings.

2. All Enclosures and DDC Hardware shall be labeled.

3. All sensors and actuators not in occupied areas shall be tagged.

4. Airflow measurement arrays shall be tagged to show flow rate range for signal output range, duct size, and pitot tube AFMS flow coefficient.

5. Duct static pressure taps shall be tagged at the location of the pressure tap.

6. Tags shall be plastic or metal and shall be mechanically attached directly to each device or attached by a metal chain or wire.

7. Labels exterior to protective enclosures shall be engraved plastic and mechanically attached to the enclosure or DDC Hardware.

8. Labels inside protective enclosures may be attached using adhesive, but shall not be hand written.

9. Identify all other control components with permanent labels. All plug-in components shall be labeled such that removal of the component does not remove the label.

10. Identify room sensors relating to unit ventilator or valves with nameplates.

11. Manufacturers' nameplates and UL or CSA labels are to be visible and legible after equipment is installed.

D. Identification of Tubing and Wiring

1. All wiring and cabling including that within factory-fabricated panels shall be labeled at each end within 5 cm (2 in.) of termination with the DDC address or termination number.

2. Permanently label or code each point of field terminal strips to show the instrument or item served.

3. All pneumatic tubing shall be labeled at each end within 5 cm (2 in.) of termination with a descriptive identifier.

3.7 IDENTIFICATION OF HARDWARE AND WIRING

A. All wiring and cabling, including that within factory-fabricated panels shall be labeled at each end within 5 cm (2 in.) of termination with the DDC address or termination number.

B. All pneumatic tubing shall be labeled at each end within 5 cm (2 in.) of termination with a descriptive identifier.

C. Permanently label or code each point of field terminal strips to show the instrument or item served.

D. Identify control panels with minimum 1 cm (½ in.) letters on laminated plastic nameplates.

E. Identify all other control components with permanent labels. All plug-in components shall be labeled such that removal of the component does not remove the label.

F. Identify room sensors relating to terminal box or valves with nameplates.

G. Manufacturers' nameplates and UL or CSA labels are to be visible and legible after equipment is installed.

H. Identifiers shall match record documents.

I. Control Equipment and Device labeling:

1. Labels and tags shall match the unique identifiers shown on the as-built drawings.

2. All Enclosures shall be labeled to match the as-built drawing by either control panel name or the names of the DDC controllers inside.

3. All sensors and actuators not in occupied areas shall be tagged.

4. Airflow measurement arrays shall be tagged to show flow rate range for signal output range, duct size, and pitot tube AFMS flow coefficient.

5. Duct static pressure taps shall be tagged at the location of the pressure tap.

6. Each device inside enclosures shall be tagged.

7. Terminal equipment need only have a tag for the unique terminal number, not for each device. Match the unique number on:

a. First, the design drawings, or

b. Second, the control as-builts, or

c. Third, the DDC addressing scheme

8. Tags shall be mechanically printed on permanent adhesive backed labeling strips, 12 point height minimum.

9. Identification of Wires

a. Tag each wire with a common identifier on each end of the wire

b. Tag each network wire with a common identifier on each end.

c. Tag each 120V power source with the panel and breaker number it is fed by.

3.8 FIELD QUALITY CONTROL

A. After completion of the installation of work in this section, test, regulate and adjust system equipment, controllers, alarms, sensors, transmitters, switches, relays, automatic control valves, automatic damper motors and related system accessories,

and the entire automation system, including interconnections with the building life safety, plumbing, fire protection and electrical systems, and place these items in complete and satisfactory operating condition. Submit data showing set points and final adjustments of controls.

B. This Contractor shall provide assistance to the Air and Water Balancer for access to all set point adjustments and calibration requirements. At the completion of the balancing process all air and water set points shall be hardcoded into the default set points for each system.

3.9 COMMISSIONING

A. The BMS contractor shall submit point to point verification of all hard-wired control points and Terminal unit control functions verification documentation for terminal units controllers showing all control systems have been tested, startup complete, final PID adjustments complete, dynamic graphics installed on workstation as per owners requirements etc. prior to scheduled commissioning.

B. The BMS contractor shall notify the authorized representative that the BMS is 100% ready for demonstration and commissioning. The BMS contractor shall demonstrate to the authorized representative typical operating functional control loops for 50% of control points and functions. If any failure occurs the test would stop and the BMS contractor shall be responsible to demonstrate all control points.

3.10 CONTROL SYSTEM DEMONSTRATION AND ACCEPTANCE

A. Demonstration

1. Prior to acceptance, the control system shall undergo a series of performance tests to verify operation and compliance with this specification. These tests shall occur after the Contractor has completed the installation, started up the system, and performed his/her own tests.

2. The tests described in this section are to be performed in addition to the tests that the contractor performs as a necessary part of the installation, start-up, and debugging process and as specified in the “Control System Checkout and Testing” article in Part 3 of this specification. The engineer will be present to observe and review these tests. The engineer shall be notified at least 10 days in advance of the start of the testing procedures.

3. The demonstration process shall follow that approved in Part 1, “Submittals.” The approved checklists and forms shall be completed for all systems as part of the demonstration.

4. The contractor shall provide at least two persons equipped with two-way communication and shall demonstrate actual field operation of each control and sensing point for all modes of operation including day, night, occupied, unoccupied, fire/smoke alarm, seasonal changeover, and power failure modes. The purpose is to demonstrate the calibration, response, and action of every point and system. Any test equipment required to prove the proper operation shall be provided by and operated by the contractor.

5. As each control input and output is checked, a log shall be completed showing the date, technician's initials, and any corrective action taken or needed.

6. Demonstrate compliance with Part 1, “System Performance.”

7. Demonstrate compliance with sequences of operation through all modes of operation.

8. Demonstrate complete operation of operator interface.

9. Additionally, the following items shall be demonstrated:

   a. DDC control loop response. The contractor shall supply trend data output in a graphical form showing the step response of each DDC control loop. The test shall show the loop's response to a change in set point, which represents a change of actuator position of at least 25% of its full range. The sampling rate of the trend shall be from 10 seconds to 3 minutes, depending on the speed of the loop. The trend data shall show for each sample the set point, actuator position, and controlled variable values. Any loop that yields unreasonably under-damped or over-damped control shall require further tuning by the Contractor.

   b. Demand limiting. The contractor shall supply a trend data output showing the action of the demand-limiting algorithm. The data shall document the action on a minute-by-minute basis over at least a 30-minute period. Included in the trend shall be building kW, demand limiting set point, and the status of sheddable equipment outputs.

   c. Optimum start/stop. The contractor shall supply a trend data output showing the capability of the algorithm. The change-of value or change-of-state trends shall include the output status of all optimally started and stopped equipment, as well as temperature sensor inputs of affected areas.

   d. Interface to the building fire alarm system.

   e. Operational logs for each system that indicate all set points, operating points, valve positions, mode, and equipment status shall be submitted to the architect/engineer. These logs shall cover three 48-hour periods and have a sample frequency of not more than 10 minutes. The logs shall be provided in both printed and electronic formats.

10. Any tests that fail to demonstrate the operation of the system shall be repeated at a later date. The contractor shall be responsible for any necessary repairs or revisions to the hardware or software to successfully complete all tests.

B. Acceptance

1. All tests described in this specification shall have been performed to the satisfaction of both the engineer and owner prior to the acceptance of the control system as meeting the requirements of completion. Any tests that cannot be performed due to circumstances beyond the control of the contractor may be

exempt from the completion requirements if stated as such in writing by the engineer. Such tests shall then be performed as part of the warranty.

2. The system shall not be accepted until all forms and checklists completed as part of the demonstration are submitted and approved as required in Part 1, “Submittals.”

3.11 CLEANING

A. The contractor shall clean up all debris resulting from their activities daily. The contractor shall remove all cartons, containers, crates, etc., under his/her control as soon as their contents have been removed. Waste shall be collected and placed in a designated location.

B. At the completion of work in any area, the contractor shall clean all work, equipment, etc., keeping it free from dust, dirt, and debris, etc.

C. At the completion of work, all equipment furnished under this section shall be checked for paint damage, and any factory-finished paint that has been damaged shall be repaired to match the adjacent areas. Any cabinet or enclosure that has been deformed shall be replaced with new material and repainted to match the adjacent areas.

3.12 MANUFACTURER'S FIELD SERVICES

A. Start and commission systems. Allow sufficient time for start-up and commissioning prior to placing control systems in permanent operation.

3.13 TEMPERATURE CONTROL SEQUENCES

A. HIGH SCHOOL BUILDING

1. Floor Radiation/Wall Radiation/Ceiling Radiation/Convectors/Fin Tube Radiation:

a. Modulate normally-open 2-WAY modulating contol valve to maintain room at setpoint in occupied mode of 70 degrees F (adjustable) as well as unoccupied reduced temperature setpoint conditions of 62 degrees F (adjustable).

2. Auditorium Rooftop Unit heating coil HC-HS-4:

a. The DDC system shall integrate the heating coil into the existing DDC programming serving existing Auditorium rooftop unit RTU-1.

b. Heating Control- Occupied Mode: If the outside air temperature is 65 degrees F (adjustable) or below and the discharge air temperature setpoint is calling for heating, the heating operation shall be staged to maintain discharge air at setpoint.

1) The heating water 2-way control valve shall modulate open to maintain the heating discharge air setpoint.

2) The controller shall measure the supply air temperature and modulate the heating coil valve open to hot water flow to maintain its heating setpoint.

3) Unoccupied Mode Heating: RTU shall be normally off when the EMCS determines the building to be in unoccupied mode. When a space sensor connected to the RTU falls below the unoccupied setpoint of 62 degrees F (adjustable), the RTU shall turn on in 100% return air mode (outside air damper closed) and the discharge air temperature setpoint shall be 90 degrees F.

c. Low Temperature Protection:

1) When the mixed air temperature downstream of the heating coil is below 35 degrees F (adjustable) in any 12 inch long section of the low temperature thermostat capillary the following shall occur:

(a) Send an alarm to the BAS.

(b) Modulate the heating water control valve to 100% open.

(c) The low temperature thermostat shall be automatically reset once the sensor temperature increases above 40 degrees F.

3. EXISTING 1971 ADDITION HEATING WATER BOILER PLANT

a. Convert all removed pneumatic control systems serving the boiler plant to the DDC system.

b. Boiler plant operation shall be enabled at all times based on outside air temperature. When the outside air temperature is below 65 degrees F (adjustable), the boiler plant shall be enabled.

1) When the boiler plant is enabled the combustion air motorized damper shall open.

2) When the boiler plant is enabled, one of the two boilers shall be enabled. The lead boiler shall be rotated weekly.

3) If the lead boiler fails to fire, the lag boiler shall be enabled.

4) Whenever the outside air temperature is 65 degrees or below (adjustable) the DDC system shall turn one of the two heating water loop pumps. The pump status shall be confirmed with a current sensor. one of the two heating water pumps shall be operated. One of the two pumps shall be deemed the lead pump, and lead pump shall rotate weekly. Should the lead pump fail to start on alarm, the lag pump shall start.

5) 3-WAY MIXING VALVE

(a) Provide sensor and well in outlet of 3-way mixing valve and modulate the mixing valve based on the following outside air reset schedule: When outside air is 20 degrees or below the supply temperature shall be 180 degrees F (adjustable), when the outside air temperature is 60 degrees or above the supply temperature shall be 110 degrees F (adjustable), at outside air temperatures between 20 and 60 F the supply setpoint shall be adjusted linearly between 110 and 180 degrees F.

4. EXISTING AIR HANDLING UNITS AH-4/AH-5

a. Provide updated graphics at the DDC system front end related to the conversion of the AH units control valves and dampers from pneumatic to electronic.

5. Blower Coil Units B-HS-5/BC-HS-6:

a. Fan Operation: General - Start blower coil unit fan when the BMS schedule determines equipment to start. Start fan following contact closure for fire alarm shutdown, low temperature thermostat, and return duct smoke detector (where applicable). Prove fan flow for Supply Fan individually through current sensors.

1) Optimal Start: The Supply Fan shall start prior to scheduled occupancy based on the time necessary for the zones to reach their occupied setpoints. The start time shall automatically adjust based on changes in outside air temperature and zone temperatures. The initial optimal start time shall be 1 hour prior to occupied mode starting (adjustable).

2) Unoccupied Mode: Blower coils shall be normally off in unoccupied mode as determined by the BMS.

b. Discharge Air Setpoint Control: Discharge air temperature setpoint shall be reset according to the space temperature sensor served by the blower coils. As the space temperature rises above a setpoint of 74 degrees F (field adjustable through BMS), the discharge air setpoint shall be reduced. As space temperature decreases, the discharge air setpoint shall be increased. The minimum discharge air temperature shall be 55 degrees F (field adjustable through BMS), and the maximum discharge air temperature shall be 90 degrees F (field adjustable through BMS).

c. Minimum Outside Air Ventilation: Normally Closed, opposed blade outside air damper shall move to the open position when the blower coil is in operation, in occupied mode. The outside air damper shall utilize the outside air duct measuring station to modulate the damper to maintain the scheduled minimum ventilation outside air rate.

d. Economizer Cooling:

1) When the discharge air temperature setpoint and the space temperature sensor are calling for cooling AND return air temperature is higher than

the outside air temperature, the outside air and return air dampers shall modulate to meet the discharge air temperature to cool the space.

e. Mechanical cooling via Variable Refrigerant Volume (VRV) Heat Pump system:

1) The DDC shall integrate into the BACnet controller on the VRV heat pump system to provide start and stop operation of the heat pump units.

2) When Economizer operation is available through the DDC system, the Heat Pump shall be locked off from mechanical cooling operation. When the outside air temperature is above 64 degrees F (adjustable) and the blower coil is calling for cooling, the heat pumps shall be enabled to operate.

3) When the blower coil is calling for cooling to meet the space temperature setpoint, the following shall occur:

(a) The DDC system shall send a dry contact to the blower coil VRV control kit to enable cooling via the VRV expansion valve kit and a separate dry contact sent to the VRV control kit to enable the blower coil supply fan.

(b) The DDC system shall send a 0-10 VDC input to the VRV expansion valve kit to provide cooling as required to meet the space setpoint.

f. Heating Control- Occupied Mode: If the outside air temperature is 65 degrees F (adjustable) or below and the discharge air temperature setpoint is calling for heating, the hot water valve shall modulate to maintain the supply air temperature at the supply air setpoint as determined by the reset schedule.

1) Unoccupied Mode Heating: The blower coil shall be normally off when the BMS determines the building to be in unoccupied mode. When the space temperature sensor served by the blower coil falls below the unoccupied setpoint of 62 degrees F (adjustable), the blower coil shall operate with outside air damper closed, return damper 100% open, heating control valve modulating to provide 95 degree air to the space until the unoccupied setpoint is reached.

2) Low Temperature Protection:

(a) When the mixed air temperature downstream of the heating coil is below 35 degrees F (adjustable) in any 12 inch long section of the low temperature thermostat capillary the following shall occur:

(1) Send an alarm to the BMS.

(2) Open the control valve to 100% open.

(3) The low temperature thermostat shall be of the automatic reset type.

g. Filter Differential: Provide analog input to measure static pressure differential across filter and alarm through the BMS when differential static pressure exceeds field adjustable setpoint.

h. Fire Alarm Shutdown: When the fire alarm system is in an alarm condition as noted through contacts in the fire alarm panel, the unit shall be shut down and all dampers and valve actuators shall be placed in their normal positions.

i. The outside air dampers shall close whenever the unit is off.

j. F-HS-24:

1) Rooftop exhaust fan F-HS-24 is the relief air fan for Art Classroom 110 and associated blower coil BC-HS-5.

2) The balancing agency shall set the relief air fan serving Art classroom 110 to modulate between two speeds during occupied mode. When the blower coil is in minimum (non-economizer) ventilation mode, the relief fan speed shall be set to the speed required to exhaust 865 CFM (minimum exhaust air rate required for an Art Classroom). When the blower coil is in economizer mode, the relief fan speed shall be set to the speed required to exhaust 1,400 CFM.

k. F-HS-32:

1) Rooftop exhaust fan F-HS-24 is the relief air fan for blower coil BC-HS-6 and unit ventilators UV-HS-28, 29, 31 and 32.

2) F-HS-32 shall be turn on with the motorized damper opened whenever any one of the outside air dampers is open on the equipment listed in part k.,1).

3) F-HS-32 shall be operated via a variable frequency drive. An air measuring station installed within the exhaust ductwork system upstream of the riser to the exhaust fan shall be utilized to track the exhaust air rate.

4) The fan speed shall be adjusted to match the outside air rates of the associated unit ventilators and blower coil BC-HS-6. When all units are in economizer mode, the exhaust fan speed shall be set to exhaust 4,500 CFM. When all units are in minimum outside air mode, the exhaust fan speed shall be set to exhaust 1,920 CFM. The exhaust fan speed shall monitor the position of BC-HS-6 and the unit ventilators and modulate between the minimum and maximum airflow settings as required based on the position of the outside air dampers.

5) The exhaust fan shall be off when all outside air dampers on the units are closed.

6. Exhaust Fan F-HS-7:

a. When existing Boys Locker Room air handling unit AHU-1 status is ON, F-HS-7 shall be operated with the motorized damper open. The variable speed drive on the fan shall be set during balancing to exhaust the scheduled exhaust air rate and the fan speed shall be normally set to this speed when the fan is on.

7. Exhaust Fan F-HS-22 and F-HS-30:

a. Fans shall be OFF in building unoccupied modes. Fans shall be turned on with motorized dampers open during building occupied modes.

8. Blower Coil Units BC-HS-3/BC-HS-4:

a. Fan Operation: General: Start blower coil unit fan when the BMS schedule determines equipment to start. Start fan following contact closure for fire alarm shutdown, low temperature thermostat, and return duct smoke detector (where applicable). Prove fan flow for Supply Fan individually through current sensors.

1) Optimal Start: The Supply Fan shall start prior to scheduled occupancy based on the time necessary for the zones to reach their occupied setpoints. The start time shall automatically adjust based on changes in outside air temperature and zone temperatures. The initial optimal start time shall be 1 hour prior to occupied mode starting (adjustable).

2) Unoccupied Mode: Blower coils shall be normally off in unoccupied mode as determined by the BMS.

b. Discharge Air Setpoint Control: Discharge air temperature setpoint shall be reset according to the space temperature sensor served by the blower coils. As the space temperature rises above a setpoint of 74 degrees F (field adjustable through BMS), the discharge air setpoint shall be reduced. As space temperature decreases, the discharge air setpoint shall be increased. The minimum discharge air temperature shall be 55 degrees F (field adjustable through BMS), and the maximum discharge air temperature shall be 90 degrees F (field adjustable through BMS).

c. Minimum Outside Air Ventilation: Normally Closed, opposed blade outside air damper shall move to the open position when the blower coil is in operation, in occupied mode. The outside air damper shall utilize the outside air duct measuring station to modulate the damper to maintain the scheduled minimum ventilation outside air rate.

d. Economizer Cooling:

1) When the discharge air temperature setpoint and the space temperature sensor are calling for cooling AND return air temperature is higher than the outside air temperature, the outside air and return air dampers shall modulate to meet the discharge air temperature to cool the space.

e. Heating Control- Occupied Mode: If the outside air temperature is 65 degrees F (adjustable) or below and the discharge air temperature setpoint is calling for heating, the hot water valve shall modulate to maintain the supply air temperature at the supply air setpoint as determined by the reset schedule.

1) Unoccupied Mode Heating: The blower coil shall be normally off when the BMS determines the building to be in unoccupied mode. When the space temperature sensor served by the blower coil falls below the unoccupied setpoint of 62 degrees F (adjustable), the blower coil shall operate with outside air damper closed, return damper 100% open, heating control valve modulating to provide 95 degree air to the space until the unoccupied setpoint is reached.

2) Low Temperature Protection:

(a) When the mixed air temperature downstream of the heating coil is below 35 degrees F (adjustable) in any 12 inch long section of the low temperature thermostat capillary the following shall occur:

(1) Send an alarm to the BMS.

(2) Open the control valve to 100% open.

(3) The low temperature thermostat shall be of the automatic reset type.

f. Filter Differential: Provide analog input to measure static pressure differential across filter and alarm through the BMS when differential static pressure exceeds field adjustable setpoint.

g. Fire Alarm Shutdown: When the fire alarm system is in an alarm condition as noted through contacts in the fire alarm panel, the unit shall be shut down and all dampers and valve actuators shall be placed in their normal positions.

h. The outside air dampers shall close whenever the unit is off.

i. Exhaust fans F-HS-15/F-HS-16:

1) When the blower coils outside air dampers are closed, F-HS-15/F-HS-16 shall be off.

2) When blower coils are operating in minimum ventilation mode with the outside air dampers open, F-HS-15 shall be OFF and F-HS-16 shall operate with the motorized damper open.

3) When the blower coils are operating in economizer mode with return dampers closed both F-HS-15 and F-HS-16 shall operate with motorized dampers open.

9. NON-cooling floor mounted fan coil units:

a. Fan Operation: General: Start fan coil unit fan when the BMS schedule determines equipment to start. Prove fan flow for Supply Fan individually through current sensors.

b. Minimum Outside Air Ventilation: Normally Closed, opposed blade outside air damper shall move to the open position when the fan coil is in operation, in occupied mode. The balancing agency shall set the damper opening position based on the scheduled outside air rate of each fan coil unit so when the damper opens no additional outside air is brought into the fan coil unit.

c. Heating Control- Occupied Mode: If the outside air temperature is 65 degrees F (adjustable) or below and the space temperature setpoint is calling for heating, the hot water valve shall modulate to maintain the space setpoint.

1) Unoccupied Mode Heating: Thefan coil shall be normally off when the BMS determines the building to be in unoccupied mode. When the space temperature sensor served by the fan coil falls below the unoccupied setpoint of 62 degrees F (adjustable), the fan coil shall operate with outside air damper closed, heating control valve modulating until the unoccupied setpoint is reached.

10. Kitchen Hoods H-1A/H-1B and kitchen general exhaust fan F-HS-1:

a. When the manual switch for the Kitchen Hood is activated or the temperature sensors in either of the two kitchen hoods is activated, exhaust fan F-HS-2 shall start. The fan speed shall be controlled by hood-mounted variable speed hood controller (or demand control ventilation control panel). DDC wiring shall be routed from the F-HS-2 variable speed drive to the kitchen hood system demand control ventilation control panel. When F-HS-1 is operating, existing Rooftop units RTU-HS-4/RTU-HS-5 shall be switched to operate in occupied mode (if either RTU is off in unoccupied mode). The supply fan airflow setpoint for RTU shall be overidden by operation of F-HS-2 so that the outside airflow setpoint for RTU-HS-4 and RTU-HS-5 shall be a minimum of 2,250 CFM each. Should the outside air setpoints for the RTUs already equal to or greatehr then 2,250 CFM each, then no airflow adjustments are required with the RTUs.

b. If the building is in occupied mode and F-HS-1 is off, kitchen general exhaust fan F-HS-1 shall operate with the motorized damper open. When F-HS-2 fan status is ON, F-HS-1 shall be OFF. F-HS-2 shall be off in unoccupied mode.

11. Unit Ventilators:

a. Run Conditions - Scheduled:

1) The unit shall run according to a user definable time schedule in the following modes:

(a) Occupied Mode: The unit shall maintain

(1) A 76°F (adj.) cooling setpoint

(2) A 70°F (adj.) heating setpoint.

2) Unoccupied Mode (night setback): The unit shall maintain

(a) A 85°F (adj.) cooling setpoint.

(b) A 64°F (adj.) heating setpoint.

3) Unit Ventilator sensors shall include local temperature, but shall not allow user temperature sensor override capability from the sensor, that shall occur at the DDC front end.

b. Alarms shall be provided as follows:

1) High Zone Temp: If the zone temperature is greater than the cooling setpoint by a user definable amount (adj.).

2) Low Zone Temp: If the zone temperature is less than the heating setpoint by a user definable amount (adj.).

c. Zone Unoccupied Override:

1) A timed local override control shall allow an occupant to override the schedule and place the unit into an occupied mode for an adjustable period of time. At the expiration of this time, control of the unit shall automatically return to the schedule.

d. Freeze Protection:

1) The unit shall shut down and generate an alarm upon receiving a low temperature thermostat status while the outside/return air damper shall close the outside air damper and open the face and bypass damper fully open to the bypass position.

e. Fan:

1) The fan shall run anytime the unit is commanded to run, unless shutdown on safeties.

f. Face and Bypass Dampers Control:

1) The unit shall maintain zone heating and cooling setpoints by modulating the face and bypass dampers through one of the following:

g. Heating:

1) When the zone temperature is less than the heating setpoint, the face and bypass dampers shall modulate open to face position (closed to bypass position) to maintain setpoint by modulating the air passing over the heating coil.

2) When the zone temperature is greater than the heating setpoint, the face and bypass dampers shall close to face position (open to bypass position).

3) Heating Coil Valve :

(a) The controller shall measure the zone temperature and modulate the heating coil valve to maintain its heating setpoint with the face and bypass damper fully open to the face (coil) position.

(b) The heating shall be enabled whenever:

(1) Outside air temperature is less than 65°F (adj.).

(2) AND the zone temperature is below heating setpoint.

(3) AND the fan is on.

(c) The heating coil valve shall open whenever the low temperature thermostat is on.

h. Economizer:

1) The controller shall measure the zone temperature and modulate the mixed air dampers in sequence to maintain the zone cooling setpoint. The outside air dampers shall maintain a minimum adjustable position open based on the ventilation rates during heating and ventilation whenever in occupied and non-economizer mode.

2) The economizer shall be enabled whenever:

(a) Outside air temperature is at least 2°F (adj.) less than the Zone Temperature.

(b) AND the outside air temperature is less than 64°F (adj.)

(c) The outside air damper shall be 100% open and the return damper closed when in economizer mode.

3) The economizer shall close whenever the low temperature thermostat is on.

4) The outside air dampers shall close and the return air damper shall open when the unit is off. If Optimal Start Up is available the mixed air damper shall operate as described in the occupied mode except that the outside air damper shall modulate to fully closed.

5) The controller shall monitor the discharge air temperature. Should discharge temperature drop below a user definable temperature (adj.), the controller shall enable the heating, close the outside damper and open the return damper.

i. Mechanical cooling via Variable Refrigerant Volume (VRV) Heat Pump system (for all unit ventilators except for UV-HS-38):

1) The DDC shall integrate into the BACnet controller on the VRV heat pump system to provide start and stop operation of the heat pump units.

2) When Economizer operation is available through the DDC system, the Heat Pump shall be locked off from mechanical cooling operation. When the outside air temperature is above 64 degrees F (adjustable) and any unit ventilator is calling for cooling, the heat pumps shall be enabled to operate.

3) When an individual unit ventilator is calling for cooling to meet the space temperature setpoint, the following shall occur:

(a) The DDC system shall send a dry contact to the unit ventilator VRV control kit to enable cooling via the VRV expansion valve kit and a separate dry contact sent to the VRV control kit to enable the unit ventilator supply fan.

(b) The DDC system shall send a 0-10 VDC input to the VRV expansion valve kit to provide cooling as required to meet the space setpoint.

j. Mechanical cooling for UV-HS-38:

1) When Economizer operation is available through the DDC system, the UV-HS-38's associated one-ton-one condensing unit shall shall be locked off from mechanical cooling operation. When the outside air temperature is above 64 degrees F (adjustable) and the unit ventilator is calling for cooling, the DDC system shall provide a digital output point to the condensing unit to operate the cooling.

k. Minimum Outside Air Ventilation - Fixed Percentage:

1) The outside air dampers shall maintain a minimum position (adj.) as determined by the balancing operations during building occupied hours when in non-economizer mode and be closed during unoccupied hours.

l. Discharge Air Temperature:

1) The controller shall monitor the discharge air temperature.

m. Alarms shall be provided as follows:

1) High Discharge Air Temp: If the discharge air temperature is greater than 110°F (adj.).

2) Low Discharge Air Temp: If the discharge air temperature is less than 40°F (adj.).

n. Fan Status:

1) The controller shall monitor the fan status.

o. Alarms shall be provided as follows:

1) Fan Failure: Commanded on, but the status is off.

2) Fan in Hand: Commanded off, but the status is on.

p. Unit Ventilator Relief/Exhaust Air Fans (where rooftop exhaust fans are provided to relieve ventilation air brought in from unit ventilators):

1) During building occupied periods all relief air fans shall be activated.

(a) Motorized Backdraft Damper: Open the fan's motorized damper when the fan is started

2) Relief air fan operation:

(a) The balancing agency shall set the relief air fan serving each classroom to modulate between two speeds during occupied mode. When the unit ventilator is in minimum (non-economizer) ventilation mode, the relief fan speed shall be set to the speed required to exhaust the minimum ventilation airflow of the unit ventilator. When the unit ventilator is in economizer mode, the relief fan speed shall be set to the speed required to exhaust the total supply airflow of the unit ventilator.

12. NON-DUCTED VARIABLE REFRIGERANT VOLUME (VRV) FAN COIL UNITS:

a. Mode: Heating mode for each controller shall be locked out at the building wide system master controller for the spaces served by non-ducted VRV fan coil units that are utilizing the building's existing heating water system for heating via fin tube radiation or convector units. Should the building's heating water system be down for any reason (via an alarm condition located at the building management system front end, such as boilers' status OFF), the VRV heat pump system heating mode shall be activated at the DDC system or at the VRV system master controller. Each remote controller shall be set to cooling mode with the temperature setpoint range restricted to a minimum value of 76 degrees F to maintain a 5 degree deadband between the cooling system and the heating system sensors operated by the building's direct digital control system which set a maximum heating setpoint of 70 degrees F.

b. For non-ducted VRV fan coil units that are NOT utilizing the building's heating water system for heat, the fan coil unit controller shall be utilized for heating with a maximum heating setpoint of 70 degrees F. The heat pump connected to these fan coil units shall be utilized for heating as required.

c. ON/OFF Timer: Each remote controller's ON/OFF daily timer setting shall be utilized to turn the fan coil unit operation mode to cooling set to the building's occupied start time. The controller shall turn off the supply fan daily at the building's occupied end time. The cooling mode shall be off on Saturday and

Sunday. Coordinate the building's occupied start and end times with facility personnel.

d. During the building's occupied periods the fan shall run and cooling shall be enabled in the fan coil unit when the temperature at the remote controller rises above the space setpoint of 76 degrees F.

13. Energy Recovery Ventilator ERV-HS-1:

a. The operation of ERV-HS-1 shall be enabled through the DDC system. During building unoccupied periods, the ERV-HS-1 shall be off at all times. During building occupied periods the ERV-HS-1 shall be activated and the associated outside air and exhaust air dampers open.

b. Supply/Exhaust fan speed: The fan speeds shall be run at constant speed with the electrically commutated fan motors balanced to the scheduled supply and exhaust airflow amounts.

c. Space temperature/Electric Heating Coil EHC-HS-1: A space temperature shall be provided in the space served by ERV-HS-1 with the space sensor set to 66 degrees F (adjustable). Should the space temperature fall below 66 degrees F, the electric heating coil shall be activated through the DDC system to meet the space temperature setpoint. Provide relays between the ERV-HS-1 controller, the space sensor and the 24-VAC electric heating coil transformer as required to operate the heating coil.

14. Cabinet Unit Heaters:

a. Cycle fan operation and valve position to maintain space temperature at setpoint conditions through space temperature sensor. Provide a two-position, normally-open, spring return control valve on the hot water return line.

B. BARR MIDDLE SCHOOL

1. Exhaust fan EF-MS-6:

a. When the DDC system determines the building to be in occuped mode, rooftop exhaust fan EF-MS-6 shall operate, and the associated motorized damper opened.

b. When the DDC system determines the building to be in unoccupied mode, the fan shall be off and the motorized damper closed.

2. Boiler system back-up primary pumps P-MS-1/P-MS-2:

a. Pumps P-MS-1/P-MS-2 are being furnished to be back-up primary pumps when associated, existing boilers are activated (B-1 connected to P-MS-1/B-2 connected to P-MS-2).

b. The DDC system shall turn on one of the two primary pumps whenever a boiler is activated (existing P-1 or P-MS-1 for boiler B-1, existing P-2 or P-

MS-2 for boiler B-2). The pump status for P-MS-1/P-MS-2 shall be confirmed with a current sensor. Should the lead pump fail to start on alarm, the lag pump shall start. The DDC system shall rotate the lead pump weekly.

3. Existing rooftop unit RTU-2:

   a. Fan Operation: General: Start RTU through 0-10 VDC input signal located on RTU supply fan variable speed drive. In AUTO position, start unit operation when the DDC schedule determines equipment to start. Start fan following contact closure for fire alarm shutdown, low temperature thermostat, return duct smoke detector. Prove fan flow for Supply Fan through current sensor.

      1) Optimal Start: The Supply fan shall start prior to scheduled occupancy based on the time necessary for the zones to reach their occupied setpoints. The start time shall automatically adjust based on changes in outside air temperature and zone temperatures. The initial optimal start time shall be 1 hour prior to occupied mode starting (adjustable).

   b. Supply Fan Speed - Modulate the fan speed to maintain the following:

      1) Provide a static pressure sensor on the supply air system at location shown on the drawings and the static pressure shall be adjusted based on the position of the supply VAV Box dampers serving the RTU. The DDC shall reset the supply duct static pressure setpoint so that the supply VAV Box damper requiring the highest inlet pressure is 100% open and all supply VAV Boxes are achieving their maximum design airflow values.

   c. Discharge Air Setpoint Control: Discharge air temperature setpoint shall be reset according to space temperature sensors. The EMCS shall discriminate all space temperature sensors served by the RTU system to determine the space with the peak cooling requirement. As the space temperature sensor in the selected space increases above a setpoint of 76 degrees F (field adjustable through EMCS), the discharge air setpoint shall be reduced. As space temperature decreases, the discharge air setpoint shall be increased. The minimum discharge air temperature shall be 55 degrees F and the maximum discharge air temperature shall be 75 degrees F (field adjustable through EMCS).

   d. Minimum Outside Air Ventilation: Normally Closed outside air damper shall move to the open position when RTU is in operation in occupied mode.

      1) The outside air damper shall be closed when the RTU is in unoccupied mode unless the RTU is operating in economizer mode during morning cool down period. To meet unoccupied mode space setpoints, the RTU shall operate in 100% recirculation mode with the outside air damper closed and the recirculation damper 100% open.

   e. Economizer:

      1) The economizer shall be enabled whenever:

(a) Outside air temperature is less than 62°F (adjustable).

(b) AND the outside air temperature is less than the return air temperature.

(c) AND the discharge air temperature setpoint is less than the outside air temperature.

(d) AND the supply fan status is on.

2) The economizer shall turn off whenever:

(a) Mixed air temperature drops from 45°F to 40°F (adjustable).

(b) OR on loss of supply fan status.

(c) OR low temperature thermostat is on.

f. DX COOLING:

1) If the conditions for economizer cooling are unavailable and the discharge air temperature setpoint is calling for cooling, the DX Cooling coil compressor shall be staged as required to maintain the discharge air temperature setpoint.

g. Heating Control via heating coil: If the outside air temperature is 65 degrees F (adjustable) or below and the discharge air temperature setpoint is calling for heating, the heating coil's 2-way modulating control valve shall modulate to maintain the discharge air setpoint.

1) Unoccupied heating mode: If a space served by RTU is also heated by existing fin tube radiation, the unoccupied heating setpoint (62 degrees, adjustable) shall utilize the fin tube as the first stage of heat. If the fin tube can't meet the unoccupied setpoint after 15 minutes OR the space is only heated via the RTU, then the RTU shall turn on in 100% recirculation mode with the VAV Box in the space below setpoint 100% open with a 64 F degree discharge setpoint. The RTU heating coil control valve shall modulate open to as required. The VAV Box reheat coil control valve shall then modulate open to meet the unoccupied space setpoint with a discharge air setpoint out of the VAV Box of 90 F. Should the RTU supply fan VFD be at its minimum speed, each VAV box not below unoccupied setpoint shall open to minimum positions to maintain RTU supply fan speed above minimum levels.

2) Low Temperature Protection:

(a) When the mixed air temperature downstream of the Heating Coil is below 35 degrees F (adjustable) in any 12 inch long section of the low temperature thermostat capillary the following shall occur:

(1) Send an alarm to the BAS.

(2) The low temperature thermostat shall be automatically reset once the sensor temperature increases above 40 degrees F.

(b) When the outside air temperature is below 35 degrees F (adjustable) and the RTU supply fan is off, the heating coil valve shall be open to provide heat through the RTU heating coil.

h. The outside and exhaust air dampers shall close when the unit is off.

i. VAV Boxes with reheat coils:

1) Box Minimum Flow Setpoints: Supply VAV Boxes shall modulate between minimum and maximum airflow setpoints as scheduled to maintain the space temperature setpoint during occupied hours.

2) Supply VAV Box reheat coil: The VAV Box hot water reheat coil 2-way valves shall modulate as required to maintain the space temperature setpoint. Where a space is served by a VAV Box reheat coil and existing fin tube radiation, the fin tube shall be the primary heating source and the VAV Box reheat coil the secondary heat source. The maximum discharge air setpoint out of the VAV Box reheat coils shall be 90 F.

4. Existing RTU-1 and Existing RTU-3 heating coil control valves:

a. Heating Control via heating coil: If the outside air temperature is 65 degrees F (adjustable) or below and the discharge air temperature setpoint is calling for heating, the heating coil's 2-way modulating control valve shall modulate to maintain the discharge air setpoint.

1) Unoccupied heating mode: If a space served by RTU is also heated by existing fin tube radiation, the unoccupied heating setpoint (62 degrees, adjustable) shall utilize the fin tube as the first stage of heat. If the fin tube can’t meet the unoccupied setpoint after 15 minutes OR the space is only heated via the RTU, then the RTU shall turn on in 100% recirculation mode with 90 F degree discharge setpoint. The RTU heating coil control valve shall modulate open to as required.

2) Low Temperature Protection:

(a) When the mixed air temperature downstream of the Heating Coil is below 35 degrees F (adjustable) in any 12 inch long section of the low temperature thermostat capillary the following shall occur:

(1) Send an alarm to the BAS.

(2) The low temperature thermostat shall be automatically reset once the sensor temperature increases above 40 degrees F.

(b) When the outside air temperature is below 35 degrees F (adjustable) and the RTU supply fan is off, the heating coil valve shall be open to provide heat through the RTU heating coil.

5. Floor Radiation/Fin Tube Radiation:

    a. Modulate normally-open 2-WAY modulating contol valve to maintain room at setpoint in occupied mode of 70 degrees F (adjustable) as well as unoccupied reduced temperature setpoint conditions of 62 degrees F (adjustable).

C. MILLER ELEMENTARY SCHOOL

1. Cabinet Unit Heaters:

    a. Cycle fan operation and valve position to maintain space temperature at setpoint conditions through space temperature sensor. Provide a two-position, normally-open, spring return control valve on the hot water return line.

2. Hydronic Heating Radiant Panels:

    a. Open and close the two-way normally-open control valve to maintain space temperature at heating setpoint. Heating setpoint shall be 70 degrees F (adjustable) in occupied modes and 64 degrees F (adjustable) during unoccupied modes.

3. Exhaust Fans EF-MES-4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 16, 18, 19, 20:

    a. Fans shall be OFF during building unoccupied periods with associated motorized damper closed.

    b. Fans shall be ON during building occupied periods with associated motorized damper opened.

4. Exhaust Fans EF-MES-14 and EF-MES-15:

    a. Exhaust fans shall serve gymnasium relief air and each be driven by a variable frequency drive.

    b. When existing air handling units AHU-1 and AHU-2 are OFF, EF-MES-14 AND EF-MES-15 shall be off with motorized dampers closed.

    c. When existing air handling units AHU-1 and AHU-2 are operating with outside air dampers in non-economizer, minimum ventilation mode, EF-MES-14 and EF-MES-15 shall be turned on with the motorized dampers open. The variable frequency drive speed shall be set through the DDC system to a speed to exhaust 650 CFM.

    d. When existing air handling units AHU-1 and AHU-2 are operating with outside air dampers in economizer (100% outside air mode), EF-MES-14 and EF-MES-15 shall be turned on with the motorized dampers open. The variable frequency drive speed shall be set through the DDC system to a speed to exhaust 3,500 CFM.

e. The balancing agency shall provide coordination as required to balance the fan speeds at the two settings indicated and provide the fan speed settings as required to set the fan programming at the two parameters.

D. TRAINING

1. Provide sixteen (8) hours of on-site training for up-to four (4) building operators from competent factory authorized personnel. Intent is to provide instruction to operation and maintenance personnel concerning the location, operation and troubleshooting of the installed systems. The instruction shall be scheduled in coordination with the Construction Manager and owner after submission and approval of formal training plans. Training on BAS systems other than Siemens shall be (40) Hours.

2. Additional training of (16) hours shall be provided for DESIGO software

3. (2) multi-day remote site classroom training sessions shall be included for up to (1) person for DESIGO software.

4. Training shall include but not limited to:

a. Explanation of drawings and operations and maintenance manuals.

b. Walk thru of the job to locate control components.

c. Operator workstation and peripherals.

d. Operator control functions including graphic generation and field panel programming.

e. Explanation of adjustment, calibration and replacement procedures.

END OF SECTION

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Hydronic system requirements.

B. Heating water and glycol piping, above grade.

C. Cooling coil condensate piping.

D. Natural Gas piping, above grade.

E. Pipe hangers and supports.

F. Unions, flanges, mechanical couplings, and dielectric connections.

1.2 REFERENCE STANDARDS

A. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators; 2023.

B. ASME B16.3 - Malleable Iron Threaded Fittings; The American Society of Mechanical Engineers; 1998 (R2006).

C. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2021.

D. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2021.

E. ASME B31.9 - Building Services Piping; The American Society of Mechanical Engineers; 2008.

F. ASTM A106/A106M - Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service; 2019a.

G. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

H. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service; 2023a.

I. ASTM B32 - Standard Specification for Solder Metal; 2020.

J. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2022.

K. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2020.

L. ASTM D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40; 2023.

M. ASTM D2855 - Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets; 2020.

N. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers; 1992 (Reapproved 2022).

O. ASTM F 708 - Standard Practice for Design and Installation of Rigid Pipe Hangers; 1992 (Reapproved 2008).

P. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2018, with Amendment (2019).

1.3 SUBMITTALS

A. Piping Schedule: Provide schedule of piping applications and materials, indicating piping and fittings.

B. Piping Shop Drawings: Provide drawings of piping installation, indicating dimensioned locations, equipment, critical dimensions, elevations, sizes, systems, and valve locations.

C. Product Data:

1. Include data on pipe materials, pipe fittings, valves, and accessories.

2. Provide manufacturers catalog information.

3. Indicate valve data and ratings.

D. Manufacturer's Installation Instructions: Indicate hanging and support methods, joining procedures.

E. Project Record Documents: Record actual locations of valves.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified in this sectionwith minimum three years of experience.

C. Welder Qualifications: Certify in accordance with ASME BPVC-IX.

1. Provide certificate of compliance from authority having jurisdiction, indicating approval of welders.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

B. Provide temporary protective coating on cast iron and steel valves.

C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

PART 2 PRODUCTS

2.1 HYDRONIC SYSTEM REQUIREMENTS

A. Comply with ASME B31.9 and applicable federal, state, and local regulations.

B. Piping: Provide piping, fittings, hangers, and supports as required, as indicated, and as follows:

1. Where more than one piping system material is specified, provide joining fittings that are compatible with piping materials and ensure that the integrity of the system is not jeopardized.

2. Use non-conducting dielectric connections whenever jointing dissimilar metals.

3. Grooved mechanical joints are not permitted in any location.

4. Provide pipe hangers and supports in accordance with ASME B31.9 or MSS SP-58 unless indicated otherwise.

C. Pipe-to-Valve and Pipe-to-Equipment Connections: Use flanges or unions to allow disconnection of components for servicing; do not use direct welded, soldered, or threaded connections.

D. Valves: Provide valves where indicated:

1. Provide drain valves where indicated, and if not indicated provide at least at main and main branch shut-offs locations, low points of piping, bases of vertical risers, and at equipment. Use 3/4 inch ball valves with cap.

2. For throttling, bypass, or manual flow control services, use ball or butterfly valves.

3. For shut-off and to isolate parts of systems or vertical risers, use ball or butterfly valves.

2.2 HEATING WATER AND GLYCOL PIPING

A. Steel Pipe for sizes 2-1/2" and above: ASTM A53/A53M, Schedule 40, black, using one of the following joint types:

1. Welded Joints: ASTM A234/A234M, wrought steel welding type fittings; AWS D1.1/D1.1M welded.

2. Threaded Joints: ASME B16.3, malleable iron fittings.

3. Fittings: ASTM B 16.3, malleable iron or ASTM A 234/A 234M, forged steel welding type fittings.

B. Copper Tube for piping sizes 3" and below: ASTM B88 (ASTM B88M), Type L (B), drawn, using one of the following joint types:

1. Solder Joints: ASME B16.18 cast brass/bronze or ASME B16.22 solder wrought copper fittings.

a. Solder: ASTM B32 lead-free solder, HB alloy (95-5 tin-antimony) or tin and silver.

b. Braze: AWS A5.8M/A5.8 BCuP copper/silver alloy.

2. Hydraulic Press Fitting for Copper Tubing.

a. Acceptable Fittings:

1) ProPress by Viega, 301 N. Main, Wichita, KS 67202, (877) 843-4262, www.viega.com.

b. Operating Conditions:

1) Maximum Operating Pressure: 200 psi.

2) Operating Temperature Range: 0-250 degrees F.

3) Maximum Test Pressure: 600 psi.

4) Maximum Vacuum: 29.2 inches hg @ 68 degrees F.

c. Features:

1) Fittings: Copper and copper alloy conforming to material requirements of ASME B16.18 or ASME B16.22.

(a) Stainless Steel Grip Ring: Adds strength to the joint without collapsing the interior passageway.

2) No flame for soldering required for installation of fittings and valves.

3) Unpressed connections identified during pressure testing when water flows past sealing element.

4) Sealing Elements: Factory installed, EPDM.

5) Fittings that have been pressed can be rotated. If rotated more than 5 degrees, the fitting must be repressed to restore its resistance to rotational movement.

6) Extended fitting end lead allows for twice the retention grip surface, and assists with proper tube alignment.

7) Soldered adapter fittings are not allowed.

3. Tee Connections: Mechanically extracted collars with notched and dimpled branch tube.

2.3 COOLING COIL CONDENSATE PIPING SYSTEM

A. Copper Tube: ASTM B 88 (ASTM B 88M), Type L (B), hard drawn.

1. Fittings: ASME B16.18, cast brass, or ASME B16.22, solder wrought copper.

2. Tee Connections: Mechanically extracted collars with notched and dimpled branch tube.

3. Joints: Solder, lead free, ASTM B 32, HB alloy (95-5 tin-antimony), or tin and silver.

B. PVC Pipe: ASTM D 1785, Schedule 40, or ASTM D 2241, SDR 21 or 26.

1. Fittings: ASTM D 2466 or D2467, PVC.

2. Joints: Solvent welded.

2.4 NATURAL GAS PIPING, ABOVE GRADE

A. Steel Pipe: ASTM A53/A53M Schedule 40 black.

1. Fittings:

a. ASME B16.3, malleable iron, or ASTM A234/A234M, wrought steel welding type.

b. Cold Press Mechanical Joint Fittings shall conform to material requirements of ASTM A420 or ASME B16.3 and performance criteria of IAPMO PS117. Sealing elements for press fittings shall be FKM. Sealing elements shall be factory installed or an alternative supplied by fitting manufacturer. Press ends shall have Smart Connect technology design. MegaPress fittings with the Smart Connect technology assure leakage of liquids and/or gases from inside the system past the sealing element of an unpressed connection. The function of this technology is to provide the installer quick and easy identification of connections which have not been pressed prior to putting the system into operation.

2. Joints:

a. NFPA 54, threaded or welded to ASME B31.1 or cold press mechanical joint fittings.

2.5 PIPE HANGERS AND SUPPORTS

A. Provide hangers and supports that comply with MSS SP-58.

1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.

B. Hangers for Pipe Sizes 1/2 to 1-1/2 Inches: Malleable iron, adjustable swivel, split ring.

C. Hangers for Cold Pipe Sizes 2 Inches and Greater: Carbon steel, adjustable, clevis.

D. Hangers for Hot Pipe Sizes 2 to 4 Inches: Carbon steel, adjustable, clevis.

E. Hangers for Hot Pipe Sizes 6 Inches and Greater: Adjustable steel yoke, cast iron roll, double hanger.

F. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.

G. Multiple or Trapeze Hangers for Hot Pipe Sizes 6 Inches and Greater: Steel channels with welded spacers and hanger rods, cast iron roll.

H. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.

I. Wall Support for Pipe Sizes 4 Inches and Greater: Welded steel bracket and wrought steel clamp.

J. Wall Support for Hot Pipe Sizes 6 Inches and Greater: Welded steel bracket and wrought steel clamp with adjustable steel yoke and cast iron roll.

K. Vertical Support: Steel riser clamp.

L. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

M. Floor Support for Hot Pipe Sizes to 4 Inches: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

N. Floor Support for Hot Pipe Sizes 6 Inches and Greater: Adjustable cast iron roll and stand, steel screws, and concrete pier or steel support.

O. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

P. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.

Q. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

R. Rooftop Supports for Low-Slope Roofs and Exterior Pipe supports at grade level: Steel pedestals with bases that rest on top of roofing membrane or on grade, not requiring any attachment to the roof structure or exterior grade and not penetrating the roofing assembly or exterior grading, with support fixtures as specified; and as follows:

1. Bases: High-density polypropylene.

2. Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly or exterior grading.

3. Steel Components: Stainless steel or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A123/A123M.

4. Attachment/Support Fixtures: As recommended by manufacturer, same type as indicated for equivalent indoor hangers and supports; corrosion-resistant material.

5. Height: Provide minimum clearance of 6 inches under pipe to grade level or to top of roofing .

2.6 UNIONS, FLANGES, MECHANICAL COUPLINGS, AND DIELECTRIC CONNECTIONS

A. Unions for Pipe of 2 Inches and Less:

1. Ferrous Piping: 150 psi brass or malleable iron, threaded.

2. Copper Pipe: Bronze, soldered joints.

B. Flanges for Pipe 2 Inches and Greater:

1. Ferrous Piping: 150 psig forged steel, slip-on.

2. Copper Piping: Bronze.

3. Gaskets: 1/16 inch thick, preformed neoprene.

C. Dielectric Connections:

1. Waterways:

a. Water impervious insulation barrier capable of limiting galvanic current to 1 percent of short circuit current in a corresponding bimetallic joint.

b. Dry insulation barrier able to withstand 600-volt breakdown test.

c. Construct of galvanized steel with threaded end connections to match connecting piping.

d. Suitable for the required operating pressures and temperatures.

2. Flanges:

a. Dielectric flanges with same pressure ratings as standard flanges.

b. Water impervious insulation barrier capable of limiting galvanic current to 1 percent of short circuit current in a corresponding bimetallic joint.

c. Dry insulation barrier able to withstand 600-volt breakdown test.

d. Construct of galvanized steel with threaded end connections to match connecting piping.

e. Suitable for the required operating pressures and temperatures.

2.7 GAS COCKS

A. Full port, brass ball valves with bottom-loaded blowout proof stem, virgin PTFE seats, thrust washer and adjustable stem packing gland, stem packing nut, chrome plated breass ball, brass adapter and steel handle.

B. 1/4" to 3/8": 1/2 psig, ASME B16.33.

C. 1/2" to 2": 1/2 psig, ASME B16.33.

2.8 BALL VALVES

A. 3-inch and smaller: 2-piece, full port:

1. Class: 150 psi saturated steam, 600 psi wog.
2. Body: ASTM B-584 Alloy 844 bronze.
3. Body End Piece: ASTM B-584 Alloy 844 bronze.
4. Ball: ASTM B-584 Alloy 844 bronze with hard chrome plate.
5. Seat Ring: Reinforced TFE.
6. Threaded Packing Gland: ASTM B-16 Alloy 360 brass.
7. Stem: 316 stainless steel.
8. Ends: Soldered or Press Fittings.

B. Acceptable Manufacturers:

1. Nibco.
2. Apollo.
3. Stockham.

2.9 ZERO LEAKAGE TRIPLE OFFSET HIGH-PERFORMANCE BUTTERFLY VALVES

A. 2-1/2 inch and larger: Triple offset rotary valve, carbon steel, bi-directional, double flange body (wafer or lug-style not acceptable), zero leakage.

1. Class: ANSI 300.
2. Body: Carbon steel.
3. Disc: Nickel plated carbon steel.
4. Shaft: ASTM A-564 Type 630 (17-4PH) stainless steel.
5. Seat: Welded Stellite GR.21, integral with valve body.
6. Seat Ring: Dublex, stainless steel, laminated, field replaceable.

7. Locator Bearing: ASTM A-743 Grade CG8M Type 317 stainless steel.
8. Thrust Bearing: Type 317 stainless steel with PTFE woven fabric.
9. Packing: Graphite.
10. Packing Gland: ASTM A-743 Grade CF8M Type 316 stainless steel.
11. Disc Pins: ASTM A-276 Type stainless steel.
12. Operator: Self-locking, manual gear operator.
13. Leakage class. Zero leakage as defined by API 598, 7th edition.

B. Acceptable Manufacturers:

1. Tyco Vanessa Series 30,000.
2. Crane Flowseal MS.
3. Adams Valve MAK.

2.10 CHECK VALVES

A. Wafer Check: 2-1/2 inch and larger:

1. Class: 125
2. Body: ASTM A-126 Class B cast iron.
3. Disc: ASTM B-148 aluminum-bronze.
4. Hinge Pin: ASTM A-276 Type 316 stainless steel.
5. Spring: ASTM A-276 Type 316 stainless steel.
6. Seat: Buna-N.
7. Ends: Lug type for installation between pipe flanges.
8. Acceptable Manufacturers:
   a. Stockham
   b. Nibco
   c. Milwaukee

B. Swing Check: 2-Inch and smaller:

1. Class: 125
2. Body: ASTM B-62 bronze.
3. Disc: ASTM B-62 bronze.

4. Hinge : ASTM B-62 bronze.
5. Hinge Pin: ASTM B-16 brass.
6. Cap: ASTM B-62 bronze.
7. Ends: Threaded or soldered.
8. Acceptable Manufacturers:
   a. Stockham
   b. Nibco
   c. Milwaukee

2.11 CALIBRATED BALANCE VALVES

A. Size 1/2 inch to 3 inch:

1. Bronze body with brass ball construction with glass and carbon filled TFE seat rings. Valves shall have differential pressure read-out ports across valve seat area. Read-out ports shall be fitted with internal EPT insert and check valve. Valve bodies shall have 1/4 inch NPT tapped drain/purge port. Valves shall have memory stop feature to allow valve to be closed for service and then reopened to set point without disturbing balance position. All valves shall have calibrated nameplate to assure specific valve setting. Valves shall be leak-tight at full rated working pressure.
2. Design Pressure/Temperature:
   a. 1/2" to 3" NPT connections: 300 psi at 250 degrees F.
   b. 1/2" to 2" sweat connections: 200 psi at 250 degrees F.

B. Size 2-1/2" to 8"

1. Valves shall be of heavy-duty cast iron construction with ANSI flanged connections suitable up to 175 psi working pressure. Valves 2-1/2" to 3" pipe shall have a brass ball with glass and carbon filled TFE seat rings. Valves 4" to 8" shall be fitted with a bronze seat, replaceable bronze disc with EPDM seal insert, and stainless steel stem. Valves shall have memory stop feature to allow valve to be closed for service and then reopened to set point without disturbing balance position. All valves shall have calibrated nameplate to assure specific valve setting. Valves shall be leak-tight at full rated working pressure.

C. Design Pressure/Temperature: 175 psi at 250 degrees F.

D. Acceptable Manufacturers:

1. Red-White Valve Corp.
2. Bell and Gossett

3. Flow Design, Inc.

PART 3 EXECUTION

3.1 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt on inside and outside before assembly.

C. Prepare piping connections to equipment using jointing system specified.

D. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

E. After completion, fill, clean, and treat systems. See Section 232500 for additional requirements.

3.2 CALIBRATED BALANCE VALVE SELECTION

A. The contractor shall be responsible for selection of the appropriate size of all calibrated balance valves. Select valve size such that optimal accurace is achieved when balanced to the flow rate as indicated on contract documents. Provide all required increasers and reducers to mate the installed calibrated balance valves to the adjacent piping and equpment.

B. Balance Valve Sizing:

GPM	Balance Valve Size
Up to 2.5	1/2"
2.6 to 4.5	3/4"
4.6 to 9.0	1"
9.1 to 22.0	1-1/4"
22.1 to 35.0	1-1/2"
35.1 to 78.0	2"
78.1 to 120.0	2-1/2"
120.1 to 200.0	3"
200.1 to 400.0	4"
400.1 to 500.0	5"

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install heating water piping to ASME B31.9 requirements.

C. PVC Pipe: Make solvent-welded joints in accordance with ASTM D2855.

D. Install cooling coil condensate drains from all cooling coils to locations shown on drawings. Provide trap sized for required depth as determined by maximum static pressure of the cooling coil supply fan.

E. Route piping in orderly manner, parallel to building structure, and maintain gradient.

F. Install piping to conserve building space and to avoid interference with use of space.

G. Group piping whenever practical at common elevations.

H. Sleeve pipe passing through partitions, walls, and floors.

I. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified.

J. Slope piping and arrange to drain at low points.

K. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. See Section 230516.

L. Inserts:

1. Provide inserts for placement in concrete formwork.

2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.

3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.

4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.

5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut above slab.

M. Pipe Hangers and Supports:

1. Install in accordance with ASME B31.9, ASTM F708, or MSS SP-58.

2. Support horizontal piping as scheduled.

3. Install hangers to provide minimum 1/2-inch space between finished covering and adjacent work.

4. Place hangers within 12 inches of each horizontal elbow.

5. Use hangers with 1-1/2 inches minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.

6. Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.

7. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.

8. Provide copper plated hangers and supports for copper piping.

N. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. See Section 230719.

3.4 FIELD QUALITY CONTROL

A. Preparation for Testing: Prepare hydronic piping in accordance with ASME B 31.9 and as follows:

1. Leave joints, including welds, uninsulated and exposed for examination during the test.

2. Flush system with clean water. Clean strainers.

3. Isolate equipment that is not to be subjected to the test pressure from the piping. If a valve is used to isolate the equipment, its closure shall be capable of sealing against the test pressure without damage to the valve. Flanged joints at which blinds are inserted to isolate equipment need not be tested.

4. Install relief valve set at a pressure no more than 1/3 higher than the test pressure, to protect against damage by expansion of liquid or other source of overpressure during the test.

B. Testing: Test hydronic piping as follows:

1. Use ambient temperature water as the testing medium, except where there is a risk of damage due to freezing. Another liquid may be used if it is safe for the workmen and compatible with the piping system components.

2. Use vents installed at high points in the system to release trapped air while filling the system. Use drains installed at low points in the system for complete removal of the test liquid.

3. Examine system to ensure that equipment and components that cannot withstand test pressures are properly isolated. Examine test equipment to ensure tight connection and that low pressure filling lines have been disconnected.

4. Subject piping system to a hydrostatic test pressure which at every point in the system is not less than 1.5 times the system design pressure, but not less than 100 psi. The test pressure shall not exceed the maximum pressure for any vessel, pump, valve, or other component in the system under testing. Make a check to verify that the stress due to pressure at the bottom of vertical runs does not exceed either 90% of specified yield strength, or 1.7 times the "SE" value in Appendix A of ASME B31.9, Code for Pressure Piping, Building Service Piping.

5. After the hydrostatic test pressure has been applied for at least 15 minutes, examine piping, joints, and connections for leakage. Eliminate leaks by tightening, repairing, or replacing components as appropriate, and repeat hydrostatic test until there are no leaks.

3.5 VALVE ENDS SELECTION

A. Select valves with the following ends or types of pipe/tube connections:

1. Copper Tube Size, 3-inch and Smaller: Press or threaded ends for heating hot water.

2. Steel Pipe Sizes, 2-inch and Smaller: threaded end.

3. Steel Pipe Sizes 2-1/2 inch and Larger: flanged end.

3.6 VALVE INSTALLATIONS

A. General Application: Use ball, and butterfly valves for shut-off duty; ball globe, and butterfly for throttling duty. Refer to piping system specification sections for specific valve applications and arrangements.

B. Locate valves for easy access and provide separate support where necessary.

C. Install valves and unions for each item of equipment arranged to allow equipment removal without system shutdown. Unions are not required on flanged devices.

D. Install valves in horizontal piping with stem at or above the center of the pipe.

E. Install valves in a position to allow full stem movement.

F. Installation of Check Valves: Install for proper direction of flow as follows:

1. Wafer Check Valves: Horizontal or vertical position.

3.7 SOLDER CONNECTIONS

A. Cut tube square and to exact lengths.

B. Clean end of tube to depth of valve socket with steel wool, sand cloth, or a steel wire brush to a bright finish. Clean valve socket in the same manner.

C. Apply a proper soldering flux in an even coat to inside of valve socket and outside of tube.

D. Insert tube into valve socket, making sure the end rests against the shoulder inside valve. Rotate valve or tube slightly to ensure even distribution of the flux.

E. Apply heat evenly to outside of valve around joint until solder will melt upon contact. Feed solder until it completely fills the joint around the tube. Avoid hot spots or overheating valve. Once the solder starts cooling, remove excess amounts around the joint with a cloth or brush.

3.8 THREADED CONNECTIONS

A. Note the internal length of threads in valve ends, and proximity of valve internal seat or wall, to determine how far pipe should be threaded into valve.

B. Align threads at point of assembly.

C. Apply appropriate tape or thread compound to the external pipe threads (except where dry seal threading is specified).

D. Assemble joint, wrench tight. Wrench on valve shall be on the valve end into which the pipe is being threaded.

3.9 FLANGED CONNECTIONS

A. Align flange surfaces parallel.

B. Assemble joints by sequencing bolt tightening to make initial contact of flanges and gaskets as flat and parallel as possible. Use suitable lubricants on bolt threads. Tighten bolts gradually and uniformly with a torque wrench.

3.10 PRESS FITTING CONNECTIONS (NON-NATURAL GAS PIPING)

A. Press connections: Copper and copper alloy press connections shall be made in accordance with the manufacturer's installation instructions. The tubing shall be fully inserted into the fitting and the tubing marked at the shoulder of the fitting. The fitting alignment shall be checked against the mark on the tubing to assure the tubing is fully engaged (inserted) in the fitting. The joints shall be pressed using the tool(s) approved by the manufacturer.

3.11 PRESS FITTING CONNECTIONS FOR NATURAL GAS PIPING

A. Cold press mechanical joint fittings shall be installed in accordance with the manufacturer's installation instructions. The protective corrosion coating shall be removed from the outside of the pipe end. The pipe shall be fully inserted into the fitting and the pipe marked at the shoulder of the fitting. The fitting alignment shall be checked against the mark on the pipe to assure the pipe is fully engaged (inserted) in the fitting. The joints shall be pressed using the tool(s) approved by the manufacturer.

B. Air Testing: The piping system shall be air tested for joint tightness. The piping system shall be pressurized with air to the maximum pressure of the system or to the code or standard required minimum for the required length of time. The system shall have no leaks at the rated pressure.

3.12 INSPECTION, TESTING AND PURGING OF NATURAL GAS PIPING

A. General: Prior to acceptance and initial operation, all piping installations shall be inspected and pressure tested to determine that the materials, design, fabrication, and installation practices comply with the requirements of authority having jurisdiction.

1. Inspections: Inspection shall consist of visual examination, during or after manufacture, fabrication, assembly, or pressure tests as appropriate. Supplementary types of nondestructive inspection techniques, such as magnetic-particle, radiographic, ultrasonic, etc., shall not be required unless specifically listed herein or in the engineering design.

2. Repairs and additions: In the event repairs or additions are made following the pressure test, the affected piping shall be tested.

    a. EXCEPTION: Minor repairs or additions, provided the work is inspected and connections are tested with a noncorrosive leak-detecting fluid.

B. Section testing: A piping system shall be permitted to be tested as a complete unit or in sections. Under no circumstances shall a valve in a line be used as a bulkhead between gas in one section of the piping system and test medium in an adjacent section, unless two valves are installed in series with a valved "telltale" located between these valves. A valve shall not be subjected to the test pressure unless it can be determined that the valve, including the valve closing mechanism, is designed to safely withstand the test pressure.

C. Regulators and valve assemblies. Regulator and valve assemblies fabricated independently of the piping system in which they are to be installed shall be permitted to be tested with inert gas or air at the time of fabrication.

D. Test medium: The test medium shall be air or an inert gas. Oxygen shall not be used.

E. Test preparation: Pipe joints, including welds, shall be left exposed for examination during the test. If the pipe end joints have been previously tested in accordance with this section, they shall be permitted to be covered or concealed.

1. Expansion joints: Expansion joints shall be provided with temporary restraints, if required, for the additional thrust load under test.

2. Equipment isolation: Equipment that is not to be included in the test shall be either disconnected from the piping or isolated by blanks, blind flanges, or caps. Flanged joints at which blinds are inserted to blank off other equipment during the test shall not be required to be tested.

3. Equipment disconnection: Where the piping system is connected to equipment or components designed for operating pressures of less than the test pressure, such equipment or equipment components shall be isolated from the piping system by disconnecting them and capping the outlet(s).

4. Valve isolation: Where the piping system is connected to equipment or components designed for operating pressures equal to or greater than the test pressure, such equipment shall be isolated from the piping system by closing the individual equipment shutoff valve(s).

5. Testing precautions: All testing of piping systems shall be done with due regard for the safety of employees and the public during the test. Bulkheads, anchorage, and bracing suitably designed to resist test pressures shall be installed if necessary. Prior to testing, the interior of the pipe shall be cleared of all foreign material.

F. Test Pressure measurement: Test pressure shall be measured with a manometer or with a pressure measuring device designed and calibrated to read, record, or indicate a pressure loss due to leakage during the pressure test period. The source of pressure shall be isolated before the pressure tests are made.

1. Test pressure: The test pressure to be used shall be no less than 1-1/2 times the proposed maximum working pressure, but not less than 3 psig (20 kPa gauge), irrespective of design pressure. Where the test pressure exceeds 125 psig (862 kPa gauge), the test pressure shall not exceed a value that produces a hoop

stress in the piping greater than 50 percent of the specified minimum yield strength of the pipe.

2. Test duration: Test duration shall be not less than 1/2 hour for each 500 cubic feet (14 m3) of pipe volume or fraction thereof. When testing a system having a volume less than 10 cubic feet (0.28 m3) or a system in a single-family dwelling, the test duration shall be permitted to be reduced to 10 minutes. For piping systems having a volume of more than 24,000 cubic feet (680 m3), the duration of the test shall not be required to exceed 24 hours.

G. Detection of leaks and defects: The piping system shall withstand the test pressure specified without showing any evidence of leakage or other defects. Any reduction of test pressures as indicated by pressure gages shall be deemed to indicate the presence of a leak unless such reduction can be readily attributed to some other cause.

1. Detection methods: The leakage shall be located by means of an approved combustible gas detector, a noncorrosive leak detection fluid, or an equivalent nonflammable solution. Matches, candles, open flames, or other methods that could provide a source of ignition shall not be used.

2. Corrections: Where leakage or other defects are located, the affected portion of the piping system shall be repaired or replaced and retested.

H. System and equipment leakage test: Leakage testing of systems and equipment shall be in accordance with the following:

1. Test gases: Fuel gas shall be permitted to be used for leak checks in piping systems that have been tested in accordance with requirements of this section.

2. Before turning gas on: Before gas is introduced into a system of new gas piping, the entire system shall be inspected to determine that there are no open fittings or ends and that all manual valves at outlets on equipment are closed and all unused valves at outlets are closed and plugged or capped.

3. Test for leakage: Immediately after the gas is turned on into a new system or into a system that has been initially restored after an interruption of service, the piping system shall be tested for leakage. If leakage is indicated, the gas supply shall be shut off until the necessary repairs have been made.

4. Placing equipment in operation: Gas utilization equipment shall be permitted to be placed in operation after the piping system has been tested and determined to be free of leakage and purged in accordance with the following table:

Nominal Pipe Size(inches)	Length of Piping Requiring Purging
3	> 30 feet
4	> 15 feet
6	> 10 feet
8 or larger	Any length

I. Purging: Purging of piping shall comply with the following:

1. Removal from service: Where gas piping is to be opened for servicing, addition, or modification, the section to be worked on shall be turned off from the gas supply at the nearest convenient point, and the line pressure vented to the outdoors, or to ventilated areas of sufficient size to prevent accumulation of flammable mixtures.

2. The remaining gas in this section of pipe shall be displaced with an inert gas as required by the following table:

Nominal Pipe Size (inches)	Length of Piping Requiring Purging
2-1/2	> 50 feet
3	> 30 feet
4	> 15 feet
6	> 10 feet
8 or larger	Any length

3. Placing in operation: Where piping full of air is placed in operation, the air in the piping shall be displaced with fuel gas, provided the piping does not exceed the length shown in the table below. The air can be safely displaced with fuel gas provided that a moderately rapid and continuous flow of fuel gas is introduced at one end of the line and air is vented out at the other end. The fuel gas flow shall be continued without interruption until the vented gas is free of air. The point of discharge shall not be left unattended during purging. After purging, the vent shall then be closed. Where required by the table below, the air in the piping shall first be displaced with an inert gas, and the inert gas shall then be displaced with fuel gas:

Nominal Pipe Size(inches)	Length of Piping Requiring Purging
3	> 30 feet
4	>15 feet
6	>10 feet
8 or larger	Any length

4. Discharge of purged gases: The open end of piping systems being purged shall not discharge into confined spaces or areas where there are sources of ignition unless precautions are taken to perform this operation in a safe manner by ventilation of the space, control of purging rate, and elimination of all hazardous conditions.

5. Placing equipment in operation: After the piping has been placed in operation, all equipment shall be purged and then placed in operation, as necessary.

3.13 SCHEDULES

A. Pipe Hanger Spacing:

1. Copper Piping:

a. 1-1/4 inch diameter and smaller: 6 feet maximum horizontal spacing, 10 feet maximum vertical spacing.

b. 1-1/2 inch diameter and larger: 10 feet maximum horizontal spacing, 10 feet maximum vertical spacing.

2. PVC Pipe or Tubing: 4 feet maximum horizontal spacing, 10 feet maximum vertical spacing.

3. Steel Pipe: 12 feet maximum horizontal spacing, 15 feet maximum vertical spacing.

END OF SECTION

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Air vents.

B. Strainers.

C. Suction diffusers.

D. Combination pump discharge valves (Multi-Purpose valves).

1.2 REFERENCE STANDARDS

A. ASME BPVC-VIII-1 - Boiler and Pressure Vessel Code, Section VIII, Division 1: Rules for Construction of Pressure Vessels; 2023.

1.3 SUBMITTALS

A. Product Data: Provide product data for manufactured products and assemblies required for this project. Include component sizes, rough-in requirements, service sizes, and finishes. Include product description and model.

B. Certificates: Inspection certificates for pressure vessels from authority having jurisdiction.

C. Manufacturer's Installation Instructions: Indicate hanging and support methods, joining procedures.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

PART 2 PRODUCTS

2.1 AIR VENTS

A. Manual Air Vent: Short vertical sections of 2-inch diameter pipe to form air chamber, with 1/8 inch brass needle valve at top of chamber.

B. Float Air Vent:

1. Brass or semi-steel body, copper, polypropylene, or solid non-metallic float, stainless steel valve and valve seat; suitable for system operating temperature and pressure; with isolating valve.

2. Cast iron body and cover, float, bronze pilot valve mechanism suitable for system operating temperature and pressure; with isolating valve.

C. Maximum Fluid Pressure: 150 psi.

D. Maximum Fluid Temperature: 250 degrees F.

2.2 STRAINERS

A. Size 2 inch and Under:

1. Provide threaded, grooved, or sweat brass or iron body for up to 175 psi working pressure, Y-pattern strainer with 1/32 inch stainless steel perforated screen.

B. Size 2-1/2 inch to 4 inch:

1. Provide flanged or flanged iron body for up to 175 psi 175 psi working pressure, up to 250 degrees F 250 degrees F working temperature, Y-pattern strainer with with 1/16 inch or 1/16 inch stainless steel perforated screen.

2.3 SUCTION DIFFUSERS

A. Fitting: Angle pattern, cast-iron body, threaded for 2 inch and smaller, flanged for 2-1/2 inch and larger, rated for 175 psi working pressure, with inlet vanes, cylinder strainer with 3/16 inch diameter openings, disposable 5/32 inch mesh strainer to fit over cylinder strainer, 20 mesh startup screen, and permanent magnet located in flow stream and removable for cleaning.

2.4 COMBINATION PUMP DISCHARGE VALVES (MULTI-PURPOSE VALVES)

A. Quarter-Turn Plug Type: Flanged cast-iron body with bolt-on bonnet, position indicator, stainless steel stem, backflow preventer, memory stop, metering connectors, bubble-tight shutoff, and wrench-adjustable plug flow regulator.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install specialties in accordance with manufacturer's instructions.

B. Provide manual air vents at system high points and as indicated.

C. Provide valved drain and hose connection on strainer blowdown connection.

D. Support pump fittings with floor-mounted pipe and flange supports.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Close-Coupled pumps.

B. Coil Condensate Pumps

1.2 REFERENCE STANDARDS

A. NEMA MG 1 - Motors and Generators; 2021.

B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

C. UL 778 - Standard for Motor-Operated Water Pumps; Current Edition, Including All Revisions.

1.3 SUBMITTALS

A. Product Data: Provide certified pump curves showing performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable. Include electrical characteristics and connection requirements.

B. Manufacturer's Installation Instructions: Indicate hanging and support requirements and recommendations.

C. Operation and Maintenance Data: Include installation instructions, assembly views, lubrication instructions, and replacement parts list.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacture, assembly, and field performance of pumps, with minimum three years of documented experience.

B. Provide motors in compliance with the requirements of the New York State Energy Conservation Construction Code, tested in accordance with IEEE Standard 112, test method B.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Taco: www.taco-hvac.com.

B. Armstrong Pumps Inc: www.armstrongpumps.com.

C. Bell & Gossett, a Xylem Inc. brand: www.bellgossett.com.

2.2 GENERAL

A. Provide pumps that operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25 percent of midpoint of published maximum efficiency curve.

B. Minimum Quality Standard: UL 778.

C. Electrical Requirements:

1. Listed and classified by UL or testing agency acceptable to authority having jurisdiction as suitable for the purpose specified and indicated.

2. Enclosures: Provide unspecified product(s) required to fit motor:

2.3 CLOSE COUPLED PUMPS

A. The pumps shall be close-coupled, foot mounted, single stage, end suction, vertical split case design, in cast iron stainless steel fitted construction specifically designed for quiet operation. Suitable standard operations at 225° F and 175 PSIG working pressure or optional temperatures to 250° F. Working pressures shall not be de-rated at temperatures up to 250F. The pump internals shall be capable of being serviced without disturbing piping connections.

B. The pumps shall have a solid alloy steel shaft that is integral to the motor. A stainless steel shaft sleeve shall be employed to completely cover the wetted area under the seal.

C. The motor bearings shall support the shaft via heavy-duty grease lubricated ball bearings.

D. Pump shall be equipped with an internally flushed mechanical seal assembly installed in an enlarged tapered seal chamber. Seal assembly shall have Buna bellows and seat gasket, stainless steel spring, and be of a carbon / ceramic design with the carbon face rotating against a stationary ceramic face.

E. Motor shaft shall connect to a stainless steel impeller. Impeller shall be hydraulically and dynamically balanced to ANSI/HI 9.6.4-2009, ISO 1940 balance grade G6.3, keyed to the shaft and secured by a stainless steel locking caps crew.

F. Pump should be designed to allow for true back pull-out access to the pump’s working components for ease of maintenance.

G. Pump volute shall be of a cast iron design for HVAC systems rated for 175 PSIG with integral cast iron flanges drilled for 125# ANSI companion flanges NPT pipe. Volute shall include gauge ports at nozzles, and vent and drain ports.

H. Motors shall meet scheduled horsepower, speed, voltage, and enclosure design. Motors shall have heavy-duty grease lubricated ball bearings to offset the additional bearing loads associated with the closed-coupled pump design. Motors shall be non-overloading at any point on the pump curve and shall meet NEMA specifications.

I. Pumps shall conform to ANSI/HI 9.6.3.1-2012 standard for Preferred Operating Region (POR) unless otherwise approved by the engineer. The pump NPSH shall conform to the ANSI/HI 9.6.1-2012 standards for *Centrifugal and Vertical Pumps for NPSH Margin*.

J. Pump shall be of a maintainable design and for ease of maintenance shall use machine fit parts and not press fit components.

K. Pump manufacturer shall be ISO-9001 certified.

L. Each pump shall be factory tested and name-plated before shipment.

2.4 COIL CONDENSATE PUMPS

A. Refer to condensate pump schedule for pump requirements.

PART 3 EXECUTION

3.1 PREPARATION

A. Verify that electric power is available and of the correct characteristics.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide access space around pumps for service. Provide no less than minimum space recommended by manufacturer.

C. Decrease from line size with long radius reducing elbows or reducers.

D. Check, align, and certify alignment of base-mounted pumps prior to start-up.

END OF SECTION

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Pipe and pipe fittings.

B. Pipe hangers and supports.

C. Valves.

D. Steam piping system.

E. Steam condensate piping system.

1.2 REFERENCE STANDARDS

A. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2021.

B. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2021.

C. ASME B31.1 - Power Piping; 2022.

D. ASME B31.9 - Building Services Piping; 2020.

E. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators; 2023.

F. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2022.

G. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

H. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service; 2023a.

I. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers; 1992 (Reapproved 2022).

J. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2023).

K. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2018, with Amendment (2019).

L. MSS SP-69 - Pipe Hangers and Supports - Selection and Application; 2003.

1.3 SYSTEM DESCRIPTION

A. Use unions and flanges downstream of valves and at equipment or apparatus connections. Use dielectric unions where joining dissimilar materials. Do not use direct welded or threaded connections.

B. Provide pipe hangers and supports in accordance with ASME B31.9 unless indicated otherwise.

C. Use gate valves for shut-off and to isolate equipment, part of systems, or vertical risers.

1.4 SUBMITTALS

A. Product Data: Provide data on pipe materials, pipe fittings, valves and accessories. Provide manufacturers catalogue information. Indicate valve data and ratings.

B. Piping Schedule: Provide schedule of piping applications and materials, indicating piping and fittings.

C. Piping Shop Drawings: Provide drawings of piping installation, indicating dimensioned locations, equipment, critical dimensions, elevations, sizes, systems, and valve locations.

D. Welders Certificate: Include welders certification of compliance with ASME BPVC-IX.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

A. Comply with ASME B31.9 and ASME B31.1 code for installation of piping system.

B. Welding Materials and Procedures: Comply with ASME BPVC-IX and applicable state labor regulations.

2.2 LOW PRESSURE STEAM PIPING (15 PSIG MAXIMUM)

A. Steel Pipe: ASTM A53/A53M, Schedule 40, black.

1. Fittings: ASME B16.3 malleable iron Class 150, or ASTM A234/A234M wrought steel.

2. Joints: Threaded, or AWS D1.1/D1.1M welded.

2.3 LOW PRESSURE STEAM CONDENSATE PIPING

A. Steel Pipe: ASTM A53/A53M, Schedule 80, black.

1. Fittings: ASME B16.3 malleable iron Class 150, or ASTM A234/A234M wrought steel.

2. Joints: Threaded, or AWS D1.1/D1.1M welded.

2.4 PIPE HANGERS AND SUPPORTS

A. Provide hangers and supports that comply with MSS SP-58.

1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.

B. Hangers for Pipe Sizes 1/2 to 1-1/2 Inch: Malleable iron, adjustable swivel, split ring.

C. Hangers for Pipe Sizes 2 to 4 Inches: Carbon steel, adjustable, clevis.

D. Hangers for Pipe Sizes 6 Inches and Over: Adjustable steel yoke, cast iron roll, double hanger.

E. Multiple or Trapeze Hangers for Pipe Sizes to 4 inches: Steel channels with welded spacers and hanger rods.

F. Multiple or Trapeze Hangers for Pipe Sizes 6 Inches and Over: Steel channels with welded spacers and hanger rods; cast iron roll and stand.

G. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.

H. Wall Support for Pipe Sizes 4 to 5 Inches: Welded steel bracket and wrought steel clamp.

I. Wall Support for Pipe Sizes 6 Inches and Over: Welded steel bracket and wrought steel clamp; adjustable steel yoke and cast iron roll.

J. Vertical Support: Steel riser clamp.

K. Floor Support for Pipe Sizes to 4 Inches: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

L. Floor Support for Pipe Sizes 6 Inches and Over: Adjustable cast iron roll and stand, steel screws, and concrete pier or steel support.

M. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.

N. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

2.5 UNIONS, FLANGES, AND COUPLINGS

A. Unions for Pipe 2 Inches and Under:

1. Ferrous Piping: 150 psig galvanized malleable iron, threaded.

B. Flanges for Pipe Over 2 Inches:

1. Ferrous Piping: 150 psig forged steel, slip-on.

2. High Performance Gaskets

a. Provide spiral wound semi-metallic gaskets meeting ASME B16.20 suitable for ASME B16.5 and B16.47 flanges, for use on either flat or raised face flanges with maximum temperature limits of 480 degrees F.

2.6 GATE VALVES

A. Outside Screw and Yoke (OS&Y) Gate Valves, rising stem, 2-1/2 inches and Larger, bolted bonnet:

1. Class: 300
2. Body: ASTM A-216 Grade WCB cast steel.
3. Bonnet: ASTM A-216 Grade WCB cast steel.
4. Stem: ASTM A-182 Grade F6a stainless steel.
5. Gland: ASTM A-108 Grade 1015/1025 steel.
6. Packing: Flexible graphite.
7. Seat Ring: ASTM A-108 Grade 1015/1025 steel with Stellite.
8. Handwheel: ASTM A-476 Grade 32510 malleable iron.
9. Ends: Flanged.

B. Up To and Including 2 inches: Rising stem, inside screw, solid wedge disc:

1. Class: 300
2. Body: ASTM B-61 bronze.
3. Bonnet: ASTM B-61 bronze.
4. Stem: Rising, ASTM B-62 cast bronze.
5. Packing Nut: ASTM B-283 forged brass.
6. Packing Gland: ASTM B-16 brass rod.
7. Packing: Flexible graphite and alum.
8. Disc: ASTM B-584 copper-nickel allow.
9. Ends: Threaded.

C. Acceptable Manufacturers:

1. Nibco
2. Stockham
3. Milwaukee

2.7 HIGH-PERFORMANCE BUTTERFLY VALVES (LOW PRESSURE STEAM SERVICE)

A. 2-1/2 inch and larger: Carbon steel, lug body, offset disc, blow-out proof stem and seat.:

1. Class: ANSI 150.
2. Body: ASTM A-216 grade WCB carbon steel, or ASTM A-516 Grade 70.
3. Disc: ASTM A-351 Grade CF8M Type 316 stainless steel; or ASTM A-182 Type 316 stainless steel.
4. Shaft: ASTM A-564 Type 630 (17-4PH) stainless steel.
5. Seat Retainer: ASTM A516 Grade 70 carbon steel.
6. Seat Ring: PTFE; or reinforced TFE.
7. Back-up Ring: ASTM B-265 Grade 3 titanium; or AMS 5596 iconel.
8. Locator Bearing: ASTM A-743 Grade CG8M Type 317 stainless steel.
9. Thrust Bearing: Type 317 stainless steel with PTFE woven fabric.
10. Packing: PTFE.
11. Packing Gland: ASTM A-743 Grade CF8M Type 316 stainless steel.
12. Disc Pins: ASTM A-276 Type stainless steel.
13. Operator: Duct iron lever or steel trimmed gear drive (depending upon size).
14. Shut-Off Class: ANSI B16.104 Class V minimum.

B. Acceptable Manufacturers:

1. Crane
2. K-Lok Butterfly Valve by Keystone Valve Co., Houston, TX 77040

PART 3 EXECUTION

3.1 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt on inside and outside before assembly.

C. Prepare piping connections to equipment with flanges or unions.

D. Keep open ends of pipe free from scale and dirt. Whenever work is suspended during construction protect open ends with temporary plugs or caps.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Route piping in orderly manner, plumb and parallel to building structure, and maintain gradient.

C. Install piping to conserve building space and avoid interference with use of space.

D. Sleeve pipe passing through partitions, walls, and floors.

E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

F. Inserts:

1. Provide inserts for placement in concrete formwork.

2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.

3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.

4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.

5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut above slab.

G. Pipe Hangers and Supports:

1. Install in accordance with ASME B31.9.

2. Support horizontal piping as indicated.

3. Place hangers within 12 inches of each horizontal elbow.

4. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.

5. Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.

6. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.

H. Provide clearance for installation of insulation and access to valves and fittings.

I. Slope steam piping one inch in 40 feet in direction of flow. Use eccentric reducers to maintain bottom of pipe level.

J. Slope steam condensate piping one inch in 40 feet. Provide drip trap assembly at low points and before control valves. Run condensate lines from trap to nearest condensate receiver.

3.3 VALVE ENDS SELECTION

A. Select valves with the following ends or types of pipe/tube connections:

1. Steel Pipe Sizes, 2-inch and Smaller: threaded end.

2. Steel Pipe Sizes 2-1/2 inch and Larger: flanged end.

3.4 THREADED CONNECTIONS

A. Note the internal length of threads in valve ends, and proximity of valve internal seat or wall, to determine how far pipe should be threaded into valve.

B. Align threads at point of assembly.

C. Apply appropriate tape or thread compound to the external pipe threads (except where dry seal threading is specified).

D. Assemble joint, wrench tight. Wrench on valve shall be on the valve end into which the pipe is being threaded.

3.5 FLANGED CONNECTIONS

A. Align flange surfaces parallel.

B. Assemble joints by sequencing bolt tightening to make initial contact of flanges and gaskets as flat and parallel as possible. Use suitable lubricants on bolt threads. Tighten bolts gradually and uniformly with a torque wrench.

3.6 SCHEDULES

A. Pipe Hanger Spacing:

1. Steel Pipe: 12 feet maximum horizontal spacing, 15 feet maximum vertical spacing.

END OF SECTION

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Piping.

B. Refrigerant.

C. Moisture and liquid indicators.

D. Valves.

E. Filter-driers.

F. Expansion valves.

G. Flexible connections.

1.2 REFERENCE STANDARDS

A. AHRI 710 - Performance Rating of Liquid-Line Driers; 2009.

B. AHRI 730 (I-P) - Flow Capacity Rating of Suction Line Filters and Suction Line Filter Driers; 2013 (Reapproved 2014).

C. AHRI 750 - Thermostatic Refrigerant Expansion Valves; 2007.

D. ASHRAE Std 15 - Safety Standard for Refrigeration Systems; 2022, with Errata (2023).

E. ASHRAE Std 34 - Designation and Safety Classification of Refrigerants; 2022, with Errata (2023).

F. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2021.

G. ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes; 2018.

H. ASME B31.5 - Refrigeration Piping and Heat Transfer Components; 2022.

I. ASME B31.9 - Building Services Piping; 2020.

J. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

K. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2022.

L. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2020.

M. ASTM B280 - Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service; 2023.

N. AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding; 2019.

O. ICC (IMC)-2018 - International Mechanical Code; 2018.

P. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2018, with Amendment (2019).

Q. UL 207 - Standard for Refrigerant-Containing Components and Accessories, Nonelectrical; Current Edition, Including All Revisions.

1.3 SYSTEM DESCRIPTION

A. Where more than one piping system material is specified ensure system components are compatible and joined to ensure the integrity of the system is not jeopardized. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.

B. Provide pipe hangers and supports in accordance with ASME B31.5 unless indicated otherwise.

C. Valves:

1. Use service valves on suction and discharge of compressors.

D. Filter-Driers:

1. Use a filter-drier on suction line just ahead of compressor.

1.4 SUBMITTALS

A. Product Data: Provide general assembly of specialties, including manufacturers catalogue information. Provide manufacturers catalog data including load capacity.

B. Piping Schedule: Provide schedule of piping applications and materials, indicating piping and fittings.

C. Piping Shop Drawings: Provide drawings of piping installation, indicating dimensioned locations, equipment, critical dimensions, elevations, sizes, systems, and valve locations.

D. Manufacturer Piping Sizing: Provide documentation from the manufacturer of the refrigeration equipment connected to the refrigerant piping and accessories establishing the required sizing of piping.

E. Shop Drawings: Indicate schematic layout of system, including equipment, critical dimensions, and sizes.

F. Design Data: Submit design data indicating pipe sizing. Indicate load carrying capacity of trapeze, multiple pipe, and riser support hangers.

G. Test Reports: Indicate results of leak test, acid test.

H. Manufacturer's Installation Instructions: Indicate support, connection requirements, and isolation for servicing.

I. Installer's qualification statement.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum 3 years of documented experience.

B. The manufacturer of the refrigeration equipment connected to the refrigerant piping and accessories shall review and provide final sizing of piping and accessories.

PART 2 PRODUCTS

2.1 PIPING

A. Copper Tube: ASTM B280, H58 hard drawn.

1. Fittings: ASME B16.22 wrought copper.

2. Joints: Braze, AWS A5.8M/A5.8 BCuP silver/phosphorus/copper alloy.

3. Mechanical Press Sealed Fittings: Double pressed type complying with UL 207 and ICC (IMC)-2018.

B. Pipe Supports and Anchors:

1. Provide hangers and supports that comply with MSS SP-58.

   a. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.

2. Hangers for Pipe Sizes 1/2 to 1-1/2 Inch: Malleable iron adjustable swivel, split ring.

3. Hangers for Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.

4. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.

5. Vertical Support: Steel riser clamp.

6. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

7. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

8. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.

9. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

10. Rooftop Supports for Low-Slope Roofs: Steel pedestals with bases that rest on top of roofing membrane, not requiring any attachment to the roof structure and

not penetrating the roofing assembly, with support fixtures as specified; and as follows:

a. Bases: High density, UV tolerant, polypropylene or reinforced PVC.

b. Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.

c. Steel Components: Stainless steel, or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A123/A123M.

d. Attachment/Support Fixtures: As recommended by manufacturer, same type as indicated for equivalent indoor hangers and supports; corrosion resistant material.

e. Height: Provide minimum clearance of 6 inches under pipe to top of roofing.

2.2 REFRIGERANT

A. Refrigerant: Use only refrigerants that have ozone depletion potential (ODP) of zero and global warming potential (GWP) of less than 50.

B. Refrigerant: R-410A as defined in ASHRAE Std 34.

2.3 MOISTURE AND LIQUID INDICATORS

A. Indicators: Single port type, UL listed, with copper or brass body, flared or solder ends, sight glass, color coded paper moisture indicator with removable element cartridge and plastic cap; for maximum temperature of 200 degrees F and maximum working pressure of 500 psi.

2.4 VALVES

A. Diaphragm Packless Valves:

1. UL listed, globe or angle pattern, forged brass body and bonnet, phosphor bronze and stainless steel diaphragms, rising stem and handwheel, stainless steel spring, nylon seat disc, solder or flared ends, with positive backseating; for maximum working pressure of 500 psi and maximum temperature of 275 degrees F.

B. Service Valves:

1. Forged brass body with copper stubs, brass caps, removable valve core, integral ball check valve, flared or solder ends, for maximum pressure of 500 psi.

2.5 FILTER-DRIERS

A. Performance:

1. Pressure Drop: 2 psi, maximum, when operating at full connected evaporator capacity.

2. Design Working Pressure: 350 psi, minimum.

B. Cores: Molded or loose-fill molecular sieve desiccant compatible with refrigerant, activated alumina, and filtration to 40 microns, with secondary filtration to 20 microns; of construction that will not pass into refrigerant lines.

C. Construction: UL listed.

1. Connections: As specified for applicable pipe type.

2.6 EXPANSION VALVES

A. Angle or Straight Through Type: AHRI 750; design suitable for refrigerant, brass body, internal or external equalizer, bleed hole, adjustable superheat setting, replaceable inlet strainer, with non-replaceable capillary tube and remote sensing bulb and remote bulb well.

B. Selection: Evaluate refrigerant pressure drop through system to determine available pressure drop across valve. Select valve for maximum load at design operating pressure and minimum 10 degrees F superheat. Select to avoid being undersized at full load and excessively oversized at part load.

2.7 FLEXIBLE CONNECTORS

A. Corrugated stainless steel hose with single layer of stainless steel exterior braiding, minimum 9 inches long with copper tube ends; for maximum working pressure of 500 psi.

PART 3 EXECUTION

3.1 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt on inside and outside before assembly.

C. Prepare piping connections to equipment with flanges or unions.

3.2 INSTALLATION

A. Install refrigeration specialties in accordance with manufacturer's instructions.

B. Route piping in orderly manner, with plumbing parallel to building structure, and maintain gradient.

C. Install piping to conserve building space and avoid interference with use of space.

D. Group piping whenever practical at common elevations and locations. Slope piping one percent in direction of oil return.

E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

F. Inserts:

1. Provide inserts for placement in concrete formwork.

2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.

3. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.

4. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut above slab.

G. Pipe Hangers and Supports:

1. Install in accordance with ASME B31.5.

2. Support horizontal piping as indicated.

3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.

4. Place hangers within 12 inches of each horizontal elbow.

5. Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.

6. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.

7. Provide copper plated hangers and supports for copper piping.

H. Arrange piping to return oil to compressor. Provide traps and loops in piping, and provide double risers as required. Slope horizontal piping 0.40 percent in direction of flow.

I. Provide clearance for installation of insulation and access to valves and fittings.

J. Provide access to concealed valves and fittings.

K. Flood piping system with nitrogen when brazing.

L. Insulate piping; refer to Section and Section 230716.

M. Follow ASHRAE Std 15 procedures for charging and purging of systems and for disposal of refrigerant.

N. Locate expansion valve sensing bulb immediately downstream of evaporator on suction line.

O. Provide external equalizer piping on expansion valves with refrigerant distributor connected to evaporator.

P. Install flexible connectors at right angles to axial movement of compressor, parallel to crankshaft.

Q. Fully charge completed system with refrigerant after testing.

3.3 FIELD QUALITY CONTROL

A. Test refrigeration system in accordance with ASME B31.5.

B. Pressure test system with dry nitrogen to 200 psi. Perform final tests at 27 inches vacuum and 200 psi using halide torch. Test to no leakage.

3.4 SCHEDULES

A. Pipe Hanger Spacing:

1. Copper Piping:

a. 1-1/4 inch diameter and smaller: 6 feet maximum horizontal spacing, 10 feet maximum vertical spacing.

b. 1-1/2 inch diameter and larger: 10 feet maximum horizontal spacing, 10 feet maximum vertical spacing.

END OF SECTION

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Materials.

1. System cleaner.

2. Closed system treatment (water).

1.2 SUBMITTALS

A. Product Data: Provide chemical treatment materials, chemicals, and equipment including electrical characteristics and connection requirements.

B. Shop Drawings: Indicate system schematic, equipment locations, and controls schematics, electrical characteristics and connection requirements.

C. Manufacturer's Installation Instructions: Indicate placement of equipment in systems, piping configuration, and connection requirements.

D. Manufacturer's Field Reports: Indicate start-up of treatment systems when completed and operating properly. Indicate analysis of system water after cleaning and after treatment.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience. Company shall have local representatives with water analysis laboratories and full time service personnel.

B. Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum 3 years of experience and approved by manufacturer.

1.4 REGULATORY REQUIREMENTS

A. Conform to applicable code for addition of non-potable chemicals to building mechanical systems and to public sewage systems.

B. Products Requiring Electrical Connection: Listed and classified by UL as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 SYSTEM CLEANER FOR NEWLY INSTALLED PIPING SYSTEMS

A. Closed Loop Water System Cleaner/Conditioner: Provide industrial degreaser which is chemically engineered to include non-ionic as well as ionic surface-active compounds dispersed in dionized water.

B. Chemical Composition:

1. Boiling Point: 212 Degrees F.
2. Freezing Point: 30 Degrees F.
3. Weight per Gallon at 68 Degrees F: 8.67 pounds.
4. Coefficient of Expansion at 68 Degrees F: 0.00019.
5. Coefficient of Expansion at 131 Degrees F: 0.00023.
6. Flash Point PMCC/COC: None/None.
7. Vapor Pressure, Reid Bomb at 100 Degrees F: 1.4 psia.
8. Vapor Density (Air = 1): <1.
9. Specific Gravity (water = 1): 1.04031.
10. Evaporation Rate (Butyl Acetate = 1): <1.
11. Volitile % by Volume: 100%.
12. Solubility in Water: Complete.
13. Color: Amber.
14. pH: 7.2/8.2.

C. Manufacturer: Interclean DG-3, or approved equal.

2.2 SYSTEM CLEANER FOR RE-USED AND RETROFITTED SYSTEMS

A. Closed Loop Water System Cleaner/Conditioner: Provide industrial cleaner consisting of ammonia-neutralized chelating and sequetering agents to convert water insoluble compounds containing the elements of calcium, magnesium, iron, aluminum, copper, lead and zinc into water soluble compounds, allowing for removal of corrosion such as rust, line and other mineral scales.

B. Chemical Composition:

1. Boiling Point: 216 Degrees F.
2. Freezing Point: 18 Degrees F.
3. Weight per Gallon at 68 Degrees F: 9.37 pounds.
4. Coefficient of Expansion at 68 Degrees F: 0.00018.
5. Coefficient of Expansion at 131 Degrees F: 0.00018.
6. Flash Point PMCC/COC: None/None.
7. Vapor Pressure, Reid Bomb at 100 Degrees F: 1.2 psia.

8. Vapor Density (Air = 1): <1.

9. Specific Gravity (water = 1): 1.12425.

10. Evaporation Rate (Butyl Acetate = 1): <1.

11. Volitile % by Volume: 100%.

12. Solubility in Water: Complete.

13. Color: Blue Green.

14. pH: 7.2/8.2.

C. Manufacturer: Interclean MC-1, or approved equal.

PART 3 EXECUTION

3.1 PREPARATION

A. Systems shall be operational, filled, started, and vented prior to cleaning. Use water meter to record capacity in each system.

B. Place terminal control valves in open position during cleaning.

C. Verify that electric power is available and of the correct characteristics.

3.2 NEW PIPING CLEANING SEQUENCE

A. Concentration:

1. 1% by volume, verify with cleaner manufacturer.

B. Water Systems:

1. Fill the system with clear water with air bleeds open to completely vent air. Close air bleeds and circulate for 30 minutes.

2. Stop circulation and drain the entire system as quickly as possible through low point drains.

3. Fill the system with the required concentration clear water and system cleaner with air bleeds open to completely vent air. Close air bleeds.

4. Operate the system at as high a temperature as possible but do not exceed 190 degrees F. Continue to operate until pH is greater than 8.3. At 180 degrees F, this may take 8-12 hours. At ambient temperature, this may take 24-36 hours.

5. Stop circulation and drain the entire system as quickly as possible through low point drains.

6. Fill the system with clear water with air bleeds open to completely vent air. Close air bleeds and circulate for 30 minutes.

7. Stop circulation and drain the entire system as quickly as possible through low point drains.

8. Inspect piping condition at representative locations. If the system is not satisfactory, repeat steps 3-7.

3.3 EXISTING PIPING CLEANING SEQUENCE

A. Concentration:

1. 10% by volume, verify with cleaner manufacturer.

B. Water Systems:

1. Fill the system with clear water with air bleeds open to completely vent air. Close air bleeds and circulate for 30 minutes.

2. Stop circulation and drain the entire system as quickly as possible through low point drains.

3. Fill the system with the required concentration clear water and system cleaner with air bleeds open to completely vent air. Close air bleeds.

4. Operate the system at as high a temperature as possible but do not exceed 190 degrees F. Continue to operate until pH is greater than 8.3. At 180 degrees F, this may take 8-12 hours. At ambient temperature, this may take 24-36 hours.

5. Stop circulation and drain the entire system as quickly as possible through low point drains.

6. Fill the system with clear water with air bleeds open to completely vent air. Close air bleeds and circulate for 30 minutes.

7. Stop circulation and drain the entire system as quickly as possible through low point drains.

8. Inspect piping condition at representative locations. If the system is not satisfactory, repeat steps 3-7.

3.4 INSTALLATION

A. Install in accordance with manufacturer's instructions.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Metal ductwork.

B. Flexible ductwork.

C. Plenums.

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS

A. This contract includes sheet metal ductwork which is to be fabricated with duct liner specified in Section 230713- DUCT INSULATION. Work of this section includes requirements for fabricating and insulating the ductwork. Net clear interior dimensions of lined ductwork shall be the duct sizes indicated on the drawings. Provide ductwork with sufficient dimensions such that final net clear interior sizes with the ductwork liner meets the drawings for sizing.

1.3 REFERENCES

A. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel; 1994.

B. ASTM A 569/A 569M - Standard Specification for Steel, Carbon (0.15 Maximum, Percent), Hot-Rolled Sheet and Strip, Commercial Quality; 1991a (Reapproved 1993).

C. ASTM A 653/A 653M - Standard Specification for Steel Sheets, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot Dip Process; 1995.

D. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 1995.

E. ASTM B 209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 1995.

F. NFPA 90A - Installation of Air Conditioning and Ventilating Systems; 1993.

G. NFPA 90B - Installation of Warm Air Heating and Air Conditioning Systems; 1993.

H. SMACNA (LEAK) - HVAC Air Duct Leakage Test Manual; 2012.

I. SMACNA (DCS) - HVAC Duct Construction Standards - Metal and Flexible;2005.

J. UL 181 - Factory-Made Air Ducts and Connectors; 1994.

1.4 PERFORMANCE REQUIREMENTS

A. No variation of duct configuration or sizes permitted except by written permission. Size round ducts installed in place of rectangular ducts in accordance with ASHRAE table of equivalent rectangular and round ducts.

1.5 SUBMITTALS

A. Product Data: Provide data for duct materials.

B. Shop Drawings: Indicate duct fittings, particulars such as gages, sizes, welds, and configuration prior to start of work for all ductwork systems.

C. Ductwork Shop Drawings: Provide drawings of ductwork installation, indicating dimensioned locations, equipment, critical dimensions, elevations, sizes, systems, and damper locations. Indicate duct fittings, particulars such as gages, sizes, welds, and configuration.

D. Coordination Shop Drawings:

1. Prior to starting construction work submit coordination drawings.

2. Submit coordination drawings that show the layout and coordination within each building and all building systems including, but not limited to the following:

a. Building structure

b. Structural penetrations

c. Reflected ceiling plan

d. HVAC ductwork

e. Diffusers, grilles and registers

f. HVAC piping

g. All HVAC equipment including kitchen exhaust hoods, air handling units, rooftop energy recovery units, boilers, fans, heating coils, fin tube radiation enclosure units, blower coils, unit ventilators, condensing units, pumps, expansion tanks, air separators, cabinet heaters, variable refrigerant volume heta pumps, floor radiator units, radiant ceiling panels, duct silencers, and VAV Boxes.

h. sanitary drain

i. sanitary vent

j. storm drain

k. domestic cold water, domestic hot water and domestic hot water recirculation

l. electrical light fixtures

m. electric panels

n. electric conduit 2" and larger

o. fire alarm devices

3. The contractor shall prepare as part of its costs, shop drawings in compatible format which will be used for incorporation into the coordination drawings.

4. The initial coordination drawings shall be produced by the contractor starting with the “Base” CAD background drawing. These backgrounds shall be updated and modified with integration and revision of CAD drawings for new construction to indicate conditions for approved final layouts for foundations, steel framing, concrete reinforcing, and access flooring approved rough-in layout plans. All building structural elements, walls, doors, windows, louvers, openings, ceiling layouts, access floor layouts and major equipment provided by the contractor and other significant elements shall be shown on designated layers. Scheduled heights for finished ceilings above finished floor, and height above finished floor of underside of concrete and metal decks and all beams and joists including provision for fireproofing and finished enclosures shall be indicated at all areas.

5. The contractor shall provide full size “CAD” files for each level, to be plotted at 3/8” or approved coordination scale.

6. All larger coordination drawings, broken up with match lines to correlate with phases and distinct plan areas with drawing designations.

7. All coordination drawings will have the location of plan view information the same.

8. Coordination drawings shall be prepared for the following areas:

    a. All areas (above ceiling).

    b. Separate coordination plans shall be prepared for the following areas:

        1) All Mechanical rooms.

        2) All Boiler Rooms.

        3) High School Roof.

        4) Miller Elementary School Roof.

        5) Barr Middle School Roof.

9. The Contractor shall meet at a minimum weekly meetings to be held to review the status of the coordination process, and drawings which the foremen and/or Superintendent of each Contractor will be required to attend. The Contractor will be required to bring at least one color plot of all areas to be coordinate. Each affected Contractor shall review, sign and date each updated coordinated drawing which will indicate their agreement that the coordination drawing(s) has (have) been fully coordinated and are void of all conflicts at each stage. Final completed coordination drawings shall be signed off by the Contractor. Any work in place not in conformance with final approved coordination drawings will be required to be removed and relocated unless specific written approval with each contractor.

10. Any conflicts, etc., discovered in the coordination stages prior to contractor sign-off which cannot be resolved by the Contractors shall be brought to the attention of the Architect for resolution.

11. Any conflicts, etc., discovered after coordination sign-off and during the installation of the Work will be the responsibility of the Contractor to resolve with the review of the Architect.

12. A coordination drawing schedule will be developed by the contractor for tracking and reporting the status of coordination drawings with the overall project schedule to which the Contractor shall be responsible.

13. Work fabricated/installed prior to the completion of this process is performed at the Contractor's own risk, and compensation of time/costs for corrections will not be allowed.

14. The Contractor shall be responsible for timely updates to the coordination drawings to indicate as-built conditions for their own work. Updates are required to include all changes regardless of the source or reason for the change.

E. Test Reports: Indicate pressure tests performed. Include date, section tested, test pressure, and leakage rate, following SMACNA (LEAK) - HVAC Air Duct Leakage Test Manual.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum 3 years of documented experience.

1.7 REGULATORY REQUIREMENTS

A. Construct ductwork to NFPA 90A standards.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.

B. Maintain temperatures within acceptable range during and after installation of duct sealants.

PART 2 PRODUCTS

2.1 MATERIALS

A. Galvanized Steel Ducts: ASTM A 653/A 653M galvanized steel sheet, lock-forming quality, with G90/Z275 zinc coating.

B. Reinforcement Shapes and Plates: Unless otherwise indicated, provide galvanized steel reinforcing where installed on galvanized sheet metal ducts.

C. Non-Fibrous, Closed Cell, Outdoor Rectangular Ductwork and Fittings:

1. Basis of Design: Thermaduct by Thermaduct, LLC. 855-809-6903 or equal

2. The panel shall be manufactured of CFC-free Kingspan Kooltherm closed cell rigid thermoset resin thermally bonded on both sides to a factory applied .001" (25 micron) aluminum foil facing reinforced with a fiberglass scrim. An added UV stable, IR reflective 1000-micron high impact resistant titanium infused vinyl is factory bonded using a full lamination process. The lamination process shall permanently bond the vinyl clad to the outer surfaces of the phenolic foam panel to provide a zero-permeability water tight barrier and to form a structurally insulated panel (SIP) in which to form duct segments. Processes that do not employ a full lamination process are not acceptable. Self-applied adhesives such as tapes, caulks or cladding that incorporate pressure sensitive or spray adhesives are not acceptable.

3. The thermal conductivity shall be no greater than 0.146BTU • in/Hr •ft2•°F, the thermal conductivity shall be no greater than 0.146BTU • in/Hr •ft2•°F.

4. The density of the foam shall not be less than 3.5 pcf with a minimum compressive strength of 28 psi.

5. The standard panel shall be 1-3/4" thick with R-12 and shall be utilized unless indicated otherwise on the print, and utilized for outdoor supply, exhaust and return ductwork applications.

6. Maximum Temperature: Continuous rating of 185 degrees F (70 deg C) inside ducts or ambient temperature surrounding ducts.

7. Maximum Thermal Conductivity: 0.146 Btu x in./h x sq. ft. x deg F at 75 deg F mean temperature.

8. Permeability: 0.00 perms maximum when tested according to ASTM E 96/E 96M, Procedure A.

9. Antimicrobial Agent: Additive for antimicrobial shall not be used but instead, raw product must pass UL bacteria growth testing.

10. Noise-Reduction Coefficient: 0.05 minimum when tested according to ASTM C 423, Mounting A.

11. Required Markings: All interior duct liner shall bear UL label and other markings required by UL 181 on each full sheet of duct panel; UL ratings for internal closure materials.

12. All insulation materials shall be closed cell with a closed cell content of >90%.

13. Pressure Class: 4" wg

14. Closure Materials:

    a. UV stable 1000 micron high impact resistant titanium infused vinyl (exterior).

        1) Factory manufactured seamless corners for zero perms.

        2) Cohesive bonded over-lap at corner seam covers for zero perms.

        3) Water resistant titanium infused welded vinyl seams.

        4) Mold and mildew resistant.

    b. Polymeric Sealing System:

        1) Structural Membrane: Aluminum scrim with woven glass fiber with UV stable vinyl clad applied

        2) Minimum Seam Cover Width: 2 7/8” inches (75 mm)

        3) Sealant: Low VOC.

        4) Color: White (colors, matched by architect optional).

        5) Water resistant.

        6) Mold and mildew resistant.

    c. Duct Connectors: Factory manufactured galvanized 4-bolt flange.

15. Outdoor Cladding:

    a. Outdoor Installations: Duct segments shall incorporate UV stable 1000 micron high impact resistant titanium infused vinyl which is introduced during the manufacturing process.

16. Flange Coverings:

    a. Flanges are field sealed airtight before flange covers are installed. Flange covering consists of the following:

        1) Foam tape insulation with molded 39 mil covers.

17. Reinforcement:

    a. Outdoor ducts shall provide designed and built with adequate reinforcement to both; withstand air pressure forces from within the duct from blower pressure and shall be built to handle expected snow load for the location where the duct is being installed. The ductwork reinforcement system when both specified static pressure and duct sizes dictate the need. This is a factory installed system and no field installation of the reinforcement system is required.

18. Weight:

a. The outdoor ductwork shall provide low weight stresses on the building framing and support members. Assembled duct shall have a weight of 0.86 lbs. per square foot to maximum weight of 2.7 lbs. per square foot (depending on R-value and reinforcement requirement). Hangers and tiedowns are to be detailed in the Installation Manual for review prior to installation but not exceeding 13’ for duct girth <84” and 8’ for duct girth >85” between hangers and designed to carry the weight and wind load of the ductwork.

D. Stainless Steel Ducts:

1. Use minimum No. 16 gage for exhaust ducts connected to cooking equipment hoods.

a. Use stainless steel reinforcing members for ducts in finished spaces and galvanized steel in unfinished spaces.

E. Aluminum Ducts: ASTM B 209; aluminum sheet, alloy 3003-H14. Aluminum Connectors and Bar Stock: Alloy 6061- T6 or of equivalent strength.

F. Insulated Flexible Ducts:

1. UL 181, Class 1, aluminum laminate and polyester film with latex adhesive supported by helically wound spring steel wire; fiberglass insulation; polyethylene vapor barrier film.

a. Pressure Rating: 10 inches WG positive and 1.0 inches WG negative.

b. Maximum Velocity: 4000 fpm.

c. Temperature Range: -20 degrees F to 210 degrees F.

G. Hanger Rod: ASTM A 36/A 36M; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

2.2 DUCTWORK FABRICATION

A. Fabricate and support in accordance with SMACNA (DCS) - HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.

B. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows are outlined on the drawings, provide air foil turning vanes. Where acoustical lining is indicated, provide turning vanes of perforated metal with glass fiber insulation.

C. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.

D. Fabricate continuously welded round and oval duct fittings two gages heavier than duct gages indicated in SMACNA Standard. Joints shall be minimum 4 inch cemented slip joint, brazed or electric welded. Prime coat welded joints.

E. Provide standard 45 degree lateral wye takeoffs unless otherwise indicated where 90 degree conical tee connections may be used.

F. Where ducts are connected to exterior wall louvers and duct outlet is smaller than louver frame, provide blank-out panels sealing louver area around duct. Use same material as duct, painted black on exterior side; seal to louver frame and duct.

2.3 SEALING MATERIALS

A. Joint and Seam Sealants, General: The term sealant used here is not limited to materials of adhesive or mastic nature, but also includes combinations of open weave fabric strips and mastics

B. Joint and Seam Tape: 2 inches wide, glass-fiber-fabric reinforced.

C. Tape Sealing System: Woven-fiber tape impregnated with a gypsum mineral compound and a modified acrylic/silicone activator to react exothermically with the tape to form a hard, durable, airtight seal.

D. Joint and Seam Sealant:

1. Color: Grey
2. Base: Water
3. Chemical Family: Synthetic Latex
4. Solids Content: 75 ± 2%
5. Viscosity: Approx. 300,000 - 400,000 CPS
6. Application Temperature: 40°F - 110°F
7. Service Temperature: -25°F - 200°F
8. Freeze/Thaw Stability: Through 5 cycles no deterioration (DPTM-20)
9. Flammability: Non-flammable
10. Wet or Dry Flash Point: No flash to boiling
11. Shelf Life: 2 Years (unopened containers)
12. Cure Time: 24 - 72 hours depending on humidity, temperature and application
13. Coverage: Dependent on application thickness, 80-100 sq. ft. at 20-30 wet mils.
14. Packaging: 1/12 gallon tubes, 1 gallon pails, 2 gallon pails, 5 gallon pails, 54 gallon drums

15. Pressure Classes: Meets all SMACNA pressure classes

16. Seal Classes: Meets all SMACNA seal classes

E. Flanged Joint Mastics: One-part, acid-curing, silicone elastomeric joint sealants, complying ASTM C920, Type S, Grade NS Class 25, Use O.

2.4 FIRE STOPPING

A. Provide fire-stopping of penetrations as work of this contract.

2.5 HANGERS AND SUPPORTS

A. Building Attachments: Concrete inserts, powder actuated fasteners, or structural steel fasteners appropriate for building materials. Do not use powder actuated concrete fasteners for lightweight aggregate concretes or for slabs less than 4 inches thick.

B. Hangers: Galvanized sheet steel, or round, uncoated steel, threaded rod.

1. Straps and Rod sizes: Conform with Table 4-1 in SMACNA HVAC Duct Construction Standards, 1985 Edition, for sheet steel width and gage and steel rod diameters

C. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

D. Trapeze and Riser Supports: Steel shapes conforming to ASTM-A36.

1. Where galvanized steel ducts are installed, provide hot-dipped galvanized steel shapes and plates.

E. Rooftop Duct Supports: Dual bases supporting "H" frame strut assembly to support duct.

1. Strut Material: Hot-dip galvanized steel.

2. Stainless steel bases and hot-dip galvanized steel struts.

3. Base Material: Polycarbonate resin, stainless steel or hot-dip galvanized

2.6 RECTANGULAR DUCT FABRICATION

A. General: Except as otherwise indicated, fabricate rectangular ducts with galvanized sheet steel, in accordance with SMACNA "HVAC Duct Construction Standards", Tables 1-3 through 1-19, including their associated details. Conform to the requirements in the referenced standard for metal thickness, reinforcing types and intervals, tie rod applications, and joint types and intervals.

1. Fabricate rectangular ducts in lengths appropriate to reinforcement and rigidity class required for pressure classification

2. Provide materials that are free from visual imperfections such as pitting, seam marks, roller marks, stains and discolorations.

B. Static Pressure Classifications: Unless otherwise noted, construct all ductwork in this contract to 4 inch water gage static pressure class, for both supply, exhaust and return ductwork.

C. Longitudinal joints shall be Pittsburgh Lock L-1.

D. Transverse joints shall be T-12 Standing S as a minimum, or shall be made using Ductmate, WDCI and Ductlock slide-on connector systems. For ductwork rated at 3" w.g. and above, the transverse joints shall be made with the Ductmate, Ward, or Nexus ductwork connection system. Formed-on connector systems and slip and drive joints (SMACNA Type T-1 through T-14, excluding T-12) shall not be permitted.

E. Fabricate duct fittings to match adjoining ducts and to comply with duct requirements as applicable to fittings. Except as otherwise indicated, fabricate elbows with centerline radius equal to 1.5 times associated duct width. Limit angular tapers to 30 degrees for contracting tapers, and 20 degrees for expanding tapers.

F. Fabricate ductwork with accessories installed during fabrication to the greatest extend possible. Refer to Division 23 section "Ductwork Accessories" for accessory requirements.

G. Fabricate plenums of galvanized sheet steel complying with ASTM A527, with G90 zinc coating in accordance with ASTM A525. Gages, construction, reinforcing and bracing shall comply with Section VI of SMACNA "HVAC Duct Construction Standards, Metal and Flexible".

H. Provide structural steel channels for support of plenums; provide structural angles and hanger rods.

2.7 RECTANGULAR DUCT FITTINGS

A. Fabricate elbows, transitions, offsets, branch connections and other duct construction in accordance with SMACNA "HVAC Metal Duct Construction Standard," 1985 Edition, Figures 2-1 through 2-10.

B. All branch takesoffs shall be made with 45 degree entry fittings; splitter dampers and extractors shall not be permitted.

2.8 ROUND DUCT FABRICATION

A. Round Ducts: Fabricate round supply ducts with spiral lockseam construction. Comply with SMACNA "HVAC Duct Construction Standards," Table 3 2 for galvanized steel gages.

1. Duct thickness shall be a minimum of 26 gauge.

B. Round Ducts: Fabricate round supply ducts using seam types identified in SMACNA "HVAC Duct Construction Standards," 1985 Edition, Figure 3-1, RL-Standards, " Table 3-2 for galvanized steel gages.

1. Drawband and crimp type transverse joints (RT-3 and RT-5 respectively) shall not be permitted.

2. Pleated, adjustable, and mitered elbows shall not be permitted, and segmented elbows shall be constructed with five segments, minimum.

2.9 ROUND SUPPLY AND RETURN FITTINGS FABRICATION

A. Conical Tees: Fabricate to conform to SMACNA "HVAC Duct Construction Standards", 1985 Edition, Figures 3-4 and 3-5 and with metal thicknesses specified for longitudinal seam straight duct.

B. Elbows: Fabricate in die-formed, gored or pleated construction. Fabricate the bend radius of die-formed, gored and pleated elbows 1.5 times the elbow diameter. Unless elbow construction type is indicated, provide elbows meeting the following requirements:

1. Round Elbows - 8 inches and Smaller: Die-formed elbows for 45- and 90- degree elbows and pleated elbows for 30, 45, 60, and 90 degrees only.

2. Round Elbows - 9 inches through 14 inches: Gored or pleated elbows for 30, 45, 60, and 90 degrees.

3. Round Elbows - Larger Than 14 Inches: Gored elbows

4. Die-Formed Elbows for Sizes Through 8 inches: 20 gage with 2-piece welded construction.

5. Round Gored Elbows Gages: Same as for non-elbow fittings specified above

6. Pleated Elbows Sizes Through 14 inches: 26 gage

C. High Efficiency Round Taps to Rectangular Duct Mains:

1. High-Efficiency Takeoff shall be utilized with a rectangular opening and an approximate 45° slope on the body. A flange shall be turned out on all four sides with each corner being filled. The flange shall also have pre-punched holes for easy installation. There shall be a closed cell neoprene gasket (3/4” X 1/4”) applied to the flange to assure a tight seal. High-Efficiency Takeoffs shall be fabricated from 24 gauge galvanized steel.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Duct sizes indicated are inside clear dimensions.

C. Install and seal metal and flexible ducts in accordance with SMACNA (DCS) - HVAC Duct Construction Standards - Metal and Flexible.

D. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

E. Use crimp joints with or without bead for joining round duct sizes 8 inch and smaller with crimp in direction of air flow.

F. Use double nuts and lock washers on threaded rod supports.

G. Connect flexible ducts to metal ducts with adhesive.

H. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.

I. At exterior wall louvers, seal duct to louver frame and install blank-out panels.

3.2 CLEANING

A. Clean newly installed duct systems with high power vacuum machines. Protect equipment which may be harmed by excessive dirt with filters, or bypass during cleaning. Provide adequate access into ductwork for cleaning purposes.

3.3 SCHEDULES

A. Ductwork Material:

1. Supply/Return/Relief (interior): Galvanized Steel.

2. Exhaust/Return (Exterior): 1-3/4" thick with R-12 Non-Fibrous, Closed Cell, Outdoor Rectangular Ductwork and Fittings.

3. Outdoor (Exterior): 1-3/4" thick with R-12 Non-Fibrous, Closed Cell, Outdoor Rectangular Ductwork and Fittings.

4. General Exhaust: Galvanized Steel.

5. Air Transfer Ductwork: Galvanized Steel.

6. Kitchen Hood Exhaust: Welded stainless Steel (concealed or exposed ductwork).

7. Outside Air Intake: Welded aluminum.

B. Ductwork Pressure Class:

1. Supply Ductwork: 4 inches

2. Return/Relief Ductwork: 4 inches

3. Transfer Air Ductwork: 1 inch

4. Outside air Ductwork: 4 inches

5. Exhaust air Ductwork: 2 inches

C. Ductwork Leakage Class:

1. Rectangular ductwork: Class 6

2. Round/Oval ductwork: Class 3

3. Air Leakage Testing: All ductwork systems shall be leak tested to the ductwork leakage classes specified. For supply air systems, measured leakage shall not exceed 3% of the total supply fan air volume. For exhaust and return air systems, measured leakage shall not exceed 5% of the total exhaust/return air volume per exhaust/return air fan system. Results of leakage testing shall be submitted to engineer for review.

D. Ducts Connected to Commercial Kitchen Hoods: Comply with NFPA 96.

1. Exposed to View: Type 304, stainless-steel sheet, No. 3 finish, 16 gauge minimum.

2. Concealed: Type 304, stainless-steel sheet, No. 3 finish, 16 gauge minimum, or carbon-steel sheet, 16 gauge minimum.

3. Welded seams and joints.

4. Pressure Class: Positive or negative 10-inch wg, 16 gauge minimum.

5. Minimum SMACNA Seal Class: Welded seams, joints, and penetrations.

6. SMACNA Leakage Class: 6.

3.4 ADDITIONAL INSTALLATION REQUIREMENTS FOR COMMERCIAL KITCHEN HOOD EXHAUST DUCTS

A. Install commercial kitchen hood exhaust ducts without dips and traps that may hold grease, and sloped a minimum of 2 percent to drain grease back to the hood.

B. Install fire-rated access panel assemblies at each change in direction and at maximum intervals of 20 feet in horizontal ducts, and at every floor for vertical ducts, or as indicated on Drawings. Locate access panel on top or sides of duct a minimum of 1-1/2 inches from bottom of duct.

C. Do not penetrate fire-rated assemblies except as allowed by applicable building codes and authorities having jurisdiction.

D. Prior to the use or concealment of any portion of a grease duct system, a leakage test shall be performed in the presence of the code enforcement official. Ducts shall be considered to be concealed where installed in shafts or covered by coatings or wraps that prevent the ductwork from being visually inspected on all sides. The permit holder shall be responsible to provide the necessary equipment and perform the grease duct leakage test. A light test or an approved equivalent test method shall be performed to determine that all welded and brazed joints are liquid tight. A light test shall be performed by passing a lamp having a power rating of not less than 100 watts through the entire section of duct work to be tested. The lamp shall be open so as to emit light equally in all directions perpendicular to the duct walls.

1. A test shall be performed for the entire duct system, including the hood-to-duct connection. The ductwork shall be permitted to be tested in sections, provided that every joint is tested.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Air turning devices.

B. Backdraft dampers - metal.

C. Combination fire and smoke dampers.

D. Duct access doors.

E. Duct test holes.

F. Fire dampers.

G. Flexible duct connectors.

H. Thermally broken low leakage motorized dampers.

I. Volume control dampers.

J. Low leakage (Class 1A) control dampers.

1.2 REFERENCE STANDARDS

A. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2024.

B. NFPA 92 - Standard for Smoke Control Systems; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

C. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; 2024.

D. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2020.

E. UL 555 - Standard for Fire Dampers; Current Edition, Including All Revisions.

F. UL 555S - Standard for Smoke Dampers; Current Edition, Including All Revisions.

G. UL 1978 - Grease Ducts; Current Edition, Including All Revisions.

1.3 SUBMITTALS

A. Product Data: Provide for shop fabricated assemblies including volume control dampers, duct access doors, duct test holes, and hardware used. Include electrical characteristics and connection requirements.

B. Shop Drawings: Indicate for shop fabricated assemblies including volume control dampers.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 AIR TURNING DEVICES

A. Turning Vanes

1. Provide single width airfoil type fabricated turning vanes and vane runners constructed in accordance with SMACNA "HVAC Duct Construction Standards".

B. Multi-blade device with blades aligned in short dimension; steel construction; with individually adjustable blades, mounting straps.

2.2 BACKDRAFT DAMPERS - METAL

A. Multi-Blade, Parallel Action Gravity Balanced Backdraft Dampers: Extruded aluminum, with center pivoted blades of maximum 6 inch width, with felt or flexible vinyl sealed edges, linked together in rattle-free manner with 90 degree stop, steel ball bearings, and plated steel pivot pin; adjustment device to permit setting for varying differential static pressure.

2.3 COMBINATION FIRE AND SMOKE DAMPERS

A. Fabricate in accordance with NFPA 90A, UL 555, UL 555S, and as indicated.

B. Provide factory sleeve and collar for each damper.

C. Multiple Blade Dampers: Fabricate with 16 gauge, 0.0598 inch galvanized steel frame and blades, oil-impregnated bronze or stainless steel sleeve bearings and plated steel axles, stainless steel jamb seals, 1/8 by 1/2 inch plated steel concealed linkage, stainless steel closure spring, blade stops, and lock, and 1/2 inch actuator shaft.

D. Operators: UL listed and labelled spring return electric type suitable for 120 volts, single phase, 60 Hz. Provide end switches to indicate damper position. Locate damper operator on interior of duct and link to damper operating shaft.

E. Combination fire and smoke dampers shall be provided with Belimo Aircontrols FSAF (133 in-#) actuators or equal. Actuator timing shall meet local codes - 15 seconds.

1. Actuator shall carry a manufacturer's 5-year warranty and be manufactured under ISO 9001 quality control.

2. Actuator shall have microcontroller based motor controller providing:

a. Electronic cut off at full open so that no noise can be generated while holding open. Holding noise level shall be inaudible.

b. Overload protection. Shall be incapable of burning out if stalled before reaching full rotation.

3. Housing shall be steel and gears shall be permanently lubricated.

4. The actuators shall be direct coupled and employ a steel-toothed cold-weld clamp for connecting to damper shafts. Aluminum clamps or set-screw attachment shall not be acceptable.

5. Actuator shall have UL555S Listing by the damper manufacturer for 250°F.

6. Dampers shall be installed straight and true, level in all planes, and square in all dimensions. Dampers shall move freely without undue stress due to twisting, racking, bowing, or other installation error. Do not install in area where moisture can penetrate damper or actuator nor where actuator temperature continuously exceeds 120°F.

F. Provide each combination fire/smoke damper with a position indicator package, which operates as a function of the damper blade position. The position indicator shall allow remote indication of damper blade position with two single pole, double throw switches and provides a positive open or closed signal.

G. Normally Open Smoke Responsive Fire Dampers: Curtain type, closing upon actuation of electro thermal link, flexible stainless steel blade edge seals to provide constant sealing pressure, stainless steel springs with locking devices to ensure positive closure for units mounted horizontally.

H. Electro Thermal Link: Fusible link melting at 165 degrees F; 120 volts, single phase, 60 Hz; UL listed and labeled.

2.4 DUCT ACCESS DOORS

A. Fabrication: Rigid and close-fitting of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated ducts, install minimum 1 inch thick insulation with sheet metal cover.

1. Less Than 12 inches Square: Secure with sash locks.

2. Up to 18 inches Square: Provide two hinges and two sash locks.

3. Up to 24 by 48 inches: Three hinges and two compression latches with outside and inside handles.

4. Larger Sizes: Provide an additional hinge.

B. Access doors with sheet metal screw fasteners are not acceptable.

2.5 DUCT TEST HOLES

A. Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.

B. Permanent Test Holes: Factory fabricated, air tight flanged fittings with screw cap. Provide extended neck fittings to clear insulation.

2.6 DYNAMIC FIRE DAMPERS

A. Dynamic Fire Dampers - Fabrication:

1. Fire Rating: UL 555 classified and labeled as a 1-1/2 hour fire damper.

2. Air Flow Rating: UL approved for dual directional air flow.

3. Frame: 5 inches x minimum 16 gage (127 x minimum 1.6 mm) roll formed, galvanized steel hat-shaped channel, reinforced at corners. Structurally equivalent to 13 gage (2.3 mm) U-channel.

4. Blades:

a. Style: Airfoil-shaped, single-piece.

b. Action: Opposed, spring closure upon fusible link release.

1) Orientation: Horizontal.

c. Material: Minimum 14 gage (2.0 mm) equivalent thickness, galvanized steel.

d. Width: Maximum 6 inches (152 mm).

5. Bearings: Self-lubricating stainless steel sleeve, turning in extruded hole in frame.

6. Blade Seals: Galvanized steel for flame seal to 1,900 degrees F (1,038 degrees C). Mechanically attached to blade edge.

7. Linkage: Concealed in frame.

8. Axles: Minimum 1/2 inch (13 mm) diameter plated steel, hex-shaped, mechanically attached to blade.

9. Mounting: Vertical or Horizontal.

10. Temperature Release Device:

a. Fusible link, 165 degrees F (74 degrees C).

b. ETL, 24 VAC/VDC, 165 degrees F (74 degrees C).

11. Finish: Mill galvanized.

12. Assembly: Factory assemble damper and accessories and furnish as a single unit conforming to UL 555.

B. Performance Data:

1. Temperature Qualified: Damper qualified in accordance with UL 555 as a 1-1/2 hour fire damper.

2. Capacity: Demonstrate capacity of damper to close in HVAC system operating conditions.

    a. Maximum Pressure: 4 inches w.g. (1 kPa).

    b. Maximum Air Velocity: 4,000 feet per minute (1,219 m/min).

3. Pressure Drop: Maximum 0.07 inches w.g. (0.02 kPa) at 2,000 feet per minute (610 m/min) through 24 x 24 inch (610 x 610 mm) damper.

C. Accessories:

1. Jamb Seals: Stainless steel, flexible metal compression type.

2. Picture Frame Mounting Angles:

    a. One-piece, roll formed retaining angles 1-1/2 x 1-1/2 inches (38 x 38 mm)

    b. Factory matched and shipped on individual damper.

    c. Factory prepunched screw holes.

    d. Requires factory sleeve.

    e. Factory Sleeve: Minimum 20 gage (1.0 mm) thickness, minimum 12 inches (305 mm) length.

    f. Steel Mullions: For dampers in oversized masonry wall openings.

    g. Breakaway Connection: Ductmate.

2.7 STATIC FIRE DAMPERS

A. Fabrication:

1. Fire Rating: UL 555 classified and labeled as a 1-1/2 hour static fire damper.

2. Air Flow Rating: UL approved for dual directional air flow.

3. Frame: Maximum 2-1/8 inches (54 mm) with no flanges x minimum 20 gage (0.9 mm) roll formed, galvanized steel.

4. Blades:

    a. Style: Curtain type, in airstream.

    b. Action: Spring or gravity closure upon fusible link release.

    c. Orientation: Horizontal.

    d. Material: Minimum 24 gage (0.6 mm) roll formed, galvanized steel.

5. Closure Springs: Type 301 stainless steel, constant force type, if required.

6. Temperature Release Device:

   a. Fusible link, 165 degrees F (74 degrees C).

   b. ETL, 24 VAC/VDC, 165 degrees F (74 degrees C).

B. Mounting: Vertical.

C. Finish: Mill galvanized.

D. Assembly: Factory assemble damper and accessories and furnish as a single unit conforming to UL 555.

E. Performance Data:

1. Temperature Qualified: Damper qualified in accordance with UL 555 as a 1-1/2 hour fire damper.

2. Pressure Drop: Maximum 0.08 inch w.g. (0.02 kPa) at 1,000 feet per minute (305 m/min) through 40 x 48 inch (1,016 x 1,219 mm) damper.

F. ACCESSORIES

1. Picture Frame Mounting Angles:

   a. One-piece, roll formed retaining angles 1-1/2 x 1-1/2 inches (38 x 38 mm).

   b. Factory matched and shipped on individual damper.

   c. Factory prepunched screw holes.

   d. Requires factory sleeve.

2. Factory Sleeve: Minimum 20 gage (1.0 mm) thickness.

3. Steel Mullions: For dampers in oversized masonry wall openings.

2.8 FLEXIBLE DUCT CONNECTORS

A. Fabricate in accordance with SMACNA (DCS) and as indicated.

B. Flexible Duct Connections: Fabric crimped into metal edging strip.

1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 30 oz/sq yd.

   a. Net Fabric Width: Approximately 2 inches wide.

2. Metal: 3 inches wide, 24 gauge, 0.0239 inch thick galvanized steel.

2.9 LOW LEAK THERMALLY-BROKEN MOTORIZED DAMPERS

A. General: Provide thermally-broken motorized dampers with insulated blades for all outside air intake dampers as well as exhaust dampers and return air dampers,. Basis of design: Tamco Series 9000.

B. Construction:

1. Frame: Extruded aluminum (6063T5), with thickness of 0.80 inches, 4 inches deep, insulated with styrofoam on four sides. Entire frame shall be thermally broken by means of polyurethane resin pockets complete with thermal cuts

2. Blades: Blades shall be extruded aluminum (6063T5, internally insulated with expanded polyurethane foam and thermally broken. Complete blade shall have an insulating factor of R-2.29 and a temperature index of 55.

3. Seals: Blade and frame seals shall be extruded silicone and secured in an integral slot within the aluminum extrusions.

4. Bearings: Bearings shall be composed of a celcon inner bearing fixed to a 7 /16 inch aluminum hexagon blade pin rotating within a polycarbonate outer bearing inserted in the frame, resulting in no metal-to-metal or metal-to-plastic contact.

5. Normal Position: Closed.

6. Blade Operation: Parallel.

7. Performance: Tested in accordance with AMCA Test Standard 500 D: Leakage: 4.12 CFM/square foot with 4 inches differential pressure, as tested through 48x48 louver.

2.10 VOLUME CONTROL DAMPERS

A. Fabricate in accordance with SMACNA (DCS) and as indicated.

B. Single Blade Dampers:

1. Fabricate for duct sizes up to 6 by 30 inch.

2. Blade: 24 gauge, 0.0239 inch, minimum.

C. Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 8 by 72 inch. Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.

1. Blade: 18 gauge, 0.0478 inch, minimum.

D. End Bearings: Except in round ducts 12 inches and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon or sintered bronze bearings.

E. Quadrants:

1. Provide locking, indicating quadrant regulators on single and multi-blade dampers.

2. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.

3. Where rod lengths exceed 30 inches provide regulator at both ends.

PART 3 EXECUTION

3.1 PREPARATION

A. Verify that electric power is available and of the correct characteristics.

3.2 INSTALLATION

A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA (DCS). See Section 233100 for duct construction and pressure class.

B. Provide backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.

C. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, smoke dampers, combination fire and smoke dampers, and elsewhere as indicated. Provide for cleaning kitchen exhaust ducts in accordance with NFPA 96. Provide minimum 8 x 8 inch size for hand access, 16" x 16" size for shoulder access, and as indicated. Provide 4 x 4 inch for balancing dampers only. Review locations prior to fabrication.

D. Provide duct test holes where indicated and required for testing and balancing purposes.

E. Provide fire dampers, combination fire and smoke dampers, and smoke dampers at locations indicated, where ducts and outlets pass through fire rated components, and where required by Authorities Having Jurisdiction. Install with required perimeter mounting angles, sleeves, breakaway duct connections, corrosion resistant springs, bearings, bushings and hinges.

F. Install combination smoke and fire dampers in accordance with NFPA 92.

G. Demonstrate re-setting of fire dampers to Nanuet Union Free School District's representative.

H. At rooftop air handling units, blower coils, air handling units, fans and motorized equipment associated with ducts that DON'T include internal fan vibration isolation devices, provide flexible duct connections immediately adjacent to the equipment.

I. Fire Dampers:

1. Provide dynamic fire dampers at locations where dampers are installed in duct systems connected to fans systems. Provide static fire dampers at locations where fire dampers are installed in air transfer duct systems not connected to fans.

2. Install dampers at locations indicated on the drawings and in accordance with manufacturer's UL approved installation instructions.

3. Install dampers square and free from racking with blades running horizontally.

4. Do not compress or stretch damper frame into duct or opening.

5. Handle damper using sleeve or frame. Do not lift damper using blades or jackshaft.

6. Install bracing for multiple section assemblies to support assembly weight and to hold against system pressure. Install bracing as needed.

J. Combination Fire/Smoke Dampers:

1. Install dampers at locations indicated on the drawings and in accordance with manufacturer's UL approved installation instructions.

2. Install dampers square and free from racking with blades running horizontally.

3. Do not compress or stretch damper frame into duct or opening.

4. Handle damper using sleeve or frame. Do not lift damper using blades, actuator, or jackshaft.

5. Install bracing for multiple section assemblies to support assembly weight and to hold against system pressure. Install bracing as needed.

K. At equipment supported by vibration isolators, provide flexible duct connections immediately adjacent to the equipment.

L. Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum 2 duct widths from duct take-off.

M. Volume Control Balancing Dampers: Provide multi-blade opposed blade dampers for ductwork 12" high and larger and single blade dampers for ductwork sizes 10" and smaller.

N. Provide balancing dampers on duct take-off to active terminal units, diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.

END OF SECTION

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Duct silencers.

1. Absorptive silencers.

1.2 REFERENCE STANDARDS

A. AABC MN-1 - AABC National Standards for Total System Balance; 2002.

B. AHRI 575 - Method of Measuring Machinery Sound Within an Equipment Space; 2017.

C. AMCA 300 - Reverberant Room Method for Sound Testing of Fans; 2014.

D. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data; 2022.

E. AMCA 302 - Application of Sone Loudness Ratings for Non-Ducted Air Moving Devices; 1973 (Reaffirmed 2012).

F. AMCA 303 - Application of Sound Power Level Ratings for Fans; 1979 (Reaffirmed 2012).

G. ANSI S1.13 - American National Standard Measurement of Sound Pressure Levels in Air; 2020.

H. ASHRAE Std 68 - Laboratory Method of Testing to Determine the Sound Power in a Duct; 1997.

I. ASHRAE (HVACA) - ASHRAE Handbook - HVAC Applications; Most Recent Edition Cited by Referring Code or Reference Standard.

J. ASTM E477 - Standard Test Method for Laboratory Measurements of Acoustical and Airflow Performance of Duct Liner Materials and Prefabricated Silencers; 2020.

K. ASTM E596 - Standard Test Method for Laboratory Measurement of Noise Reduction of Sound-Isolating Enclosures; 2022.

1.3 SUBMITTALS

A. Product Data: Provide catalog information indicating, materials, dimensional data, pressure losses, and acoustical performance.

B. Shop Drawings: Indicate assembly, materials, thicknesses, dimensional data, pressure losses, acoustical performance, layout, and connection details.

C. Test Reports: Indicate dynamic insertion loss and noise generation values of silencers.

D. Manufacturer's Installation Instructions: Indicate installation procedures necessary to maintain integrity of sound isolation.

E. Manufacturer's Field Reports: Indicate installation is complete and in accordance with instructions.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

B. Perform Work in accordance with AHRI 575, AMCA 300, or ANSI S1.13 standards and recommendations of ASHRAE Std 68.

PART 2 PRODUCTS

2.1 RECTANGULAR DUCT SILENCERS

A. Acceptable Manufacturers:

1. Price (basis of design)
2. Industrial Acoustics
3. Vibro Acoustics

B. General

1. Silencers shall be of the size, configuration, capacity and acoustic performance as scheduled on the drawings. Silencers shall be fabricated by the same manufacturer.
2. Silencer inlet and outlet connection dimensions must be equal to the duct sizes shown on the drawings. Duct transitions at silencers are not permitted unless shown on the contract drawings or approved by the project engineer.

C. Construction

1. Silencers shall be constructed in accordance with ASHRAE and SMACNA Standards for the pressure and velocity classification specified for the air distribution system in which it is installed.
2. Casing seams and joints shall be lock-formed and sealed or stitch welded and sealed except as noted, to provide leakage-resistant construction.
3. Airtight construction shall be achieved by use of a duct-sealing compound supplied and installed by the contractor at the jobsite.
4. Perforated steel shall be adequately stiffened to insure flatness and form. Spot welds shall be painted as required.
5. Fire-Performance Characteristics:
    a. Silencer assemblies, including acoustic media fill, natural cotton fiber, sealants and acoustical spacers shall have Class 1 flame-spread index not

exceeding 25 and smoke-developed index not exceeding 50 when tested according to ASTM E84, NFPA 255 or UL 723.

6. Material gauge thickness:

   a. Material gauges noted in other sections are minimums and shall increase as required for the system pressure and velocity classification.

   b. The silencers shall not fail structurally when subjected to a differential air pressure of 8 inches water gauge.

7. Outer casing shall be ASTM A 653/A 653M, G90 galvanized sheet steel, gauge as listed below

   a. Rectangular Silencers, including STC-rated models: 16 gauge

   b. Rectangular Elbow Silencers: 16 gauge

   c. Circular Silencers:

      1) For units up to 20 inches in diameter: 20 gauge

8. Rectangular elbow silencers:

   a. Acoustical splitter/baffles shall be internally radiused and aerodynamically designed for efficient turning of the air.

9. Inner perforated metal liner shall be supplied in accordance with ASTM A 653/A 653M, G90 galvanized sheet steel in the following gauge thicknesses according to silencer type or connection size:

   a. Rectangular Silencers: 22 gauge

   b. Rectangular Elbow Silencers: 22 gauge

   c. Circular Silencers: 22 gauge

10. Principal Sound-Absorbing Mechanism:

    a. Absorptive (Dissipative) and Film Lined Silencers:

       1) Standard Acoustic media:

          (a) Media shall be of acoustic quality, shot-free glass fiber insulation with long, resilient fibers bonded with a thermosetting resin. Glass fiber density and compression shall be as required to insure conformance with laboratory test data.

          (b) Media shall be packed with a minimum of 15% compression during silencer assembly.

          (c) Media shall be resilient such that it will not pull apart during normal applications, and shall resist settling, breakdown, and sagging from

vibration. Media shall not rot, mildew, or otherwise deteriorate, and shall have sufficient flexibility to readily form around corners and curved surfaces.

(d) Media shall not cause or accelerate corrosion of aluminum or steel.

11. Duct connection method: flanged.

12. HTL Casings:

a. All silencers shall have high transmission loss (HTL) walls externally applied and completely sealed to the silencer casing by the silencer manufacturer.

b. If requested by the project engineer, relevant breakout noise calculations shall be provided to ensure compliance with the relevant room noise criteria that are based on the sound power levels of the specified equipment.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Support duct silencers independent of ducts. Refer to Section 233100 and Section 233300.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Roof mounted downblast exhausters.

B. Kitchen hood upblast roof exhausters.

1.2 REFERENCE STANDARDS

A. AMCA 99 - Standards Handbook; 2016.

B. AMCA 204 - Balance Quality and Vibration Levels for Fans; 2020.

C. AMCA 210 - Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating; 2016, with Errata (2018).

D. AMCA 300 - Reverberant Room Method for Sound Testing of Fans; 2014.

E. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data; 2022.

F. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2020.

G. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; 2024.

H. UL 705 - Power Ventilators; Current Edition, Including All Revisions.

I. UL 762 - Outline of Investigation for Power Roof Ventilators for Restaurant Exhaust Appliances; Current Edition, Including All Revisions.

1.3 SUBMITTALS

A. Product Data: Provide data on fans and accessories, including fan curves with specified operating point plotted, power, rpm, sound power levels at rated capacity, and electrical characteristics and connection requirements.

B. Manufacturer's Instructions: Indicate installation instructions.

C. Maintenance Data: Include instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

D. Coordination Drawings: Plans and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from Installers of the items involved: Roof framing and support members relative to duct penetrations.

E. Maintenance Materials: Furnish the following for Nanuet Union Free School District's use in maintenance of project.

1. Extra Fan Belts: One set for each individual belt driven fan.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.5 FIELD CONDITIONS

A. Permanent ventilators may be used for ventilation during construction only after ductwork is clean, filters are in place, bearings have been lubricated, and fan has been test run under observation.

B. Provide one set of variable and adjustable pitch sheaves for each belt-driven centrifugal fan selected for midpoint operation at specified performance. Furnish one set of fixed sheaves and matched belts for each belt-driven centrifugal fan, selected following completion of balancing to deliver specified unit airflow. Turn fixed sheaves and matched belts over to balancer upon completion of balancing of variable and adjustable pitched sheaves.

PART 2 PRODUCTS

2.1 POWER VENTILATORS - GENERAL

A. Static and Dynamically Balanced: Comply with AMCA 204.

B. Performance Ratings: Comply with AMCA 210, bearing certified rating seal.

C. Sound Ratings: Comply with AMCA 301, tested to AMCA 300, bearing certified sound ratings seal.

D. Fabrication: Comply with AMCA 99.

E. UL Compliance: UL 705, listed, labeled, designed, manufactured, and tested.

F. Electrical Components: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

G. Enclosed Safety Switches: Comply with NEMA 250.

2.2 KITCHEN HOOD UPBLAST ROOF EXHAUSTERS

A. Acceptable Manufacturers:

1. Loren Cook.

2. Twin City.

3. Greenheck.

B. Description: Fan shall be a spun aluminum, roof mounted, direct driven, upblast extended pressure centrifugal exhaust ventilator.

C. Certifications: Fan shall be manufactured at an ISO 9001 certified facility. Fan shall be listed by Underwriters Laboratories (UL 762) and UL listed for Canada (Power

Ventilator for Restaurant Exhaust Appliances). Fan shall bear the AMCA certified ratings seal for sound and air performance.

D. Construction: The fan shall be of bolted and welded construction utilizing corrosion resistant fasteners. The spun aluminum structural components shall be constructed of minimum 16 gauge marine alloy aluminum, bolted to a rigid aluminum support structure. The aluminum base shall have a one piece inlet spinning and continuously welded curb cap corners for maximum leak protection. The windband shall have a rolled bead for added strength. A two piece top cap shall have stainless steel quick release latches to provide access into the motor compartment without the use of tools. An external wiring compartment with integral conduit chase shall be provided into the motor compartment to facilitate wiring connections. The motor shall be enclosed in a weather-tight compartment, separated from the exhaust airstream. Unit shall bear an engraved aluminum nameplate. Nameplate shall indicate design CFM and static pressure. Unit shall be shipped in ISTA certified transit tested packaging.

E. Wheel: Wheel shall be centrifugal backward inclined, constructed of 100 percent aluminum, including a precision machined cast aluminum hub. Wheel inlet shall overlap an aerodynamic aluminum inlet cone to provide maximum performance and efficiency. Wheel shall be balanced in accordance withA MCA Standard 204-05, Balance Quality and Vibration Levels for Fans.

F. Motor: Motor shall be NEMA design B with a minimum of class B insulation rated for continuous duty and furnished at the specified voltage, phase and enclosure.

G. Options/Accessories:

1. Birdscreen:

a. Provide aluminum construction.

b. Protects fan discharge.

2. Clean Out Port: Removable grease repellent compression rubber plug allows access for cleaning wheel through windband.

3. Roof Curb Extension: Vented curb extension where required for compliance with minimum clearances required by NFPA 96.

4. Drain Connection:

a. Aluminum construction.

b. Allows single-point drainage of grease, water, or other residues.

5. Finishes: Factory primed.

6. Grease Trap:

a. Aluminum.

b. Includes drain connection.

c. Collects grease residue.

7. Hinge Kit:

a. Aluminum hinges.

b. Hinges and restraint cables mounted to base (sleeve).

c. Allows fan to tilt away for access to wheel and ductwork for inspection and cleaning.

8. Heat Baffle: Prevents heat from radiating into motor compartment.

9. Tie-down Points: Four brackets located on windband secures fan in heavy wind applications.

2.3 ROOF MOUNTED DOWNBLAST EXHAUSTERS

A. Acceptable Manufacturers:

1. Loren Cook.

2. Twin City.

3. Greenheck.

B. Fan Unit: Direct drive, with spun aluminum housing and aluminum rub ring; resilient mounted motor; 1/2 inch mesh, 0.62 inch thick aluminum wire birdscreen; square base to suit roof curb with continuous curb gaskets.

C. Roof Curb: 16 inch high self-flashing of galvanized steel with continuously welded seams, built-in cant strips, insulation and curb bottom, and factory installed nailer strip.

D. Disconnect Switch: Factory wired, non-fusible, in housing for thermal overload protected motor.

E. Backdraft Damper: Motor actuated, aluminum multiple blade construction, felt edged with offset hinge pin, nylon bearings, blades linked.

F. Sheaves (for belt drive fans only): Cast iron or steel, dynamically balanced, bored to fit shafts and keyed; variable and adjustable pitch motor sheave selected so required rpm is obtained with sheaves set at mid-position; fan shaft with self-aligning pre-lubricated ball bearings.

G. Motor (for three phase fans only): Heavy duty type with permanently lubricated sealed ball bearings and furnished at the scheduled voltage and phase.

1. Provide premium efficiency motor, suitable for inverter duty.

H. Motor (FOR single phase DIRECT DRIVE FANS): Motor shall be an electronically commutated motor rated for continuous duty and furnished either with leads for connection to 0-10 VDC external controller.

1. Provide with Air Balance Kit:

    a. Provides a point to set the speed range over which the motor will operate

    b. Shall contains an integral 24V control transformer

    c. Shall incorporate a speed control to facilitate field air balancing as well as a Hand-Stop-Auto control that allows selection of operating modes from 'stopped,' to manual, to fully automatic control

    d. Shall provide convenient terminals for landing motors and controls as well as auxiliary control of motor operated dampers

    e. Shall Provide a means for remote on/off control

    f. Status indicated by a tricolor LED light

I. Standard Roof curbs: 16 or 18 inch high self-flashing of galvanized steel with continuously welded seams, built-in cant strips, insulation and curb bottom, and factory installed nailer strip.

J. Acoustical roof curbs: Acoustical Curbs shall be provided to reduce fan generated sound from traveling down ductwork without adversely affecting fan performance. Air shall pass between the streamlined baffles allowing fan sound to be absorbed and dissipated within the curb area preventing it from entering the building. Each perforated aluminum baffle section shall be filled with fiberglass wool. Spring steel wire holding clips shall secure the aluminum baffle. Assembly shall be a rigid, durable section which shall not warp or twist out of shape. Permanently constructed baffles shall be removable for access to dampers or for cleaning. No tools shall be required. Standard construction features for sound curbs shall be 18 gauge steel and one inch (25 mm) insulation. Sound curbs shall mount directly to the roof deck structure. Roofing material shall be sealed to the top of the lap-jointed wooden nailer for weather tightness.

K. Curb Adapters (where called out on drawings and/or schedules):

    1. Roof Curb Adapter and Extension:

        a. Used to connect a new roof fan to an existing roof curb

        b. Roof Products and Systems (RPS) model CA-2 or equal

        c. Construction:

            1) 18 gauge galvanized steel

            2) 1-1/2", 3 LB. density fiberglass insulation

            3) Unitized construction

            4) Continuous welded corner seams

            5) 16 inch height

d. Field measure existing roof curb dimensions as required to provide curb adapter size to match replacement fan inlet dimensions.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Secure roof exhausters with cadmium plated steel lag screws to roof curb.

C. Extend ducts to roof exhausters into roof curb. Counterflash duct to roof opening.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Single-duct terminal units.

1. Single-duct, variable-volume units.

B. Variable volume terminal units.

C. Integral controls.

1.2 REFERENCE STANDARDS

A. AHRI 410 - Forced-Circulation Air-Cooling and Air-Heating Coils; 2001, with Addenda (2011).

B. AHRI 880 (I-P) - Performance Rating of Air Terminals; 2017 (Reaffirmed 2023).

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023c.

D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2020.

E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

F. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2024.

G. SMACNA (SRM) - Seismic Restraint Manual Guidelines for Mechanical Systems; 2008.

H. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; Current Edition, Including All Revisions.

1.3 SUBMITTALS

A. Product Data: Provide data indicating configuration, general assembly, and materials used in fabrication. Include catalog performance ratings that indicate air flow, static pressure, and NC designation. Include electrical characteristics and connection requirements.

B. Shop Drawings: Indicate configuration, general assembly, and materials used in fabrication, and electrical characteristics and connection requirements.

1. Include schedules listing discharge and radiated sound power level for each of second through sixth octave bands at inlet static pressures of 1 to 4 inch wg.

C. Certificates: Certify that coils are tested and rated in accordance with AHRI 410.

D. Manufacturer's Installation Instructions: Indicate support and hanging details, installation instructions, recommendations, and service clearances required.

E. Project Record Documents: Record actual locations of units and locations of access doors required for access of valving.

F. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, maintenance and repair data, and parts lists. Include directions for resetting constant-volume regulators.

G. Warranty: Submit manufacturer warranty and ensure forms have been completed in Nanuet Union Free School District's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

C. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.5 WARRANTY

A. Provide five year manufacturer warranty for air terminal units.

PART 2 PRODUCTS

2.1 SINGLE-DUCT, VARIABLE-VOLUME UNITS

A. The assemblies shall be pressure independent and shall reset to any air flow between zero and the maximum cataloged air volume.

B. At an inlet velocity of 2000 fpm, the minimum operating pressure for any unit shall not exceed 0.04 w.g.

C. The assemblies shall consist of an absorptive rectangular silencer (where scheduled) that matches the terminal discharge area configuration and performance, as described on the plans and/or air distribution schedules. The silencers have slip and drive connections for easy installation.

D. Performance characteristics including pressure drop and sound data for the terminal/silencer assembly shall have been attained through lab testing in accordance to ASHRAE 130-2008 and AHRI 880-2008. Sound ratings of air distribution per the levels indicated on the drawing schedules.

E. Performance of the complete VAV terminal and silencer assembly (where scheduled) shall be AHRI certified.

F. The air flow sensor shall be of a cross configuration located at the inlet of the assembly. The sensor shall have twelve total pressure sensing ports and a center averaging chamber designed to accurately average the flow across the inlet of the

assembly. Sensor shall provide accuracy within 5% with 90° sheet metal elbow directly at the inlet of the assembly. The air flow sensor shall amplify the sensed air flow signal.

G. The primary air valve damper shall be heavy gauge metal, with peripheral gasket and solid steel shaft, pivoted in self-lubricating bearings. In the full closed position, air leakage past the closed damper shall not exceed 2% of the nominal catalog rating at 3 in. w.g. inlet static pressure, when tested in accordance to ASHRAE 130.

H. The entire valve/damper assembly shall be tested to 1.25 million cycles without failure.

I. The VAV terminal casing shall be constructed of 22 gauge zinc-coated steel, internally lined with 1/2 in. thick, fiberglass insulation which complies with UL-181, ASTM C1071, and NFPA-90A. Any cut edges of fiberglass exposed to the air stream shall be coated with NFPA-90A approved sealant. The liner shall not contain Pentabrominated diphenyl ether CAS#32534-81-9 and Octabrominated diphenyl ether.

J. Silencer/sound attenuator sections (where scheduled) shall consist of 16 ga solid metal casing, 26 ga perforated liners, and absorptive acoustic fiberglass liner.

1. Acceptable methods of silencer construction shall be Pittsburgh lock. Screws or other mechanical fasteners on the silencer shall not be acceptable.

2. The silencer noses and perforated liners shall be rigidly fastened to the casing of the silencer on both the top and bottom.

3. The silencer section acoustic media shall be shot free inorganic glass fiber with long, resilient fibers, bonded with thermosetting resin, and contain 50% recycled media. Glass fiber shall be packed with a minimum 10% compression to eliminate voids and settling; density shall be consistent with that used to generate catalog test data. Combustion ratings for acoustical media shall be equal to or less than the combustion ratings noted below when tested in accordance with ASTM E84, UL713, and NFPA 255:

a. Flame Spread Classification: 25

b. Smoke Development Rating: 50

K. Hot Water Heating

1. Coil Casing: Minimum 22 gauge, 0.0299 inch galvanized steel, factory-installed on terminal discharge with rectangular outlet, duct connection type.

2. Access Door: Gasketed and insulated located on bottom.

3. Coil Fins: Aluminum or aluminum plated fins, mechanically-bonded to seamless copper tubes.

4. Coil leak tested to minimum 350 psig.

5. Base performance data on tests run in accordance with AHRI 410and units to bear AHRI 410 label.

L. Control: Actuator shall be supplied and installed by the Temperature Controls Contractor. Box shall be set up for pressure independent operation with air flow sensor and tubing provided and installed by the box manufacturer.

M. Access Door: Provide ultra-low leakage, premium quality and performance, flat oval design, 1/2” insulated double wall, access door. Door shall be formed 24 gauge, galvanized steel flanged frame and door panel. Door shall have positive bulb door seal, (foam gaskets are not acceptable). The unit should include camp lock design fasteners for easy removal and box inspection.

N. Accessories: Hanger brackets, NEMA 1 control box with 24 power connection and disconnect switch.

O. Factory mount and wire controls. Mount electrical components in control box with removable cover. Incorporate 24 volt, low voltage single point electrical connection to power source.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install the inlets of air terminal units and air flow sensors a minimum of four duct diameters from elbows, transitions, and duct takeoffs.

C. Provide ceiling access doors or locate units above easily removable ceiling components.

D. Support units individually from structure with wire rope complying with ASTM A492 and ASTM A603 in accordance with SMACNA 1981. See Section 23 0548.

E. Do not support from ductwork.

F. Connect to ductwork in accordance with Section 233100.

G. Install the terminal units in accordance with the manufacturer's instructions.

H. Install the inlets of the air terminal units with the air flow sensors a minimum of three duct diameters from elbows, transitions, and duct takeoffs.

I. See drawings for the size(s) and duct location(s) of the air terminal units.

J. Provide ceiling access doors or locate units above easily removable ceiling components.

K. Support the terminal units individually from the structure in accordance with manufacturer’s recommendations.

L. Embed anchors in concrete in accordance with ASTM E488/E488M.

M. Do not support the terminal units from the ductwork.

N. Verify that electric power is available and of the correct characteristics.

3.2 ADJUSTING

A. Ensure the damper operator attached to the assembly allows full modulation of flow range from 100 percent of design flow to zero.

END OF SECTION

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Diffusers.

B. Registers/grilles.

1.2 REFERENCE STANDARDS

A. ASHRAE Std 70 - Method of Testing the Performance of Air Outlets and Air Inlets; 2023.

B. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

C. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2020.

1.3 SUBMITTALS

A. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

B. Project Record Documents: Record actual locations of air outlets and inlets.

1.4 QUALITY ASSURANCE

A. Test and rate air outlet and inlet performance in accordance with ASHRAE Std 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

PART 2 PRODUCTS

2.1 RETURN REGISTERS

A. Approved Manufacturers:

1. Price 530 (basis of design)

2. Titus

3. Nailor

B. Furnish and install steel return registers of the sizes and mounting types indicated on the plans and outlet schedule. Registers shall be 45 degree deflection fixed louver type with blades spaced 3/4 in. on center. The blades shall run parallel to the long dimension of the register. The register shall be finished in B12 White Powder Coat. Paint finish shall pass 500 hours of salt spray exposure with no measurable creep in accordance with ASTM D1654 and 1000 hours with no rusting or blistering as per ASTM D610 and ASTM D714.

2.2 SPIRAL DUCT RETURN GRILLE, EXTRUDED ALUMINUM

A. Approved Manufacturers:

1. Price SDGER (basis of design)
2. Titus
3. Nailor

B. Furnish and install return grilles of sizes and mounting types indicated on the plans and outlet schedule. Perforated face shall be securely attached to aluminum grille frame. The grille shall be finished in clear anodized for field painting.

2.3 TRANSFER REGISTERS

A. Approved Manufacturers:

1. Price 630 (basis of design)
2. Titus
3. Nailor

B. Furnish and install aluminum transfer registers of the sizes and mounting types indicated on the plans and outlet schedule. Registers shall be 45 degree deflection fixed louver type with blades spaced 3/4 in. on center. The blades shall run parallel to the long dimension of the register. The register shall be finished in B12 White Powder Coat. Paint finish shall pass 500 hours of salt spray exposure with no measurable creep in accordance with ASTM D1654 and 1000 hours with no rusting or blistering as per ASTM D610 and ASTM D714.

2.4 EXHAUST REGISTERS

A. Approved Manufacturers:

1. Price 630 (basis of design)
2. Titus
3. Nailor

B. Furnish and install aluminum exhaust registers of the sizes and mounting types indicated on the plans and outlet schedule. Registers shall be 45 degree deflection fixed louver type with blades spaced 3/4 in. on center. The blades shall run parallel to the long dimension of the register. The register shall be finished in B12 White Powder Coat. Paint finish shall pass 500 hours of salt spray exposure with no measurable creep in accordance with ASTM D1654 and 1000 hours with no rusting or blistering as per ASTM D610 and ASTM D714.

2.5 SQUARE PLAQUE DIFFUSERS

A. Construction:

1. Diffusers shall be steel construction, and shall consist of a seamless, one-piece, precision formed backpan that incorporates a round inlet collar of sufficient length for connecting rigid or flexible duct.

2. An inner plaque assembly shall be incorporated and shall drop no more than ¼ inch below the ceiling plane to assure proper air distribution performance.

3. The inner plaque assembly shall be completely removable from the room side to allow for full access to any dampers or other ductwork components located near the diffuser neck.

4. The diffuser shall integrate with all duct sizes shown on the plans without affecting the face size and appearance of the unit.

5. The face panel shall have smooth edges and rounded corners to blend with the back cone.

6. The diffuser ceiling module size shall be:

   a. 24 x 24 inches (600 x 600 millimeters)

   b. 12 x 12 inches (300 x 300 millimeters)

B. Paint Specification:

1. Paint finish shall be:

   a. All components shall have a baked-on powder coat finish.

      1) The paint finish must demonstrate no degradation when tested in accordance with ASTM D1308 (covered and spot immersion) and ASTM D4752 (MEK double rub) paint durability tests.

      2) The paint film thickness shall be a minimum of 2.0 mils.

      3) The finish shall have a hardness of 2H.

      4) The finish shall withstand a minimum salt spray exposure of 500 hours with no measurable creep in accordance with ASTM D1654, and 1000 hours of exposure with no rusting or blistering as per ASTM D610 and ASTM D714.

      5) The finish shall have an impact resistance of 80 inch-pounds.

   b. All components shall have a custom finish in a color to match a customer supplied sample.

2.6 MODULAR CORE ADJUSTABLE DIRECTIONAL DIFFUSERS

A. Approved Manufacturers:

1. Price AMCD (basis of design)

2. Titus

3. Nailor

B. Furnish and install directional modular core louvered face diffusers of the sizes and mounting types shown on the plans and air distribution schedule. Diffusers shall consist of an outer frame assembly, which facilitates mounting in the application shown. A collar that allows connection to the square duct size indicated shall be an integral part of the frame assembly. The diffuser core shall consist of fixed louver directional modules that may be easily field adjusted from the diffuser face (without any type of tools or mechanical device) for 1, 2, 3, or 4 way discharge. Each module shall be easily removable to allow for access to any damper or other ductwork component in or near the diffuser neck. Finish shall be B12 white powder coat. Paint finish shall pass 500 hours of salt spray exposure with no measurable creep in accordance with ASTM D1654 and 1000 hours with no rusting or blistering as per ASTM D610 and ASTM D714.

2.7 SPIRAL DUCT GRILLE, EXTRUDED ALUMINUM

A. Approved Manufacturers:

1. Price SDGE (basis of design)

2. Titus

3. Nailor

B. Furnish and install supply registers of sizes and mounting types indicated on the plans and outlet schedule. Register shall be double deflection type with two sets of fully adjustable deflection blades spaced 3/4 in. on center. The front blades shall run parallel to the short dimension of the register, as indicated in the outlet schedule. The air-scoop shall be adjusted via the operator on the side frame. The register shall be finished in clear anodized for field painting.

2.8 LOUVERED FACE SUPPLY REGISTERS

A. Approved Manufacturers:

1. Price 510 (basis of design)

2. Titus

3. Nailor

B. Furnish and install steel supply registers of the sizes and mounting types indicated on the plans and outlet schedule. Registers shall be 45 degree deflection fixed louver type with blades spaced 3/4 in. on center. The blades shall run parallel to the (long / short) dimension of the register. The register shall be finished in B12 White Powder Coat. Paint finish shall pass 500 hours of salt spray exposure with no measurable creep in accordance with ASTM D1654 and 1000 hours with no rusting or blistering as per ASTM D610 and ASTM D714.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Comply with SMACNA (ASMM) for flashing/counter-flashing of roof penetrations and supports for roof curbs and roof mounted equipment.

C. Check location of outlets and inlets and make necessary adjustments in position to comply with architectural features, symmetry, and lighting arrangement.

D. Install diffusers to ductwork with air tight connection.

E. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, despite whether dampers are specified as part of the diffuser, or grille and register assembly.

END OF SECTION

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Grease Laden Exhaust Hoods

B. Kitchen Hood Demand Control Ventilation System

1.2 REFERENCES

A. NFPA 70 - National Electrical Code; National Fire Protection Association; 1996.

B. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; National Fire Protection Association; 1994.

C. UL (EAUED) - Electrical Appliance and Utilization Equipment Directory; Underwriters Laboratories Inc.; current edition.

1.3 SUBMITTALS

A. Submit the following for approval:

1. Product Data Sheets including the following data if applicable:

a. Electrical Ratings

b. Dimensions

c. Weights

d. Loads

e. Required Clearances

f. Field Connections

2. Shop Drawings:

a. Indicate hoods, exhaust, and supply equipment being controlled by the system.

b. Indicate locations of sensors, system controller, VFDs and other components.

c. Provide wiring diagrams for power, signal, and control wiring.

d. Provide a description of Sequence of Operation

3. Installation Instructions

a. Indicate Installation Procedures and Scopes of Work

4. Reference Information:

a. Hood Operation and Maintenance Manual.

b. Sample Startup Report

c. VFD Manuals

1.4 QUALITY ASSURANCE

A. All electrical components, devices, and accessories shall be listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Control System shall be tested and certified to conform to the following standards.

1. UL2017 – Standard for General-Purpose Signaling Devices and Systems.
2. UL710– Standard for Exhaust Hoods for Commercial Cooking Equipment.
3. FCC Class B Standard CFR47 Part 15.109 on Radiated Emissions.
4. FCC Class B Standard CFR47 Part 15.109 on Conducted Emissions.
5. CSA C22.2 No. 205-M1983 – Signal Equipment.
6. CE Class B Directive 98/34/EEC: Technical Standards & Regulations Directive
7. CE Class B Directive 2004/108/EC: Electromagnetic Compatibility with Amending Directives 92/31/EEC, 93/68/EEC and 91/263/EEC
8. CE Standard EN 61000-6-3: 2007 – Emissions
9. CE Standard EN 61000-3-2: 2006 – Harmonic Current Emissions
10. CE Standard EN 61000-3-3: 1995 +A1:2001, +A2:2005 – Voltage Fluctuations and Flicker
11. CE Standard EN 61000-6-1: 2007 Electrostatic Discharge
12. CE Standard EN 61000-6-1: 2007 Radiated Immunity
13. CE Standard EN 61000-6-1: 2007 Electrical Fast Transients.
14. CE Standard EN 61000-6-1: 2007 Surge.
15. CE Standard EN 61000-6-1: 2007 Conducted Immunity.
16. CE Standard EN 61000-6-1: 2007 Voltage Dips and Short Interruptions.

1.5 REGULATORY REQUIREMENTS

A. Products Requiring Electrical Connection: Listed and classified by UL (EAUED) as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 GREASE LADEN EXHAUST HOODS (H-1A/H-1B)

A. Wall or island style as scheduled on the drawings, kitchen exhaust hoods designed for removal of grease laden heat and fumes.

B. Construction:

1. Kitchen Ventilation hood(s) shall be of the Type I, exhaust only wall canopy or island style suitable for all types of cooking applications. The hood(s) shall be U.L. 710 Listed without a fire damper for 700°F rated cooking appliances.

2. The hood(s) exterior shall be constructed of a minimum of 18 gauge 430 series stainless steel. The hood(s) shall be constructed using the standing seam method for optimum strength and with a Performance Enhancing Lip (PEL) to improve capture efficiency by turning air back into the hood.

3. All seams, joints and penetrations of the hood enclosure shall be welded and/or liquid tight. Lighter material gauges, alternate material types and finishes are not acceptable. All unexposed interior surfaces shall be constructed of a minimum 18 gauge corrosion resistant steel including, but not limited to ducts, plenum, and brackets.

4. The hood(s) shall include a filter housing constructed of the same material as the hood. The high efficiency stainless steel filters shall be U.L. 1046 Classified and NSF Certified, in sufficient number and sizes to ensure optimum performance. Filters shall direct the exhaust airflow through individual cyclone chambers, utilizing centrifugal impingement grease extraction technology. The filter housing shall terminate in a pitched, full length grease trough which shall drain into a removable grease container. These filters shall have a grease removal efficiency of 69% at 8 microns (51% from 3-10 microns).

5. Vapor proof, U.L. Listed LED light fixtures shall be pre-wired to a junction box located at the top of the hood for field connection. Wiring shall conform to the requirements of the NFPA 70 7. Hoods shall be built in accordance with the NFPA 96, IMC, UMC, and bear the NSF Seal of Approval. The hood manufacturer shall provide, on request, the necessary data that confirms compliance with the code authorities listed above.

C. Options:

1. Fire Suppression System (Provide for all kitchen hoods scheduled):

a. Field piping installed chemical fire suppression system for the protection of the kitchen ventilation system and cooking appliances. Fire system cabinet shall be included as part of ALL kitchen hoods. The system shall be capable of automatic detection and actuation and remote manual actuation. Piping shall be installed above the hood and shall be concealed from view. No exposed piping shall be allowed except for appliance drops. System shall be

complete with agent tank, nitrogen cartridge, regulated release mechanism and regulated actuator assembly.

b. The hood(s) shall contain a factory engineered and pre-piped, UL Listed, Wet Chemical, ANSUL R-102 restaurant fire suppression system.

c. The system piping shall be installed in the hood at the time of construction above the hood, and shall be concealed from view. No exposed piping is acceptable, with the exception of appliance drops. The system shall be capable of automatic detection and actuation and remote manual actuation. The system shall have the fire suppression capabilities to protect the duct(s), plenum(s), filter area(s) and cooking equipment.

d. The system shall include schedule 40 black iron pipe, detectors, and chrome appliance drops.

e. The system shall include all parts to complete the system as well as field installation and certification. A 1-1/4" Mechanical gas valve (for high school hoods H-1A/H-1B) shall be furnished for gas line shut-off application.

f. The system shall also include the release assembly, agent cylinder, agent, detectors, fusible links, liquid tight fittings, remote manual pull station, and schedule 40 black iron pipe with chrome sleeving for exposed areas.

g. A certified local Ansul distributor shall be selected by the factory for final system hook-up.

h. Carbon dioxide or Ansul based system shall meet the requirements of NFPA 96.

i. Detectors: The detectors shall be the fusible link style designed to separate at a specific temperature.

j. Manual pull station for remote mounting.

k. Furnish emergency solenoid gas shutoff valve for installation where shown on drawings.

l. Provide services of Ansul representative for final system hook-up and certification.

2. Light Fixtures: UL listed, vapor-proof LED light fixtures shall be prewired, with connections accessible at the top of the hood for field connection to power. Wiring shall conform to the requirements of the National Electric Code.

3. Electrical Control Panel: Face mounted canopy light control switch and fan control switch with pilot light to control hood lights and exhaust fan.

4. Enclosure panels: Formed of 18 gauge, type 304 stainless steel with #4 finish to enclose the area between the top of the hood and ceiling.

D. Variable Volume Kitchen Control Package (FOR HIGH SCHOOL HOODS H-1A/H-1B):

1. The Variable Volume Kitchen Control system shall be a U.L. Listed outlet center. The standard package shall consist of a utility control cabinet constructed of a minimum 18 gauge 400 series stainless steel, a user interface keypad, and temperature sensors.

    a. Temperature sensors shall be made of stainless steel and shall be installed in a U.L. approved coupling.

    b. The hood cabinet shall be UL Listed to Standard 891. The pre-engineered control center shall include, but not be limited to, fan motor starters, light and fan switches, fire relay which controls the exhaust fan, quarter turn latch, color coded wiring with wiring diagram, grounding terminal blocks, and distribution terminal control strip for control wiring connection. All electrical components shall be UL listed or Classified where applicable and wired in compliance with the National Electrical Code.

    c. The control center shall be utility cabinet mounted with the switches face mounted on the utility cabinet, with overall dimensions for the control cabinet being 36 in. x 24 in. x 12 in.

2. The utility control cabinet shall house a NEMA-1 stainless steel box which includes terminal blocks for field connections and a Programmable Logic Controller (PLC). The PLC shall be capable of controlling multiple exhaust and supply fans via Variable Frequency Drive (VFD) and/or analog signals.

3. The utility control cabinet shall house the VFD connected to the hood's exhaust fan. The VFD shall be provided by the hood and variable volume kitchen control package manufacturer:

    a. Variable Frequency Controllers: Enclosed controllers suitable for operating the indicated loads, in conformance with requirements of NEMA ICS 7. Select unspecified features and options in accordance with NEMA ICS 3.1.

        1) Employ microprocessor-based inverter logic isolated from power circuits.

        2) Employ pulse-width-modulated inverter system.

        3) Shall have internal 5% impedance reactors to reduce the harmonics to the power line and to add protection from AC line transients. The 5% impedance may be from dual (positive and negative DC bus) reactors, or 5% AC line reactors. VFD's with only one DC reactor shall add an AC line reactor.

        4) Design for ability to operate controller with motor disconnected from output.

        5) Design to attempt five automatic restarts following fault condition before locking out and requiring manual restart.

        6) Design for user selectable restart after power outage or interruption.

b. AC transient protection system consisting of 4-120 joule rated MOV's (phase-to-phase and phase-to-ground), capacitor clamp, and 5% equivalent impedance internal reactors.

c. Enclosures: NEMA 250, Type 1, for indoor locations, suitable for equipment application in places restricted to persons employed on the premises.

d. Rated Input Voltage: 208 volts, three phase, 48-63 Hertz, +30%/-35%.

e. Motor Nameplate Voltage: 200 volts, three phase, 60 Hertz.

f. Displacement Power Factor: Between 1.0 and 0.95, lagging, over entire range of operating speed and load. g. Operating Ambient: 0 degrees C to 40 degrees C.

g. Current Limit Adjustment: 60 to 110 percent of rated.

h. Acceleration Rate Adjustment: minimum range 0.5 to 30 seconds.

i. Deceleration Rate Adjustment: minimum range 1 to 30 seconds.

j. Input Signal: two analog inputs, user selectable 0 to 10 VDC, 4 to 20 mA DC.

k. Output Signal: analog output signal proportional to motor speed, user selectable 0 to 10 VDC, 4 to 20 mA DC.

l. Suitable for variable torque loads.

m. Regenerative braking feature to permit direction of of regenerative energy from the motor back into the AC line.

n. DC injection brake feature, user selectable.

o. Suitable for operating on a circuit capable of delivering 100,000 AIC fault current.

p. Emergency Stop Interface: Input to receive dry contact closure to signal drive stop on alarm condition.

q. Include undervoltage protection/release, input phase loss protection, motor overcurrent protection, and ground fault protection.

r. Control Power Source: integral 24VDC, 250ma on-board source.

s. Output relays: Three output relays with programmable function, Form C, 250VAC/2Arms, programmable to respond to drive faults, drive current output level low, and drive current output level high. Programmable to read Form C relay output as proof of flow, signaling condition via keypad warning, relay output, and/or serial communications bus. Outputs shall include programmable time delays that shall allow acceleration from zero speed, without signaling a false underload condition.

t. Digital inputs: Six digital inputs, user programmable

u. Frequency rejection: Three independent programmable bands, user selectable width and mid-points, to prevent drive output of rejected frequencies. w. PID Setpoint Controllers: Provide two (2) PID setpoint controllers to allow pressure and flow signals to be connected, closed loop controlled from the micropressor.

v. Filters: Provide DV/DT filtering on drive output as recommended by drive manufacturer, motor manufacturer, or cooling tower manufacturer.

w. Filters: Provide EMI/RFI filtering in compliance with standard EN 61800-3 for the First Environment, restricted level with up to 100' of motor cables.

x. Disconnecting Means: Include integral non-fused disconnect switch on the line side of each VFD.

4. The user interface shall be a keypad provided in accordance with the following specifications.

a. Keypad:

1) The user interface shall be a membrane keypad with a graphic overlay and LCD display. The standard interface shall include hood (fan) operation, hood light, gas reset, and auto tempering buttons depending on the configuration.

2) System notifications (including but not limited to hood operation, current alarms, and fan 100% override time left) shall be displayed in the middle of the screen. A red alarm light shall flash on the keypad upon a system alarm.

5. System Operation:

a. The sequence of operation shall utilize resistive type temperature sensors that are mounted in the capture tank of the hood to monitor exhaust air temperatures. Fluctuation of exhaust temperature caused by cooking load shall be sensed by the temperature sensor and conveyed to the controller. The controller shall fully modulate the speed of the fan via the analog signal, from maximum speed down to a minimum speed to be determined by building test and balance. The system shall be capable of serving as an IMC compliant auto start-up control to automatically start the fans during cooking operations. Analog signal(s) shall allow modulation of the fans based on the exhaust air temperature sensed by the temperature sensors. It must have a fully modulating turndown of up to 50% of maximum speed. Upon pressing the Fan 100% button, exhaust fan speeds shall go to maximum speed for 10 minutes (adjustable), or until the Fan 100% button is pressed again, which shall return the system to full temperature control.

b. In a fire condition, the control panel shall be capable of forcing the exhaust to maximum speed, shutdown of supply air from associated rooftop units, and shutdown of lights regardless of current fan speeds via integration with a fire system.

c. Standard Variable Volume Controls shall be provided with a digital remote enable, fire system interface, and shunt trip breaker control.

d. The follow options shall be furnished:

1) Building Management System Interface

(a) BACnet

(b) Gas Reset

(c) High Temperature Alarm

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify ventilation outlets, service connections, and supports are correct and in required location.

B. Verify that electric power is available and of the correct characteristics.

3.2 INSTALLATION

A. Install items in accordance with manufacturers' instructions.

B. Insulate to prevent electrolysis between dissimilar metals.

C. Weld and grind joints in steel work tight, without open seams, where necessary due to limitations of sheet sizes or installation requirements.

D. Sequence installation and erection to ensure correct mechanical and electrical utility connections are achieved.

E. Cut, fit, and patch where necessary. Provide cutting and patching of items of this section required for installation or services of equipment.

F. Cut and drill components for service outlets, fixtures, and fittings.

G. Use anchoring devices appropriate for equipment and expected usage.

H. Provide sealant to achieve clean joint with adjacent building finishes and between abutting components.

I. A Factory-Authorized Service Representative shall perform startup service including:

1. Inspection of installed components. Verification of correct installation and operation.

2. Programming of system parameters for proper detection of cooking conditions.

3. Programming of system parameters for proper operation of control input/output points.

4. Programming of VFD parameters for proper control communication with control system.

5. Programming of VFD motor operational set points (maximum speed and allowable motor current).

6. Verification of Hood control system functionality.

7. Results shall be captured in a written report.

3.3 ADJUSTING

A. Test and Balance Contractor shall adjust hood balancing baffles and VFDs to achieve maximum design airflow at maximum speed.

3.4 CLEANING

A. Remove masking or protective covering from stainless steel and other finished surfaces.

B. Wash and clean equipment.

C. Polish glass, plastic, hardware, accessories, fixtures, and fittings.

3.5 DEMONSTRATION AND INSTRUCTIONS

A. A Factory-Authorized Service Representative shall train Owner's maintenance personnel to adjust, operate, and maintain Packaged Kitchen Hood Ventilation Control Systems.

3.6 PROTECTION OF FINISHED WORK

A. Remove protective coverings from prefinished work.

END OF SECTION

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Energy recovery units.

B. Roof curbs.

1.2 REFERENCE STANDARDS

A. ASHRAE Std 52.2 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size; 2017, with Addendum (2022).

B. ASHRAE Std 84 - Method of Testing Air-to-Air Heat/Energy Exchangers; 2020, with Errata (2021).

1.3 SUBMITTALS

A. Product Data: Manufacturer's installation instruction, product data, and engineering calculations.

B. Shop Drawings: Show design and assembly of energy recovery unit and installation and connection details.

C. Manufacturer's Qualification Statement.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. Firm regularly engaged in manufacturing energy recovery units.

2. Products in satisfactory use in similar service for not less than five years.

3. Manufactured and assembled in the United States of America.

PART 2 PRODUCTS

2.1 ENERGY RECOVERY UNITS

A. Air-to-Air Energy Recovery Ventilators shall be fully assembled at the factory and consist of a fixed-plate cross-flow heat exchanger with no moving parts, an insulated double wall G90 galvanized 20-gauge steel cabinet, outdoor air hood with bird screen, motorized supply air damper, filter assemblies for both intake and exhaust air, enthalpy core, supply air blower assembly, motorized exhaust air damper, exhaust air hood, exhaust air blower assembly and electrical control box with all specified components and internal accessories factory installed and tested and prepared for single-point high voltage connection. Entire unit with the exception of field-installed components shall be assembled and test operated at the factory.

B. Cabinet:

1. Materials: Formed double wall insulated metal cabinet, fabricated to permit access to internal components for maintenance.

2. Outside casing: 20 gauge, galvanized (G90) steel meeting ASTM A653 for components that do not receive a painted finish.

3. Access doors shall be hinged with airtight closed cell foam gaskets. Door pressure taps, with captive plugs, shall be provided for cross-core pressure measurement allowing for accurate airflow measurement.

4. Unit shall have factory-installed duct flanges on all duct openings.

5. Cabinet Insulation: Unit walls and doors shall be insulated with 1 inch, 4 pound density, foil/scrim faced, high density fiberglass board insulation, providing a cleanable surface and eliminating the possibility of exposing the fresh air to glass fibers, and with a minimum R-value of 4.3 (hr-ft^2-°F/BTU).

6. Enthalpy core: Energy recovery core shall be of the total enthalpy type, capable of transferring both sensible and latent energy between airstreams. Latent energy transfer shall be accomplished by direct water vapor transfer from one airstream to the other, without exposing transfer media in succeeding cycles directly to the exhaust air and then to the fresh air. No condensate drains shall be allowed. The energy recovery core shall be designed and constructed to permit cleaning and removal for servicing. The energy recovery core shall have a ten year warranty. Performance criteria are to be as specified in AHRI Standard 1060.

7. Control center / connections: Energy Recovery Ventilator shall have an electrical control center where all high and low voltage connections are made. Control center shall be constructed to permit single-point high voltage power supply connections to the fused disconnect.

8. Passive Frost Control: The ERV core shall perform without condensing or frosting under normal operating conditions (defined as outside temperatures above -10ºF and inside relative humidity below 40%). Occasional more extreme conditions shall not affect the usual function, performance or durability of the core. No condensate drains shall be allowed.

9. Motorized Isolation Damper(s): Exhaust Air motorized and Outside Air motorized damper(s) of an AMCA Class I low leakage type shall be factory installed.

C. Blower Sections:

1. Blower assemblies: Shall be statically and dynamically balanced and designed for continuous operation at maximum rated fan speed and horsepower.

2. Blower section construction, Supply Air and Exhaust Air: Blower assemblies consist of a direct driven backward-inclined blower.

D. Motors:

1. Blower motors shall be Premium Efficiency, EISA compliant for energy efficiency. The blower motors shall be totally enclosed (TEFC) and be shall be supplied with factory installed motor starters.

E. Controls:

1. Fan control: Terminal strip for EC motors.

2. Sensors: Dirty filter monitor for both airstreams.

3. Factory-installed microprocessor controller and sensors:

a. The microprocessor controller shall have the ability to communicate with the Building Mangement System via Modbus RTU/TCP and BACnet MSTP/IP

b. Has factory-installed hardware and software to enable the building automation interface via BACnet to monitor, control, and display status and alarms

c. Factory-installed microprocessor controller shall come with backlit display that allows menu-driven display for navigation and control of unit

F. Filter section:

1. ERV shall have 2" thick MERV 13 disposable pleated filters located in the outdoor air airstream and MERV-8 pleated filter located in the exhaust airstream. All filters shall be accessible from the exterior of the unit.

G. Roof Curb: 14" high curb furnished with ERV.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that structure is ready for installation of unit, that openings in deck for ductwork, if required, are correctly sized and located, and that mechanical and electrical utilities supplying unit are of correct capacities and are accessible.

3.2 INSTALLATION

A. Provide openings for suitable ductwork connection.

3.3 SYSTEM STARTUP

A. Provide services of manufacturer's authorized representative to provide start up of unit.

END OF SECTION

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Air cooled condensing units.

1.2 REFERENCE STANDARDS

A. AHRI 270 - Sound Performance Rating of Outdoor Unitary Equipment; 2015, with Addendum (2016).

B. AHRI 520 - Performance Rating of Positive Displacement Condensing Units; 2004.

C. ASHRAE Std 15 - Safety Standard for Refrigeration Systems; 2022, with Errata (2023).

D. ASHRAE Std 52.2 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size; 2017, with Addendum (2022).

E. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

F. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2024.

G. NFPA 90B - Standard for the Installation of Warm Air Heating and Air-Conditioning Systems; 2024.

1.3 SUBMITTALS

A. Product Data: Provide rated capacities, weights, accessories, electrical nameplate data, and wiring diagrams.

B. Sustainable Design Documentation: Submit manufacturer's product data on refrigerant used, showing compliance with specified requirements.

C. Shop Drawings: Indicate assembly, required clearances, and location and size of field connections.

D. Design Data: Indicate refrigerant pipe sizing.

E. Manufacturer's Instructions: Indicate rigging, assembly, and installation instructions.

F. Project Record Documents: Record actual locations of components and connections.

G. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listing.

H. Warranty: Submit manufacturers warranty and ensure forms have been filled out in Nanuet Union Free School District's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum 3 years of experience and approved by manufacturer.

1.5 WARRANTY

A. Provide five year manufacturers warranty for condensing units and compressors.

PART 2 PRODUCTS

2.1 SYSTEM DESIGN

A. Split-System Heating and Cooling Units: Self-contained, packaged, matched factory-engineered and assembled, pre-wired indoor and outdoor units; UL listed.

1. Cooling: Outdoor electric condensing unit with evaporator located in a unit ventilator.

2. Provide refrigerant lines internal to units and between indoor and outdoor units, factory cleaned, dried, pressurized and sealed, with insulated suction line.

B. Performance Requirements: See Drawings for additional requirements.

2.2 OUTDOOR UNITS

A. Outdoor Units: Self-contained, packaged, pre-wired unit consisting of cabinet, with compressor and condenser.

1. Comply with AHRI 210/240.

2. Refrigerant: Use only refrigerants that have ozone depletion potential (ODP) of zero and global warming potential (GWP) of less than 50.

3. Refrigerant: R-410A.

4. Cabinet: Galvanized steel with baked enamel finish, easily removed and secured access doors with safety interlock switches, glass fiber insulation with reflective liner.

B. Compressor: AHRI 520; scroll, 3600 rpm, resiliently mounted integral with condenser, with positive lubrication, crankcase heater, high pressure control, motor overload protection, service valves and drier. Provide time delay control to prevent short cycling and rapid speed changes.

C. Air Cooled Condenser: Aluminum fin and copper tube coil, AHRI 520 with direct drive axial propeller fan resiliently mounted, galvanized fan guard.

1. Condenser Fans: Direct-drive propeller type.

2. Condenser Fan Motor: Enclosed, 1-phase type, permanently lubricated.

D. Coil: Air-cooled, aluminum fins bonded to copper tubes.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrates are ready for installation of units and openings are as indicated on shop drawings.

B. Verify that proper power supply is available and in correct location.

3.2 INSTALLATION

A. Install in accordance with NFPA 90A and NFPA 90B.

B. Install refrigeration systems in accordance with ASHRAE Std 15.

END OF SECTION

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Air-source outdoor units.

B. Refrigerant piping.

C. Refrigerant branch units.

D. Indoor units.

E. Outdoor unit support systems.

F. Control panels.

G. Control wiring.

1.2 REFERENCE STANDARDS

A. ASHRAE Std 15 - Safety Standard for Refrigeration Systems; 2022, with Errata (2023).

B. ASHRAE Std 34 - Designation and Safety Classification of Refrigerants; 2022, with Errata (2023).

C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's standard data sheets showing the following for each item of equipment, marked to correlate to equipment item markings indicated in Contract Documents:

1. Outdoor Units:

a. Refrigerant Type and Size of Charge.

b. Output and Input Cooling Capacity: Btu/h.

c. Output and Input Heating Capacity: Btu/h.

d. Operating Temperature Range, Cooling and Heating.

e. Fan Capacity: Flow in cfm with respective fan curves.

f. External Static Pressure (ESP): In-wc.

g. Sound Pressure Level: dB(A).

h. Electrical Data: Complete including motor size.

i. Maximum number of indoor units that can be served.

j. Maximum refrigerant piping run from outdoor unit to indoor unit(s).

k. Maximum height difference between outdoor unit to Indoor unit(s), both above and below.

2. Control Panels: Complete data of controllers, input-output points, and zones.

B. Shop Drawings: Installation drawings custom-made for this project; include as-designed HVAC layouts, locations of equipment items, refrigerant piping sizes and locations, condensate piping sizes and locations, remote sensing devices, control components, electrical connections, control wiring connections. Include:

1. Detailed piping diagrams, with branch balancing devices.

2. Condensate piping routing, size, and pump connections.

3. Detailed power wiring diagrams.

4. Detailed control wiring diagrams.

5. Locations of required access through fixed construction.

6. Drawings required by manufacturer.

C. Operating and Maintenance Data:

1. Manufacturer's complete standard instructions for each unit of equipment and control panel.

2. Custom-prepared system operation, troubleshooting, and maintenance instructions and recommendations.

3. Identification of replaceable parts and local source of supply.

D. Warranty: Executed warranty, made out in Nanuet Union Free School District's name.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. Company that has been manufacturing variable refrigerant volume heat pump equipment for at least 5 years.

2. Company that provides system design software to installers.

B. Installer Qualifications: Trained and approved by manufacturer of equipment.

C. The units shall be tested by a National Recognized Testing Laboratory (NRTL), in accordance with ANSI/UL 1995 – Heating and Cooling Equipment and bear the Listed Mark.

D. All wiring shall be in accordance with the National Electric Code (NEC).

E. The system will be produced in an ISO 9001 and ISO 14001 facility, which are standards set by the International Standard Organization (ISO). The system shall be factory tested for safety and function.

F. The condensing units shll be factory charged with R410A.

1.5 WARRANTY

A. Compressors: Provide manufacturer's warranty for ten (10) years from date of installation. During the stated period, should any part fail due to defects in material and workmanship, it shall be repaired or replaced at the discretion of manufacturer according to the manufacturer's terms and conditions. All warranty service work shall be preformed by the manufacturer's factory trained service professional.

B. The equipment manufacturer shall warrant the indoor and outdoor products in this specification section installed that under normal use and maintenance for comfort cooling and conditioning applications such products (the “Products”) will be free from defects in material and workmanship. This warranty applies to compressor and all parts and is limited in duration to ten (10) years starting from the ‘’installation date’’ which is one of the two dates below:

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: The system design indicated in Contract Documents is based on equipment and system designed by Daikin AC; www.daikinac.com.

B. The variable capacity heat pump air conditioning system shall be a Daikin Variable Refrigerant Volume Series (heat or cool model) system as specified.

C. The systems shall consist of multiple evaporators using PID control, REFNET joints and headers, a two-pipe refrigeration distribution system and Daikin VRV condenser unit.

D. The condensers shall be a direct expansion (DX), air-cooled heat pump, multi-zone air-conditioning system with variable speed inverter driven compressors using R-410A refrigerant.

E. The condensing units may connect an indoor evaporator capacity up to 200% of the condensing unit capacity. All zones are each capable of operating separately with individual temperature control.

F. The Daikin condensing unit shall be interconnected to unit ventilator DX cooling coils in accordance with Daikin’s engineering data book detailing each unit.

G. The fan coil unit, unit ventilator and blower coil DX cooling coils shall be connected to the condensing units utilizing Daikin’s REFNET specified piping joints and headers to ensure correct refrigerant flow and balancing. T style joints are not acceptable for a variable refrigerant system.

H. Operation of the system shall permit either cooling or heating of all of the indoor units simultaneously. Each indoor unit or group of indoor units shall be able to provide set temperature independently via a local remote controller, the existing Intelligent Manager, or the specified Direct Digital Control (DDC) system interface.

I. Each fan coil unit, blower coil, unit ventilator or group of unit ventilators shall be independently controlled.

J. The condensing unit shall feature a sealed E-box with a minimum of IP55 rating to provide high dust and moisture protection for reliability.

K. Each system shall be able to enlarge from single to dual module or dual to triple module without the need for installed main pipe size changes. The manufacturer shall provide predefined pipe sizes and design rules ensuring reliable system operation and offering design flexibility in phased installation applications.

L. Stable Operation – System shall provide stable inverter operation at varied ambient conditions.

M. No Drain Pan Heater – System shall be capable of heating operation without the need for a drain pan heater. If alternate manufacturer is chosen, an additional drain pan heater shall be provided by the manufacturer.

N. Independent Control - Each indoor unit shall use a dedicated electronic expansion valve with 2000 positions for independent control.

O. VFD Inverter Control and Variable Refrigerant Temperature - Each condensing unit shall use high efficiency, variable speed all “inverter” compressor(s) coupled with inverter fan motors to optimize part load performance. The system capacity and refrigerant temperatures shall be modulated automatically to set suction and condensing pressures while varying the refrigerant volume for the needs of the cooling or heating loads. The control will be automatic and customizable depending on load and weather conditions.

P. Unit Ventilator and blower coil DX coils shall use PID to control superheat to deliver a comfortable room temperature condition and optimize efficiency.

Q. Configurator software - Each system shall be available with configurator software package to allow for remote configuration of operational settings and also for assessment of operational data and error codes.

R. Independent Control - Each fan coil unit, blower coil and unit ventilator DX coil shall use a dedicated electronic expansion valve for independent control.

S. Flexible Design –

1. Systems shall be capable of up to 540ft [623 ft. equivalent] of linear piping between the condensing unit and furthest located indoor unit.

T. Systems shall be capable of up to 3,280ft (1,000m) total “one-way” piping in the piping network.

1. Systems shall have a vertical (height) separation of up to 295ft between the condensing unit and the indoor units.

2. Systems shall be capable of up to 295ft (90m) from the first REFNET / branch point.

3. The condensing unit shall have the ability to connect an indoor unit evaporator capacity of up to 200% of the condensing unit nominal capacity.

4. Systems shall be capable of 361ft vertical separation between indoor units.

5. Oil Return – Each system shall be furnished with a centrifugal oil separator and active oil recovery cycle.

6. Simple wiring – Systems shall use 16/18 AWG, 2 wire, stranded, non-shielded and non-polarized daisy chain control wiring between fan coil units, blower coils and unit ventilators and heat pumps and between fan coil units, blower coils and unit ventilators and remote controllers.

7. Each condensing unit shall include a multi-functional digital display that can provide system operation status such as operating refrigerant temperatures, pressures, outdoor electronic expansion valve opening and compressor operation time.

8. Each condensing unit shall include a service window that can provide easy access to system field settings and operation status without completely removing the condensing unit panel.

9. Systems shall include a self-diagnostic, auto-check function to detect a malfunction and display the type and location.

10. Each condensing unit shall incorporate contacts for electrical demand shedding with optional 3 stage demand control with 12 customizable demand settings.

11. Each system shall be capable of integrating with open protocol BACnet and LonWorks building management systems.

12. Each system shall use indoor and condensing units with quiet operation as low as 27 dB(A).

13. Each system shall include a built-in data recorder that can store up to 40 minutes of operational data which can help identify the issue in case of a product failure

14. Heating during Defrost and Oil Return. Reverse cycle (cooling mode) in these modes shall not be permitted due to the potential reduction in space temperature.

15. Low Ambient Cooling - Each system shall be capable of low ambient cooling operation to -4°FDB (-20°CDB).

16. The condensing unit shall have configurable settings for intermittent fan operation to help minimize snow accumulation on fan blades when the system is off.

17. The condensing unit shall be factory equipped with a Schrader valve for connection to a pressure relief kit.

18. Substitutions: Systems manufactured by other manufacturers will not be considered.

2.2 VARIABLE REFRIGERANT FLOW SYSTEM

A. Cooling Operation:

1. The operating range in cooling shall be 23°F DB ~ 122°F DB (-5°CDB ~ 50°CDB).

2. Cooling mode indoor room temperature range shall be 57-77°FWB (13.8 - 25°CWB).

B. Heating Operation:

1. The operating range in heating shall be -13°F WB – 61°F WB.

2. Heating mode indoor room temperature range shall be 59°FDB - 80°F DB (15°CDB – 26.7°CDB).

C. WIRING:

1. The control voltage between the indoor and condensing unit, and between the indoor unit and associated remote controller, shall be 16VDC non-shielded, stranded 2 conductor cable.

2. The control wiring shall be a two-wire multiplex transmission system, making it possible to connect multiple indoor units to one condensing unit with one 2-cable wire, thus simplifying the wiring installation.

D. REFRIGERANT PIPING:

1. REFNET piping joints and headers shall be used to ensure proper refrigerant balance and flow for optimum system capacity and performance.

a. T style joints shall not be acceptable as this will negatively impact proper refrigerant balance and flow for optimum system capacity and performance.

2.3 AIR-SOURCE OUTDOOR UNITS

A. GENERAL:

1. The condensing unit shall be designed specifically for use with VRV series components.

2. The refrigeration circuit of the condensing unit shall consist of Daikin inverter scroll compressors, motors, fans, condenser coil, electronic expansion valves, solenoid valves, 4-way valve, distribution headers, capillaries, filters, shut off valves, oil separators, service ports and refrigerant accumulator.

3. Liquid and suction lines shall be individually insulated between the condensing and indoor units.

4. The condensing unit can be wired and piped with access from the left, right, rear or bottom.

5. The connection ratio of indoor units to condensing unit shall be permitted up to 200% of nominal capacity.

6. Each condensing system shall be able to support the connection of up to 64 indoor units dependent on the model of the condensing unit.

7. The sound pressure level standard shall be that value as listed in the Daikin engineering manual for the specified models at 3 feet from the front of the unit. The condensing unit shall be capable of operating automatically at further reduced noise during night time or via an external input.

8. The system will automatically restart operation after a power failure and will not cause any settings to be lost, thus eliminating the need for reprogramming.

9. The condensing unit shall be modular in design and should allow for side-by-side installation with minimum spacing.

10. The following safety devices shall be included on the condensing unit; high pressure sensor and switch, low pressure switch, control circuit fuses, crankcase heaters, fusible plug, overload relay, inverter overload protector, thermal protectors for compressor and fan motors, over current protection for the inverter and anti-recycling timers.

11. To ensure the liquid refrigerant does not flash when supplying to the various indoor units, the circuit shall be provided with a sub-cooling feature.

12. Oil recovery cycle shall be automatic occurring 2 hours after start of operation and then every 8 hours of operation.

13. The condensing unit shall be capable of heating operation at -13°F (-25°C) wet bulb ambient temperature without additional low ambient controls or an auxiliary heat source.

B. UNIT CABINET:

1. The condensing unit shall be completely weatherproof and corrosion resistant. The unit shall be constructed from rust-proofed galvanized steel panels coated with a baked enamel finish.

2. Each condensing unit shall have a three-segment panel design which allows for direct access to outdoor fans, critical mechanical and electrical components separately for ease of installation and service.

3. Each outdoor unit shall have separate knock-outs for both refrigerant piping and wiring on the bottom panel.

C. FAN:

1. The condensing unit shall consist of one or more propeller type, direct-drive fan motors that have multiple speed operation via a DC (digitally commutating) inverter.

2. The condensing unit fan motor shall have multiple speed operation of the DC (digitally commutating) inverter type, and be of high external static pressure and shall be factory set as standard at 0.12 in. WG. A field setting switch to a maximum 0.32 in. WG pressure is available to accommodate field applied duct for indoor mounting of condensing units.

3. The condensing unit shall have configurable settings for intermittent fan operation to help minimize snow accumulation on fan blades when the system is off.

4. The fan shall be a vertical discharge configuration with a nominal airflow maximum range of 6,200 CFM to 14,505 CFM dependent on model specified.

5. The fan motor shall have inherent protection and permanently lubricated bearings and be mounted.

6. The fan motor shall be provided with a fan guard to prevent contact with moving parts.

D. CONDENSER COIL:

1. The condenser coil shall be manufactured from copper tubes expanded into aluminum fins to form a mechanical bond.

2. The heat exchanger coil shall be of a waffle louver fin and rifled bore tube design to ensure high efficiency performance.

3. The heat exchanger on the condensing units shall be manufactured from Hi-X seamless copper tube with N-shape internal grooves mechanically bonded on to aluminum fins to an e-Pass Design.

4. The fins shall be coated with an anti-corrosion hydrophilic blue coating as standard from factory with a salt spray test rating of 1000hr per ASTM test standards.

5. The condensing unit shall be factory equipped with condenser coil guards on all sides.

E. COMPRESSOR:

1. The Daikin inverter scroll compressors shall be variable speed (PVM inverter) controlled which is capable of changing the speed to follow the variations in total cooling and heating load as determined by the suction gas pressure as measured in the condensing unit.

    a. In addition, samplings of evaporator and condenser temperatures shall be made so that the high/low pressures detected are read every 20 seconds and

calculated. With each reading, the compressor capacity (INV frequency) shall be controlled to eliminate deviation from target value.

1) Non –inverter-driven compressors, which may cause starting motor current to exceed the nominal motor current (RLA) and require larger wire sizing, shall not be allowed.

2. The inverter driven compressors in the condensing unit shall be of highly efficient reluctance DC (digitally commutating), hermetically sealed scroll “G-type” or “J-type”.

3. Neodymium magnets shall be adopted in the rotor construction to yield a higher torque and efficiency in the compressor instead of the normal ferrite magnet type.

a. At complete stop of the compressor, the neodymium magnets will position the rotor into the optimum position for a low torque start.

4. The capacity control range shall be as low as 1% to 100%.

5. The compressor’s motor shall have a cooling system using discharge gas, to avoid sudden changes in temperature resulting in significant stresses on winding and bearings.

6. Each compressor shall be equipped with a crankcase heater, high pressure safety switch, and internal thermal overload protector.

7. Oil separators shall be standard with the equipment together with an intelligent oil management system.

8. The compressor shall be mounted on vibration dampening rubber grommets to minimize the transmission of vibration, eliminating the standard need for external spring isolation.

9. In the event of compressor failure, the remaining compressors shall continue to operate and provide heating or cooling as required at a proportionally reduced capacity. The microprocessor and associated controls shall be manually activated to specifically address this condition for single module and manifolded systems.

10. In the case of multiple condenser modules, conjoined operation hours of the compressors shall be balanced by means of the Duty Cycling Function, ensuring sequential starting of each module at each start/stop cycle, completion of oil return, completion of defrost or every 8 hours. When connected to a central control system sequential start is activated for all system on each DIII network.

F. Roof Curbs:

1. Roof Curbs: 18 ga. galvanized steel, unitized construction with attn integral base plate, continuous welded corner seams, pressure treated wood nailer, counterflashing with location screws. Internally re-inforced to conform with load bearing factors.

a. 24" overall height, length based on heat pump unit length.

2.4 INDOOR UNITS

A. 2x2 CASSETTE UNIT

1. General: Daikin indoor unit model FXZQ-TAVJU shall be a ceiling cassette fan coil unit, operable with R-410A refrigerant, equipped with an electronic expansion valve, for installation into the ceiling cavity equipped with a decoration panel grille. It shall be available in capacities from 5,800 Btu/h to 18,000 Btu/h. The decoration panel shall be a four-way air distribution type, with fresh white (Munsell N9.5) or Daikin Silver color, impact resistant with a washable decoration panel. The supply air is distributed via motorized louvers which can be horizontally and vertically adjusted from 0° to 90°. Computerized PID control shall be used to control superheat to deliver a comfortable room temperature condition. The unit shall be equipped with a programmed drying mechanism that dehumidifies while limiting changes in room temperature when used with Daikin remote controls. The indoor units sound pressure shall range from 25.5 dB(A) to 33 dB(A) at low speed measured at 5 feet below the unit.

2. The unit shall be completely factory assembled and tested. Included in the unit is factory wiring, piping, electronic proportional expansion valve, control circuit board, flare connections, condensate drain pan, condensate drain pump, condensate safety shutoff and alarm, self-diagnostics, auto-restart function, 3-minute fused time delay, and test run switch.

3. Indoor unit and refrigerant pipes will be charged with dehydrated air prior to shipment from the factory.

4. Both refrigerant lines shall be fully insulated from the outdoor unit or nearest branch connection into the refrigerant network.

5. The 4-way supply air flow can be field modified to 3-way and 2-way airflow to accommodate various installation configurations including corner installations.

6. Return air shall be through the concentric panel, which includes a resin net mold resistant filter.

7. The indoor units shall be equipped with a condensate pan and condensate pump. The condensate pump provides up to 24-13/16” of lift, measured from the drain outlet, and has a built in safety shutoff and alarm.

8. The indoor units shall be equipped with a return air thermistor.

9. The indoor unit will be powered with 208~230V/1-phase/60Hz.

10. The voltage range will be 253 volts maximum and 187 volts minimum.

11. Unit Cabinet:

    a. The cabinet shall be space saving and shall be located into the ceiling.

b. Three auto-swing positions shall be available to choose from via field setting.

c. The airflow of the unit shall have the ability to shut down one or two sides allowing for simpler corner installation.

d. Fresh air intake shall be possible by way of direct duct installation to the side of the indoor unit cabinet.

e. The cabinet shall be constructed with sound absorbing foamed polystyrene and polyethylene insulation.

f. Face Panels:

1) The decoration panel shall be a four-way air distribution type and constructed of impact resistant polymer.

2) The decoration panel dimensions shall measure 24-7/16” x 24-7/16” and shall fit into a standard 2x2 ceiling grid with no overlap of adjacent tiles.

3) The four air discharge outlet louvers shall be independently motorized and controllable. Each louver shall have a visual indicator to easily identify the louver and simplify the airflow configuration.

4) The louver outlets shall be capable of closure to allow for 3-way and 2-way air distribution.

5) The decoration panel shall be a low profile design, extending 5/16” below the ceiling.

6) The decoration panel color shall be fresh white (Munsell N9.5).

12. Fan:

a. The fan shall be driven by a direct-drive DC motor with statically and dynamically balanced impeller and shall have three user-selectable speeds available: high, medium, and low.

b. The fan motor shall operate on 208/230 volts, 1 phase, 60 hertz with a motor output of 50W.

c. The airflow rate shall be available in high, medium, and low settings.

13. Filter: The return air shall be filtered by means of a washable long-life filter with mildew proof resin.

14. Coil:

a. Coils shall be of the direct expansion type constructed from copper tubes expanded into aluminum fins to form a mechanical bond.

b. The coil shall be of a waffle louver fin and high heat exchange, rifled bore tube design to ensure highly efficient performance.

c. The coil shall be a 2-row cross fin copper evaporator coil with 22 FPI design completely factory tested.

d. The refrigerant connections shall be flare connections and the condensate will be 1 -1/32 inch outside diameter PVC.

e. A condensate pan shall be located under the coil.

f. A condensate pump with a 24-13/16” lift, measured from the drain outlet, shall be located below the coil in the condensate pan with a built in safety alarm.

g. A thermistor will be located on the liquid and gas line.

15. Electrical:

a. A separate power supply will be required of 208/230 volts, 1 phase, 60 hertz. The acceptable voltage range shall be 187 to 253 volts.

b. Transmission (control) wiring between the indoor and outdoor unit shall be a maximum of 3,280 feet (total 6,560 feet).

c. Transmission (control) wiring between the indoor unit and remote controller shall be a maximum distance of 1,640 feet.

16. Control:

a. The unit shall have controls provided by Daikin to perform input functions necessary to operate the system.

b. The unit shall be compatible with the existing Daikin Intelligent Touch Manager advanced multi-zone controller.

17. Accessories

a. Direct fresh air intake kit where called out on the drawings

B. 4 WAY CEILING SUSPENDED CASSETTE UNIT

1. General: Daikin indoor unit model FXUQ shall be a ceiling suspended cassette fan coil unit, operable with R-410A refrigerant, equipped with an electronic expansion valve, for installation onto a ceiling within a conditioned space. It shall be available in capacities from 18,000 Btu/h to 36,000 Btu/h. It shall be a four-way air distribution type, fresh white, impact resistant with a washable panel. The supply air is distributed via motorized louvers which can be horizontally and vertically adjusted from 0° to 60°. Computerized PID control shall be used to control superheat to deliver a comfortable room temperature condition. The indoor units sound pressure shall range from 36 dB(A) to 40 dB(A) at low speed measured at 5 feet below the unit.

2. Indoor Unit:

a. The Daikin unit shall be completely factory assembled and tested. Included in the unit is factory wiring, piping, electronic proportional expansion valve, control circuit board, fan motor thermal protector, flare connections, condensate drain pan, condensate safety shutoff and alarm, self-diagnostics, auto-restart function, 3-minute fused time delay, and test run switch.

3. Indoor unit and refrigerant pipes will be charged with dehydrated air prior to shipment from the factory.

   a. Both refrigerant lines shall be insulated from the outdoor unit.

   b. The 4-way supply air flow can be field modified to 3-way and 2-way airflow to accommodate various installation configurations including corner installations.

   c. Return air shall be through the concentric panel, which includes a resin net mold resistant filter.

   d. The indoor units shall be equipped with a condensate pan and condensate pump. The condensate pump provides up to 23-5/8” of lift and has a built in safety shutoff and alarm.

   e. The indoor units shall be equipped with a return air thermistor.

   f. All electrical components are reached through the decoration panel, which reduces the required side service access.

   g. The indoor unit will be separately powered with 208~230V/1-phase/60Hz.

   h. The voltage range will be 253 volts maximum and 187 volts minimum.

4. Unit Cabinet:

   a. The cabinet shall be space saving and shall be located into the ceiling.

   b. Three auto-swing positions shall be available to choose, which include standard, draft prevention and ceiling stain prevention.

   c. The airflow of the unit shall have the ability to shut down outlets with multiple patterns allowing for simpler installation in irregular spaces.

   d. The cabinet shall be constructed with sound absorbing foamed polystyrene and polyethylene insulation.

5. Fan:

   a. The fan shall be direct-drive turbo fan type with statically and dynamically balanced impeller with three fan speeds available.

   b. The fan motor shall operate on 208/230 volts, 1 phase, 60 hertz with a motor output range from 0.06 to 0.14 HP.

   c. The airflow rate shall be available in three settings.

d. The fan motor shall be thermally protected.

6. Filter:

a. The return air shall be filtered by means of a washable long-life filter with mildew proof resin.

7. Coil:

a. Coils shall be of the direct expansion type constructed from copper tubes expanded into aluminum fins to form a mechanical bond.

b. The coil shall be of a waffle louver fin and high heat exchange, rifled bore tube design to ensure highly efficient performance.

c. The coil shall be a 3-row cross fin copper evaporator coil with 21 FPI design completely factory tested.

d. The refrigerant connections shall be flare connections and the condensate will be 1 inch outside diameter PVC.

e. A condensate pan with antibacterial treatment shall be located under the coil.

f. A condensate pump with a 23-5/8 inch lift shall be located below the coil in the condensate pan with a built-in safety alarm.

g. A thermistor will be located on the liquid and gas line.

8. Electrical:

a. A separate power supply will be required of 208/230 volts, 1 phase, 60 hertz. The acceptable voltage range shall be 187 to 253 volts.

b. Transmission (control) wiring between the indoor and outdoor unit shall be a maximum of 3,280 feet (total 6,560 feet).

c. Transmission (control) wiring between the indoor unit and remote controller shall be a maximum distance of 1,640 feet.

9. Control:

a. The unit shall have controls provided by Daikin to perform input functions necessary to operate the system.

b. The unit shall be compatible with interfacing with a BMS system via BACnet gateways.

c. The unit shall be compatible with the existing Daikin Intelligent Touch Manager advanced multi-zone controller.

C. 1-Way Ceiling-Recessed Cassette, Indoor Units:

1. General: Daikin indoor unit model FXEQ shall be a ceiling suspended cassette fan coil unit, operable with R-410A refrigerant, equipped with an electronic expansion valve, for installation onto a ceiling within a conditioned space. It shall be a one-way air distribution type, fresh white, impact resistant with a washable panel. The supply air is distributed via motorized vertical and horizontal louvers which can be adjusted from 0° to 45° and 20° to 70° respectively. Computerized PID control shall be used to control superheat to deliver a comfortable room temperature condition. The unit shall be equipped with a programmed drying mechanism that dehumidifies while limiting changes in room temperature when used with Daikin remote control BRC1E73. The indoor units sound pressure shall range from 26 dB(A) to 38 dB(A) at low speed measured at 3.3 feet below the unit.

2. The Daikin indoor unit FXEQ shall be completely factory assembled and tested. Included in the unit is factory wiring, piping, electronic proportional expansion valve, control circuit board, fan motor thermal protector, flare connections, condensate drain pan, condensate lift pump, condensate safety shutoff and alarm, self-diagnostics, auto-restart function, 3-minute fused time delay, and test run switch.

3. The indoor unit shall be able to process up to 15% fresh air

4. Indoor unit and refrigerant pipes will be charged with dehydrated air prior to shipment from the factory.

5. Both refrigerant lines shall be insulated from the outdoor unit.

6. Return air shall be through the flat back panel, which includes a white resin net mold resistant filter.

7. The indoor units shall be equipped with a condensate pan and condensate pump. The condensate pump provides up to 33-716” of lift and has a built in safety shutoff and alarm.

8. The indoor units shall be equipped with a return air thermistor.

9. Motor and some of the electrical components shall be reachable through the decoration panel.

10. The indoor unit will be separately powered with 208~230V/1-phase/60Hz.

11. The voltage range will be 253 volts maximum and 187 volts minimum.

12. Unit Cabinet:

    a. The cabinet shall be space saving and shall be located into the ceiling.

    b. The cabinet shall have a built in 4” knock-out to connect fresh air intake

    c. The cabinet shall be constructed with sound absorbing foamed polyurethane noise insulation.

d. The cabinet shall be equipped with foamed polystyrene and foamed polyethylene heat insulation.

13. Fan:

a. The fan shall be direct-drive Sirocco fan type with statically and dynamically balanced impeller with five selectable fan speeds available.

b. The fan motor shall operate on 208/230 volts, 1 phase, 60 hertz with a motor output range from 0.11 to 0.15 HP.

c. The airflow rate shall be available in five settings.

d. The fan motor shall be thermally protected.

14. Filter:

a. The return air shall be filtered by means of a mold resistant Resin net filter.

b. The filter shall be accessible from the decoration panel

15. Coil:

a. Coils shall be of the direct expansion type constructed from copper tubes expanded into aluminum fins to form a mechanical bond.

b. The coil shall be of a waffle louver fin and high heat exchange, rifled bore tube design to ensure highly efficient performance.

c. The coils for units up to 1 ton shall be a 2-row cross fin copper evaporator coil with 20.5 FPI design completely factory tested for the

d. The coils for units from 1.25 ton to 2.0 ton shall be 2-row cross fin copper evaporator coil with 20.5 FPI and an additional row with 15.9 FPI.

e. The refrigerant connections shall be flare connections and the condensate will be 1-1/32 inch outside diameter PVC.

f. A condensate pan with antibacterial treatment shall be located under the coil.

g. A condensate pump with a 25 inch lift shall be located below the coil in the condensate pan with a built-in safety alarm.

h. A thermistor will be located on the liquid and gas line.

16. Electrical:

a. A separate power supply will be required of 208/230 volts, 1 phase, 60 hertz. The acceptable voltage range shall be 187 to 253 volts.

b. Transmission (control) wiring between the indoor and outdoor unit shall be a maximum of 3,280 feet (total 6,560 feet).

c. Transmission (control) wiring between the indoor unit and remote controller shall be a maximum distance of 1,640 feet.

17. Control:

a. The unit shall have controls provided by Daikin to perform input functions necessary to operate the system.

b. The unit shall be compatible with interfacing with a BMS system via optional LonWorks or BACnet gateways.

c. The unit shall be compatible with a Daikin Intelligent Touch Manager advanced multi-zone controller.

D. Wall Mounted, Indoor Units:

1. General: Daikin indoor unit FXAQ shall be a wall mounted fan coil unit, operable with refrigerant R-410A, equipped with an electronic expansion valve, for installation onto a wall within a conditioned space. This compact design shall be furnised with finished white casing. Computerized PID control shall be used to control superheat to deliver a comfortable room temperature condition. The unit shall be equipped with a programmed drying mechanism that dehumidifies while limiting changes in room temperature when used with Daikin remote control BRC1E72, BRC1E73 and BRC2A71. A mildew-proof, polystyrene condensate drain pan and resin net mold resistant filter shall be included as standard equipment. The indoor units sound pressure shall range from 31 dB(A) to 41 dB(A) at low speed measured at 3.3 feet below and from the unit.

2. The Daikin indoor unit FXAQ shall be completely factory assembled and tested. Included in the unit is factory wiring, piping, electronic proportional expansion valve, control circuit board, fan motor thermal protector, flare connections, condensate drain pan, self-diagnostics, auto-restart function, 3-minute fused time delay, and test run switch. The unit shall have an auto-swing louver which ensures efficient air distribution, which closes automatically when the unit stops. The remote controller shall be able to set five (5) steps of discharge angle. The front grille shall be easily removed for washing. The discharge angle shall automatically set at the same angle as the previous operation upon restart. The drain pipe can be fitted to from either left or right sides.

3. Indoor unit and refrigerant pipes will be charged with dehydrated air prior to shipment from the factory.

4. Both refrigerant lines shall be insulated from the outdoor unit.

5. Return air shall be through a resin net mold resistant filter.

6. The indoor units shall be equipped with a condensate pan.

7. The indoor units shall be equipped with a return air thermistor.

8. The indoor unit will be separately powered with 208~230V/1-phase/60Hz.

9. The voltage range will be 253 volts maximum and 187 volts minimum.

10. Unit Cabinet:

    a. The cabinet shall be affixed to a factory supplied wall mounting template and located in the conditioned space.

    b. The cabinet shall be constructed with sound absorbing foamed polystyrene and polyethylene insulation.

11. Fan:

    a. The fan shall be a direct-drive cross-flow fan, statically and dynamically balanced impeller with high and low fan speeds available.

    b. The fan motor shall operate on 208/230 volts, 1 phase, 60 hertz with a motor output range 0.054 to 0.058 HP.

    c. The airflow rate shall be available in high and low settings.

    d. The fan motor shall be thermally protected.

12. Coil:

    a. Coils shall be of the direct expansion type constructed from copper tubes expanded into aluminum fins to form a mechanical bond.

    b. The coil shall be of a waffle louver fin and high heat exchange, rifled bore tube design to ensure highly efficient performance.

    c. The coil shall be a 2-row cross fin copper evaporator coil with 14 fpi design completely factory tested.

    d. The refrigerant connections shall be flare connections and the condensate will be 11/16 inch outside diameter PVC.

    e. A thermistor will be located on the liquid and gas line.

    f. A condensate pan shall be located in the unit.

13. Electrical:

    a. A separate power supply will be required of 208/230 volts, 1 phase, 60 hertz. The acceptable voltage range shall be 187 to 253 volts.

    b. Transmission (control) wiring between the indoor and outdoor unit shall be a maximum of 3,280 feet (total 6,560 feet).

    c. Transmission (control) wiring between the indoor unit and remote controller shall be a maximum distance of 1,640 feet.

14. Control:

a. The unit shall have controls provided by Daikin to perform input functions necessary to operate the system.

b. The unit shall be compatible with interfacing with a BMS system via optional LonWorks or BACnet gateways.

c. The unit shall be compatible with a Daikin Intelligent Touch Manager advanced multi-zone controller.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install refrigerant piping in accordance with equipment manufacturer's instructions.

C. Perform wiring in accordance with NFPA 70, National Electric Code (NEC).

D. Coordinate with installers of systems and equipment connecting to this system.

3.2 SYSTEM STARTUP

A. Prepare and start equipment and system in accordance with manufacturer's instructions and recommendations.

B. Adjust equipment for proper operation within manufacturer's published tolerances.

END OF SECTION

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PART 1 GENERAL

1.1 SECTION INDLUDES

A. Finned tube radiation.

B. Unit ventilators.

C. Unit ventilator shelving/cabinets and piping enclosure systems.

D. Air coils.

E. Blower coils.

F. Convectors.

G. Non-variable refrigerant volume heating only Fan Coil Units.

1.2 REFERENCE STANDARDS

A. AHRI Directory of Certified Product Performance - Air-Conditioning, Heating, and Refrigeration Institute (AHRI) Current Edition.

B. AHRI 410 - Forced-Circulation Air-Cooling and Air-Heating Coils 2001, with Addenda (2011).

C. ASHRAE (HVACA) - ASHRAE Handbook - HVAC Applications Most Recent Edition Cited by Referring Code or Reference Standard.

D. ASHRAE Std 62.1 - Ventilation for Acceptable Indoor Air Quality Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

E. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

F. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems 2021.

G. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible 2021.

1.3 SUBMITTALS

A. Product Data: Provide typical catalog of information including arrangements.

B. Shop Drawings:

1. Indicate cross sections of cabinets, grilles, bracing and reinforcing, and typical elevations.

2. Indicate air coil and frame configurations, dimensions, materials, rows, connections, and rough-in dimensions.

3. Submit schedules of equipment and enclosures typically indicating length and number of pieces of element and enclosure, corner pieces, end caps, cap strips, access doors, pilaster covers, and comparison of specified heat required to actual heat output provided.

4. Indicate mechanical and electrical service locations and requirements.

C. Selection Samples: For each finish product specified, color chart representing manufacturer's full range of available colors.

D. Verification Samples: For each finish product specified, color chip representing actual product in color and texture.

E. Certificates: Certify that coils are tested and rated in accordance with AHRI 410.

F. Manufacturer's Instructions: Indicate installation instructions and recommendations.

G. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listings.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.5 WARRANTY

A. Provide 5 year manufacturer's warranty for unit ventilators.

PART 2 PRODUCTS

2.1 FIN TUBE RADIATION

A. Heating Elements: Seamless copper tubing, mechanically expanded into evenly spaced aluminum fins sized, suitable for soldered fittings.

B. Element Hangers: Quiet operating, ball bearing cradle type providing unrestricted longitudinal movement, on enclosure brackets.

C. Enclosures: 16 gauge sheet steel with easily jointed components for wall to wall installation.

1. Support rigidly on wall at least 3 feet on center maximum.

D. Finish: Factory applied baked primer coat.

E. Access Doors: For otherwise inaccessible valves, provide factory-made permanently hinged access doors, 6 by 7 inch minimum size, integral with cabinet.

2.2 UNIT VENTILATORS

A. Performance Data and Safety Requirements:

1. Provide products listed, classified, and labeled by Underwriters Laboratories Inc. (UL), Intertek (ETL), or testing firm acceptable to Authority Having Jurisdiction as suitable for the purpose indicated.

B. Required Directory Listings: AHRI Directory of Certified Product Performance - Air-Conditioning, Heating, and Refrigeration Institute (AHRI).

C. Hydronic Coils:

1. Copper tubes mechanically expanded or bonded into evenly spaced aluminum fins.

2. Factory pressure tested, hydrostatically, to not less than 350 psi.

D. Refrigerant Coils:

1. Provide factory installed thermal expansion valves, properly sized to accommodate the selected condensing unit.

2. Factory proof and leak tested to ensure leak tight operation.

3. Provide insulated drain pan, to prevent condensation, with field convertible left or right hand connections.

4. All units shall come furnished with an insulated drain pan constructed of stainless steel. A drain outlet shall be provided on both ends of the pan. The drain hand of connection shall be easily field-reversed to the opposite end. The drain pan shall be able to be sloped in either direction for proper condensate removal.

E. All hydronic coils shall be constructed with copper tubes and mechanically bonded aluminum corrugated plate fins. All coils shall have aluminum individual unshared fin surfaces. An air brake shall exist between coils. Water coils shall be furnished with a threaded drain plug at the lowest point. A manual air vent shall be provided at the high point of the coil.

F. Cabinet: Exterior cabinet panels shall be constructed of heavy-gauge steel. All sheet metal panels must be cleaned and phosphatized, then painted electrostatically with an oven baked environmentally friendly thermosetting urethane powder finish. The color shall be off-white.

G. Cabinet Accessories: Matching steel construction, reinforced, for use with unit ventilators, with steel alignment pins, adjustable kick plates with leveling bolts, shelves and sliding doors with locks as indicated, corner, end, and wall filler sections as required, sized to match unit ventilator heights and widths.

H. Cabinets shall be shipped fully assembled. Base and Side panels shall be constructed of 18-gauge cold-rolled steel. Side panels have seven adjustable slots to support shelves and additional 12 gauge steel nternal side supports that are welded for

additional vertical rigidity. Bottom base shall be supported by two 14 gauge horizontal continuous angles the length of the cabinet. Two support bases shall be fabricated from 14-gauge steel and four adjustable feet allowing for a 1" vertical adjustment.

1. One fully adjustable shelf from 16-gauge steel shall be supported by a 16 gauge continuous welded angle for additional strength. Each cabinet shall be supplied with front and side adjustable floor kick plates to conceal cabinet legs and a back wall F-channel from 18-gauge steel to support the length of the cabinet and deliver a uniform continuous appearance. All cabinet parts shall be cleaned and phosphatized prior to applying a baked on polyester powder coat finish.

I. Cabinet steel tops shall be assembled to the base cabinet and shall be fabricated from 16 gauge furniture quality cold-rolled steel and two 16 gauge support channels shall be welded to the top underside for additional support. Tops shall be sanded to remove all blemishes prior to being cleaned and phosphatized before applying a baked on polyester powder coat finish.

1. Provide Steel Top with Pencil Proof Anodized Aluminum Grill (grill to be clear anodized 204-R finish) to be located above piping tunnel.

J. End Panels: 1" Standard End Panels shall be installed to finish off cabinets when needed. End panels shall be fabricated from 18-gauge furniture quality cold-rolled steel. Internal 16 gauge steel side stiffeners shall be welded for additional support. Top corners shall be sanded to remove all blemishes prior to being cleaned. End panels shall be cleaned and phospatized prior to applying a baked on polyester powder coat finish to match cabinets.

K. Fill-In Sections: Filler sections shall be available in 12", 18" or 24" wide. Filler sections shall be furnished with side and top F- channels to hide field cut sections. Filler sections tops shall be fabricated from 16- Gauge furniture quality cold-rolled steel. Filler sections shall be designed to be cut in the field and include required angels and hardware for a per installation. Filler sections shall be cleaned and phospatized prior to applying a baked-on polyester powder coat finish to match cabinets.

L. Vertical and Horizontal Piping Enclosure Systems:

1. Horizontal systems: Cold-rolled gavanized steel, 16 gauge with stamped louver on top and bottom of enclosure unit, flat top or slope type as outlined on the drawings, height as outlined on the drawings.

2. Accessories as called out on drawings:

a. End caps, Wall trim supports, 12" wide enclosures with access doors, 12" wide end cap with access doors.

3. Vertical systems: Cold-rolled gavanized steel, 16 gauge, length, width and height as outlined on the drawings.

a. Finish: Baked enamel.

b. Tamper Proof hardware provided at all enclosure locations.

c. Access doors where called out on drawings

d. Complete trim accessories including wall, end, corner, and custom trims where designated on drawings.

e. Basis of Design Manufacturer: HVAC Custom Enclosure Co, LLC or equal

4. Finish of enclosure systems shall match finish/color of unit ventilator cabinet systems.

M. Finish: Factory applied baked primer coat on visible surfaces of enclosure or cabinet.

N. Construction: All internal sheet metal parts must be made of galvanized steel to inhibit corrosion.The entire frame shall be welded construction to provide strength and rigidity. Hidden reinforced top panel support shall be integral with the frame and support the fan assembly. Frames assembled with sheet metal fasteners shall not be acceptable. Unit shall be of a draw-thru design. Blow-thru design is not acceptable. Unit shall have a built-in metal wire raceway from one end compartment to the other.

O. Floor Units:

1. Floor mounted units shall have an integral pipe tunnel for convenient crossover of piping or electrical wiring in accordance with local and National Electric Codes (N.E.C.). The front surface shall consist of three separate, removable panels easily handled by one person. Control compartment must be accessible without removing the entire front panel. Unit top shall have two access doors (one at each end) for access to motor and bearings. Unit discharge grille shall be welded continuous bar type with round edged steel bars placed for a 10° vertical deflection. A 1/4" painted galvanized mesh shall be furnished and located beneath discharge grille. Unit top surface shall be supplied with a textured non-glare paint surface that resists scuffing and hides fingerprints. Units shall come with front adjustable leg levelers. End panels shall ship separately, individually wrapped in plastic and boxed to prevent damage during construction.

2. Provide 21-7/8" deep units with a full adapter back, a closed pipe tunnel and a rear outdoor air inlet. Provide field cut of rear, full adapter back of unit ventilator to match intake louver opening size. Provide 2" step down at rear, top of unit ventilators where indicated on schedule and/or drawings.

P. Fans: Centrifugal forward-curved double-width wheels, statically and dynamically balanced, direct driven, arranged to draw air through coil.

Q. Room Fans and Motor: The unit fan and motor assembly shall be of a modular construction so that it is removable from the bottom for service, maintenance and access to the coil section for cleaning. The motor and fan assembly shall be low speed design to assure maximum quietness and efficiency. Fans shall be double inlet, forward curved centrifugal type with offset aerodynamic blades. Assembly shall be statically and dynamically balanced. Fan housings shall be steel construction, incorporating logarithmic expansion for quieter operation. Fan shaft shall be 1-1/4" diameter hollow steel with 1-1/4" end bearing. Fan and motor assembly shall be direct drive, 3 speed type. Fan/coil arrangement shall be draw-thru design for uniform coil face

velocity and discharge air temperature. Motors shall be Electrically Commutated Motor (ECM) plug-in type, designed specifically for unit ventilator operation. Motors shall be located out of the airstream and have an internal thermal overload device (auto reset).Fan motors and controls shall have each hot line protected by factory installed cartridge type fuse(s).Motors shall have sleeve type bearings and require oiling no more than once annually. Units shall have shaft bearing located out of the air stream. Bearings in the airstream are not acceptable.

R. Face and Bypass Damper: Each unit shall be provided with a factory-installed face and bypass damper, constructed of aluminum. The long sealing edges of the damper shall have silicone rubber impregnated cloth seals for long life and positive sealing. Face and bypass damper stops not fitted with seals shall not be acceptable. The damper ends shall have blended mohair seals glued along the ends for a positive seal. Plastic clip-on brush end seals will not be acceptable. The unit design shall incorporate the face and bypass damper to prevent coil surface wiping and be before the fan in a draw through configuration. Face and bypass damper positioned in the direct discharge of the room fan is not acceptable. The face and bypass damper shall be arranged so a dead air space results between the coil and the damper in a full bypass condition to minimize heat pick up.

S. Outdoor and Room Air Damper: Each unit shall be provided with separate room air and outdoor air dampers. The room air damper shall be constructed of aluminum using metal-forming techniques to resist twisting and shall be counterbalanced against back pressure. Outdoor air damper shall be two-piece double-wall construction with 1/2" thick, 1.5 lbs.density fiberglass insulation encapsulated between welded 20 ga. galvanized steel blades for rigidity and to inhibit corrosion, and have additional insulation on the exterior surfaces of the damper blade and on the ends of the outdoor air chamber. Dampers shall be fitted with mohair seals along all the sealing edges.

1. Dampers shall use turned-metal principle on long closing ends with no metal-to-metal contact. No plastic or rubber gaskets shall be acceptable. Damper bearings shall be made of nylon or other material which does not require lubrication.

T. Filter: Easily removed 1 inch thick MERV-13 type, located to filter air before coil.

2.3 AIR COILS

A. Water Coils:

1. Coils rated and tested in accordance with AHRI 410.

2. Tubes: Material to consist of seamless copper or brass, mechanically expanded or tension wound to fins; appropriate tube joining methods based on tube material.

3. Fins: Material to consist of aluminum or copper, continuous plate type with full fin collars or individual helical finned tube type wound under tension.

4. Casing: Heavy gauge galvanized steel with mounting holes, including intermediate tube supports if required by coil design and length.

5. Acceptable Factory Testing Methods:

    a. Proof test at 1.5 times the maximum operating pressure and leak test at the maximum operating temperature.

    b. Leak test at minimum 300 psig air pressure under water.

    c. Perform hydrostatic testing for coils with removable headers in accordance with approved shop drawings and normally accepted means and methods.

B. Electric Coils:

1. A coil of 80% nickel, 20% chromium resistance wire precisely centered in a .475" diameter stainless steel sheath shall be provided. Magnesium oxide powder, compacted to rock-like density, insulates the coil electrically from the sheath. A 1-1/4" O.D. spiral wound stainless steel fin shall make a minimum of five passes per linear around the outside of the tubular element.

2. The elements shall be furnished with mounting flanges, making them individually removable from the terminal box. The heater frame shall be constructed of heavy gauge corrosion resistant steel and is provided with flanges for structural rigidity.

3. All heaters include thermal cutouts (not heat limiters or fusible links) in accordance with requirements of UL and CSA. All controls are factory-wired to clearly marked terminal blocks for field connections.

4. Properly sized knockouts shall be provided. All heaters are supplied complete with wiring diagrams and installation instructions, and all are given a dielectric test at a minimum of 1200 volts before shipment

2.4 BLOWER COILS

A. Type and Arrangement:

1. The unit shall be furnished as a draw-through style air handler.

B. General Construction:

1. The air handling unit shall include a blower, fan housing, coil, and drain-pan enclosed within and mounted to a rigid cabinet. Steel parts exposed to moisture shall be galvanized and insulated to prevent condensation. The complete fan assembly shall be wired via quick connect electrical contacts and easily removable for service and maintenance.

2. The air handling unit shall include a blower, fan housing, coil, and drain-pan enclosed within and mounted to a rigid cabinet. Steel parts exposed to moisture shall be galvanized and insulated to prevent condensation.

3. Cabinet:

    a. Unit will be supplied with 1-inch, double-wall panels. The cabinet shall be thermally isolated through injected foam insulation inside each cabinet.

Single wall cabinets with fiberglass insulation exposed in the airstream are not acceptable. Frame channels which allow heat conductance between the inside and outside of the cabinet are not acceptable. Base rails used for unit mounting/hanging are acceptable. Panel shall have a minimum thermal insulation of R-6.5. Foam injected insulation conforms to:

1) ASTM C1071 (including C665)

2) UL 181 for erosion

3) 25/50 rating for flame spread/smoke developed per ASTM E-84, UL 723 and NFPA 90A.

4. Supply Fan:

a. Supply fans shall be a DWDI forward-curved type fan. Fan assemblies shall be balance tested dynamically by the manufacturer. Manufacturer must ensure maximum fan RPM is below the first critical speed.

b. The complete fan assembly, including motor and main drain pan shall be easily removable.

c. Fan motor(s) assembly shall be direct-drive style and not include belts, pulleys, or sheaves.

d. Fan motor(s) shall be of Direct Current Brushless type or minimum motor efficiency of 85 percent when rated in accordance of NEMA Standard MG 1-2016 at full load conditions.

e. Manufacturer’s supply fan motor shall have means to adjust motor speed for field balancing.

f. Units shall be certified in accordance with the Central Station Air Handler certification program that is based on AHRI Standard 430.

g. Forward-curved fan must be capable of delivering 1.5" w.g. external static pressure and 3.0" w.g. total static pressure at nominal cabinet CFM.

5. Filter Section:

a. Draw-through filter section shall be flat type furnished with MERV 13 deep pleated panel filters.

b. Filter media shall be UL 900 listed, Class I or Class II.

c. Filters shall be easily accessible via a door or panel located on the side of the unit.

6. Electrical:

a. Supply fans shall be driven by Electrically Commutated motors that are run-tested in the assembled unit and permanently lubricated. All motors shall

have integral thermal overload protection with a maximum ambient operating temperature of 55°C. Motors shall be capable operating at 90 percent of rated voltage on all speed settings. Motors can operate up to 10 percent overvoltage.

b. Motor wires shall include a quick-disconnect motor plug.

c. All controls equipment including ECM control module, low voltage transformers, safety switches, disconnects, fusing, and terminal strips must be located inside the main unit cabinet.

7. Heating Coil:

a. Heating performance shall be as specified on the unit schedule.

b. Hot water coil fins shall have full drawn collars to provide a continuous surface cover over the entire tube for maximum heat transfer. Seamless copper tubes shall be mechanically expanded into the fins to provide a continuous primary-to-secondary compression bond over the entire finned length for maximum heat transfer rates. Bare copper tubes shall not be visible between fins.

c. Coils shall be provided with headers of seamless copper tubing with intruded tube holes to permit expansion and contraction without creating undue stress or strain. Coil connections shall be female pipe thread connections with connection size to be determined by manufacturer based upon the most efficient coil circuiting. Vent and drain connections shall be furnished on the coil connection, external to the cabinet. Vent connections shall be provided at the highest point to ensure proper venting. Drain connections shall be provided at the lowest point.

8. Cooling Coils:

a. Direct expansion and variable refrigerant volume (VRV) fins shall have full drawn collars to provide a continuous surface cover over the entire tube for maximum heat transfer. Seamless copper tubes shall be mechanically expanded into the fins to provide a continuous primary-to-secondary compression bond over the entire finned length for maximum heat transfer rates. Bare copper tubes shall not be visible between fins. Coil casing shall be constructed of galvanized steel.

b. Direct Expansion coils shall be provided with a distributor. The return coil connection shall be a sweat connection with size to be determined by manufacturer based upon the most efficient coil circuiting.

c. All steel parts exposed to moisture shall be galvanized.

d. Unit shall include a stainless steel primary drain pan and a stainless steel secondary drain pan. The primary drain pan shall be positively sloped in every plane. Primary and secondary drain pans to be insulated with anti-

microbial closed-cell insulation. The drain pan shall be designed to ensure no pooling of condensate water per ASHRAE 62.2.

e. Coils shall have stub-outs off of the headers extending through the unit panneling.

9. Economizer/Mixing Box:

a. A factory-installed mixing box for mixing two separate airstreams shall be furnished attached to the main unit. This component must be constructed of a similar cabinet that the main unit is constructed of.

b. An economizer section shall be provided, controlling return, and outdoor air.

c. Dampers intended for modulating each airstream shall be furnished to cover the openings of the supplied mixing box.

d. Damper blades shall be of airfoil construction. Dampers shall be AMCA Class 1-A leakage rated

e. Damper blades shall be interoperable via linkage shaft. Gear linkage dampers shall not be acceptable.

f. Damper actuators shall be furnished factory installed on the mixing box. The actuators shall be controlled via 0-10V modulating signal and factory-wired back to the control area within the main cabinet.

10. Controls:

a. Unit shall be supplied with a digital controls ready interface. This interface is to be located inside the control box internal to the main unit. This interface shall include a 24VAC transformer and terminal blocks for connections to fan motor control, sensor control, safety switches, valve actuators, and damper control if applicable.

1) Fan motor control to be furnished as 0-10 VDC.

b. Unit shall be furnished with a disconnect switch and inline fusing to protect vital electrical components. The disconnect switch shall be operable from the outside of the cabinet to reduce hazards during field service and commissioning.

2.5 HYDRONIC CABINET HEATERS

A. Provide products listed, classified, and labeled by Underwriters Laboratories Inc. (UL), Intertek (ETL), or testing firm acceptable to Authority Having Jurisdiction as suitable for the purpose indicated.

B. Coils:

1. Evenly spaced aluminum fins mechanically bonded to copper tubes.

2. Heating Hot Water: Suitable for working temperatures up to a maximum not less than 200 degrees F.

C. Cabinet: Minimum 16 gage, 0.0598 inch thick sheet steel front panel with exposed corners and edges rounded, easily removed panels, glass fiber insulation, integral air outlet, and inlet grilles.

D. Finish: Factory applied baked primer coat on visible surfaces of enclosure or cabinet.

E. Fans: Centrifugal forward-curved double-width wheels, statically and dynamically balanced, direct driven.

F. Motor: Electrically Commutated Motor.

G. Filter: Easily removed, 1 inch thick glass fiber throw-away type, located to filter air before coil.

2.6 CONVECTORS

A. Heating Elements:

1. Convector heating elements shall be non-ferrous consisting of 3/8" diameter copper tubing and .010 thick aluminum plate fins with full-flanged collars. The tubes shall be expanded mechanically into fin collars to form a permanent thermal bond. Fins shall be protected front and back by formed shield plates running entire length of element. Headers shall be cast bronze provided with bottom threaded piping connections. Heating elements shall be tested by manufacturer at 100 P.S.I. air pressure under water. Elements shall be supported from brackets on sides of cabinet which shall allow for proper pitching of the element.

B. Cabinets:

1. Cabinets shall be formed from cold rolled steel and shall be suitably braced and reinforced where necessary to provide stiffness, and accurately fitted to prevent air leakage. Cabinet front shall be flanged top and bottom for added rigidity. Top edge of cabinet fronts shall be smoothly formed with 3/8" inside radius. Air outlet louvers (and inlet louvers where required) shall be the venetian type. 18-gauge cold rolled steel heating element support brackets shall be spot welded to inside ends of all Convector cabinets. After fabrication, all cabinets shall be thoroughly cleaned, and provided with a high quality baked powder prime finish. Accessory items shall be included as noted per job requirements.

2. Wall hung slope top cabinets:

a. cabinets shall be constructed from not less than 18-gauge CRS front and top and 20-gauge CRS back and sides. The front shall wrap around the sides of the cabinet and shall fasten at sides with concealed friction-fit slip joints. Air outlet louvers of venetian type shall be in slope top. Air inlet shall be through open bottom. Back shall be provided with holes for mounting on wall. Back panel has stiffener with key-hole for added support and for mounting to wall.

3. Wall mounted to floor slope tob cabinets:

a. cabinets shall be constructed from not less than 18-gauge CRS front and top and 20- gauge CRS back and sides. The front shall wrap around the sides of the cabinet and shall fasten at sides with concealed friction-fit fasteners. Air outlet louvers of venetian type shall be in slope top. Air inlet shall be through venetian type louvers stamped in front panel, same length and height as air outlet louvers.

4. Access Doors: Convectors shall be provided with access doors to allow access to hydronic accessories including shut-off valves and control valves. Access doors shall be 4-1/4" x 4-1/4" and shall be located in the non-louvered area. Access doors shall be hinged on top with straight shaft type hinge and secured by a concealed 1/4 turn Hex-head operator.

2.7 NON-VARIABLE REFRIGERANT VOLUME FLOOR MOUNTED FAN COIL UNITS

A. Cabinet:

1. Unit shall be supplied with powder coat painted cabinet. Finish must meet ASTM B117 specifications (salt spray test).

B. Supply Fan:

1. Supply fans shall be a DWDI forward-curved type. Fan assemblies including fan, motor and sheaves shall be dynamically balanced by the manufacturer on all three planes at all bearing supports. Manufacturer shall ensure maximum fan RPM is below the first critical speed.

2. The complete fan assembly, including motor and main drain pan shall be easily removable.

3. Units shall be certified in accordance with the Room Fan Coil Unit certification program that is based on ARI Standard 440.

4. An ECM blower motor shall be provided on all units. Factory motor wiring shall be set for optimum fan performance. The unit shall be shipped at one fixed setting. The ECM motor shall utilize a permanent magnet rotor, which is connected to the shaft through resilient rings to absorb high frequency torque ripple. ECM motor shall be programmed for constant CFM or constant torque.

5. ECM blower motor shall be 3 speeds, single phase with means for proportional field adjustment of each speed.

C. Electrical:

1. All motors shall have integral thermal overload protection with a maximum ambient operating temperature of 104°F. Motors shall be capable of starting at 78 percent of rated voltage and operating at 90 percent of rated voltage on all speed settings. Motors can operate up to 10 percent overvoltage.

2. Motor wires shall include a quick-disconnect motor plug.

D. Water Heating Coil:

1. Heating performance shall be as specified on the unit schedule.

2. Coil fins shall have full drawn collars to provide a continuous surface cover over the entire tube for maximum heat transfer. Seamless copper tubes shall be mechanically expanded into the fins to provide a continuous primary-to-secondary compression bond over the entire finned length for maximum heat transfer rates. Bare copper tubes shall not be visible between fins.

3. Coils shall be provided with headers of seamless copper tubing with intruded tube holes to permit expansion and contraction without creating undue stress or strain. Coil connections shall be copper sweat connections with connection size to be determined by manufacturer based upon the most efficient coil circuiting. Vent and drain connections shall be furnished on the coil connection, external to the cabinet. Vent connections shall be provided at the highest point to ensure proper venting. Drain connections shall be provided at the lowest point.

4. Water coils shall not exceed an internal pressure of 500 psig.

E. Filters:

1. Filters shall be 1” (25 mm) throwaway. They shall be concealed from sight and easily removable.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surfaces are suitable for installation.

B. Verify that field measurements are as indicated on drawings.

3.2 INSTALLATION

A. Install in accordance with manufacturer's recommendations.

B. Install equipment exposed to finished areas after walls and ceilings are finished and painted.

C. Do not damage equipment or finishes.

D. Unit Ventilators:

1. Locate as indicated, level and shim units, and anchor to structure.

2. Coordinate exact location of wall louvers.

3. Install shelving and auxiliary cabinetry where indicated on drawings.

E. Units with Hydronic Coils:

1. Provide with shut-off valve on supply piping and tamper-proof, balancing valve with memory stop on return piping.

2. If not easily accessible, extend air vent to exterior surface of cabinet for ease of servicing.

F. Units with Cooling Coils: Connect drain pan to condensate drain.

G. Air Coils:

1. Install in ducts and casings in accordance with SMACNA (DCS).

a. Support coil sections independent of piping on steel channel or double angle frames and secure to casing.

2. Coil Safeguards:

a. Protect coils to prevent damage to flanges and fins.

b. Comb out damaged fins.

3. Install all coils level except cleanable coils with 1:50 pitch.

3.3 CLEANING

A. After construction and painting is completed, clean exposed surfaces of units.

B. Vacuum clean coils and inside of units.

C. Touch-up marred or scratched surfaces of factory-finished cabinets using finish materials furnished by the manufacturer.

D. Install new filters.

E. Protect units before, during and after installation. Damaged material due to improper site protection shall be cause for rejection.

3.4 PROTECTION

A. Provide finished cabinet units with protective covers during the balance of construction.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Hydronic radiant panel heaters (ceiling mounted).

1.2 REFERENCE STANDARDS

A. ASHRAE Std 138 - Method of Testing for Rating Ceiling Panels for Sensible Heating and Cooling; 2021.

B. ASTM B75/B75M - Standard Specification for Seamless Copper Tube; 2020.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023c.

1.3 SUBMITTALS

A. Product Data: Provide data for ceiling panel heaters.

B. Manufacturer's Installation Instructions: Indicate installation instructions and recommendations.

C. Field Quality Control Submittals: Indicate test reports and inspection reports.

D. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions of equipment and controls, installation instructions, maintenance and repair data, and parts listings.

E. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Nanuet Union Free School District's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

1.5 WARRANTY

A. Provide 5 year manufacturer's warranty for ceiling mounted hydronic radiant panel heating units.

PART 2 PRODUCTS

2.1 HYDRONIC RADIANT PANEL HEATERS

A. Acceptable Manufacturers:

1. Aerotech (basis of design).

2. Price Industries: www.price-hvac.com/#sle.

3. Sterling: www.sterlingheat.com.

B. Exposed Linear Radiant Panels

1. Exposed linear radiant panels shall use extruded aluminum with integrated heat sinks on the back to transfer heat between copper tubes and the panel face. The linear radiant panel is to radiate heat to the zone below.

2. Water Tubes: Tubes shall consist of ASTM B75 ½" nominal copper tubing. Water connections shall be suitable for solder, compression fittings, push-on fittings or threaded connection.

3. Heat Sinks: Heat sinks shall be extruded aluminum and copper pipe will be mechanically fastened to the heat sink. A non-hardening heat transfer paste is required between the tubing and the heat sink.

4. Extruded Aluminum Plank: The panel shall be constructed of 1.2 mm thick extruded aluminum.

5. Paint Finish: All visible components shall be powder-coated with highly emissive powder coat polyester paint for optimal radiative properties as well as durability and easy cleaning. Manufacturer shall provide water pressure drop data as well as heat output data derived from tests in accordance with DIN 14037 (heating).

6. Linear radiant panel capacity shall be tested and certified by manufacturer in accordance with DIN 14037 (heating) to meet the performance listed on the schedule. Should any performance rating, water supply temperature, water pressure drop, etc. deviate from the schedule, manufacturer shall submit updated capacity as well as computational fluid dynamic modeling demonstrating that any changes do not impact the air distribution in a room that would cause a detriment to the PMV and ADPI rating from the design conditions. Manufacturer shall have factory testing facility available to perform performance test of units in accordance with said standard, as required. Upon request, up to 1% of units for the project can be tested in accordance with the standard.

7. Water connections shall be shipped sealed to limit the introduction of dust and dirt during shipping and construction.

C. Ceiling Mounted Modular Radiant Panels

1. Modular radiant panels shall use heat sinks on the back of a rigid ceiling tile to transfer heat between copper tubes and the panel face. The modular radiant panels are to radiate heat to the zone below.

2. Water Tubes: Tubes shall consist of ASTM B75 ½" nominal copper tubing. Water connections shall be suitable for solder, compression fittings, push-on fittings or threaded connection.

3. Heat Sinks: Heat sinks shall be extruded aluminum and copper pipe will be mechanically fastened to the heat sink. A non-hardening heat transfer paste is required between the tubing and the heat sink and between the heat sink and the panel.

4. Face: The panel face shall be constructed of 14 ga. aluminum.

5. Paint Finish: All visible components shall be powder-coated with highly emissive powder coat polyester paint for optimal radiative properties as well as durability and easy cleaning. Manufacturer shall provide water pressure drop data as well as heat and cool output data derived from tests in accordance with DIN 14037 (heating).

6. Modular radiant panel capacity shall be tested and certified by manufacturer in accordance with DIN 14037 (heating) to meet the performance listed on the schedule. Should any performance rating, chilled water supply temperature, water pressure drop, etc. deviate from the schedule, manufacturer shall submit updated capacity as well as computational fluid dynamic modeling demonstrating that any changes do not impact the air distribution in a room that would cause a detriment to the PMV and ADPI rating from the design conditions. Manufacturer shall have factory testing facility available to perform performance test of units in accordance with said standard, as required. Upon request, up to 1% of units for the project can be tested in accordance with the standard. Request will be made with order and prior to shipment of chilled sails. Engineer will have the option of witnessing this test.

7. Water connections shall be shipped sealed to limit the introduction of dust and dirt during shipping and construction.

PART 3 EXECUTION

3.1 EXAMINATION

A. Hydronic Radiant Ceiling Panel Heaters:

1. Examine areas to receive radiant heating units for compliance with requirements for installation tolerances and other conditions affecting performance.

2. Examine roughing-in for hydronic piping connections to verify actual locations prior to installation.

3. Ensure surfaces in contact with radiant heating panels are free of burrs and sharp protrusions.

4. Ensure surfaces are level and plumb.

5. Proceed with installation only after unsatisfactory conditions are corrected.

3.2 PREPARATION

A. Clean all surfaces prior to installation.

3.3 INSTALLATION

A. Install in accordance with manufacturer's recommendations.

B. Hydronic Radiant Ceiling Panel Heaters:

1. Install level and plumb.

2. Suspend from structure.

3. Support in grid-type suspended ceiling using grid as support element as follows:

   a. Install a minimum of four ceiling support system rods or wires for each panel, located not more than 6 inches from panel corners.

   b. Fasten support clips to panel and to ceiling grid members at or near each panel corner with clips designed for the application.

   c. For panels of sizes less than ceiling grid, install as indicated on reflected ceiling plan(s) or center of acoustical panel, and support panels independently with at least two 3/4 inch metal channels spanning and secured to ceiling tees.

   d. Install at least one independent support rod or wire from structure to tab on panel with breaking strength of the weight of panel at a safety factor of 3.

4. Unless otherwise indicated, install shutoff valve and union or flange at each connection.

5. Provide tamper-proof, balancing valve with memory stop on return piping.

6. Provide float operated automatic air vents with stop valve.

3.4 FIELD QUALITY CONTROL

A. Provide manufacturer's field representative to test, inspect, instruct, and observe.

B. Hydronic Radiant Ceiling Panel Heaters:

1. Inspect for damage to finish.

2. Repair damaged finish to match original finish.

3. Perform the following field tests, inspections, and prepare test reports:

   a. Leak Test:

      1) After installation, fill water tubes, and test for leaks.

      2) Repair leaks and retest until no leaks exist.

   b. Test and adjust controls and safeties.

4. Remove and replace damaged and malfunctioning controls and equipment and retest as specified above.

3.5 CLEANING

A. Radiant Ceiling Panel Heaters: Remove paint splatters, other spots, dirt, and debris.

3.6 PROTECTION

A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Electrical demolition.

1.2 RELATED REQUIREMENTS

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. Materials and equipment for patching and extending work: As specified in individual sections.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify field measurements and circuiting arrangements are as indicated.

B. Verify that abandoned wiring and equipment serve only abandoned facilities.

C. Demolition drawings are based on casual field observation and existing record documents.

D. Report discrepancies to Engineer before disturbing existing installation.

E. Beginning of demolition means installer accepts existing conditions.

3.2 PREPARATION

A. Disconnect electrical systems in walls, floors, and ceilings to be removed.

B. Coordinate utility service outages with utility company.

C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.

D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.

1. Obtain permission from Nanuet Union Free School District at least 24 hours before partially or completely disabling system.

2. Make temporary connections to maintain service in areas adjacent to work area.

E. Existing Telephone System: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.

1. Notify Nanuet Union Free School District at least 24 hours before partially or completely disabling system.

2. Notify telephone utility company at least 24 hours before partially or completely disabling system.

3. Make temporary connections to maintain service in areas adjacent to work area.

3.3 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

A. Perform work for removal and disposal of equipment and materials containing toxic substances regulated under the Federal Toxic Substances Control Act (TSCA) in accordance with applicable federal, state, and local regulations. Applicable equipment and materials include, but are not limited to:

1. PCB-containing electrical equipment, including transformers, capacitors, and switches.

2. PCB- and DEHP-containing lighting ballasts.

3. Mercury-containing lamps and tubes, including fluorescent lamps, high intensity discharge (HID), arc lamps, ultra-violet, high pressure sodium, mercury vapor, ignitron tubes, neon, and incandescent.

B. Remove, relocate, and extend existing installations to accommodate new construction.

C. Remove abandoned wiring to source of supply.

D. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.

E. Maintain access to existing electrical installations that remain active. Modify installation or provide access panel as appropriate.

F. Extend existing installations using materials and methods compatible with existing electrical installations, or as specified.

3.4 CLEANING AND REPAIR

A. Clean and repair existing materials and equipment that remain or that are to be reused.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Single conductor building wire.

B. Armored cable.

C. Metal-clad cable.

D. Wiring connectors.

E. Electrical tape.

F. Heat shrink tubing.

G. Wire pulling lubricant.

1.2 REFERENCE STANDARDS

A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire; 2013 (Reapproved 2018).

B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft; 2023.

C. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation; 2004 (Reapproved 2020).

D. ASTM D3005 - Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape; 2017.

E. ASTM D4388 - Standard Specification for Nonmetallic Semi-Conducting and Electrically Insulating Rubber Tapes; 2020.

F. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

G. NEMA WC 70 - Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy; 2021.

H. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

I. UL 44 - Thermoset-Insulated Wires and Cables; Current Edition, Including All Revisions.

J. UL 83 - Thermoplastic-Insulated Wires and Cables; Current Edition, Including All Revisions.

K. UL 486A-486B - Wire Connectors; Current Edition, Including All Revisions.

L. UL 486C - Splicing Wire Connectors; Current Edition, Including All Revisions.

M. UL 486D - Sealed Wire Connector Systems; Current Edition, Including All Revisions.

N. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.

2. Coordinate with electrical equipment installed under other sections to provide terminations suitable for use with the conductors to be installed.

3. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for conductors and cables, including detailed information on materials, construction, ratings, listings, and available sizes, configurations, and stranding.

B. Project Record Documents: Record actual installed circuiting arrangements. Record actual routing for underground circuits.

1.5 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

1.7 FIELD CONDITIONS

A. Do not install or otherwise handle thermoplastic-insulated conductors at temperatures lower than 14 degrees F, unless otherwise permitted by manufacturer's instructions. When installation below this temperature is unavoidable, notify Engineer and obtain direction before proceeding with work.

PART 2 PRODUCTS

2.1 CONDUCTOR AND CABLE APPLICATIONS

A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.

B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.

C. Nonmetallic-sheathed cable is not permitted.

D. Underground feeder and branch-circuit cable is not permitted.

E. Service entrance cable is not permitted.

F. MC cable is not permitted, except as indicated below:.

1. Where not otherwise restricted, may be used:

   a. Where concealed above accessible ceilings for final connections from junction boxes to luminaires.

   b. Where concealed in hollow stud walls, above accessible ceilings, and under raised floors for branch circuits up to 20 A.

      1) Exception: Provide single conductor building wire in raceway for circuit homerun from first outlet to panelboard.

2. In addition to other applicable restrictions, may not be used:

   a. Where exposed to view.

   b. Where exposed to damage.

   c. For damp, wet, or corrosive locations, unless provided with a PVC jacket listed as suitable for those locations.

2.2 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

A. Provide products that comply with requirements of NFPA 70.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Provide new conductors and cables manufactured not more than one year prior to installation.

D. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.

E. Comply with NEMA WC 70.

F. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.

G. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.

H. Conductors for Grounding and Bonding: Also comply with Section 260526.

I. Conductors and Cables Installed Exposed in Spaces Used for Environmental Air (only where specifically permitted): Plenum rated, listed and labeled as suitable for use in return air plenums.

J. Conductor Material:

1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.

2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.

K. Minimum Conductor Size:

1. Branch Circuits: 12 AWG.

a. Exceptions:

1) 20 A, 120 V circuits longer than 75 feet: 10 AWG, for voltage drop.

2) 20 A, 120 V circuits longer than 150 feet: 8 AWG, for voltage drop.

L. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

M. Conductor Color Coding:

1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.

2. Color Coding Method: Integrally colored insulation.

a. Conductors size 4 AWG and larger may have black insulation color coded using vinyl color coding electrical tape.

3. Color Code:

a. 480Y/277 V, 3 Phase, 4 Wire System:

1) Phase A: Brown.

2) Phase B: Orange.

3) Phase C: Yellow.

4) Neutral/Grounded: Gray.

b. 208Y/120 V, 3 Phase, 4 Wire System:

1) Phase A: Black.

2) Phase B: Red.

3) Phase C: Blue.

4) Neutral/Grounded: White.

c. Equipment Ground, All Systems: Green.

d. Travelers for 3-Way and 4-Way Switching: Pink.

e. For control circuits, comply with manufacturer's recommended color code.

2.3 SINGLE CONDUCTOR BUILDING WIRE

A. Manufacturers:

1. Copper Building Wire:

a. Cerro Wire LLC: www.cerrowire.com/#sle.

b. Encore Wire Corporation: www.encorewire.com/#sle.

c. Southwire Company: www.southwire.com/#sle.

B. Description: Single conductor insulated wire.

C. Conductor Stranding:

1. Feeders and Branch Circuits:

a. Size 10 AWG and Smaller: Solid.

b. Size 8 AWG and Larger: Stranded.

2. Control Circuits: Stranded.

D. Insulation Voltage Rating: 600 V.

E. Insulation:

1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2, except as indicated below.

a. Installed Underground: Type XHHW-2.

b. Fixture Wiring Within Luminaires: Type TFFN/TFN for luminaires with labeled maximum temperature of 90 degrees C; Approved suitable type for luminaires with labeled maximum temperature greater than 90 degrees C.

2.4 WIRING CONNECTORS

A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.

B. Connectors for Grounding and Bonding: Comply with Section 260526.

C. Wiring Connectors for Splices and Taps:

1. Copper Conductors Size 8 AWG and Smaller: Use twist-on insulated spring connectors.

2. Copper Conductors Size 6 AWG and Larger: Use mechanical connectors or compression connectors.

D. Wiring Connectors for Terminations:

1. Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.

2. Provide compression adapters for connecting conductors to equipment furnished with mechanical lugs when only compression connectors are specified.

3. Where over-sized conductors are larger than the equipment terminations can accommodate, provide connectors suitable for reducing to appropriate size, but not less than required for the rating of the overcurrent protective device.

4. Provide motor pigtail connectors for connecting motor leads in order to facilitate disconnection.

5. Copper Conductors Size 8 AWG and Larger: Use mechanical connectors or compression connectors where connectors are required.

E. Do not use insulation-piercing or insulation-displacement connectors designed for use with conductors without stripping insulation.

F. Do not use push-in wire connectors as a substitute for twist-on insulated spring connectors.

G. Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F for standard applications and 302 degrees F for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.

1. Manufacturers:

a. 3M: www.3m.com/#sle.

b. Ideal Industries, Inc: www.idealindustries.com/#sle.

c. NSI Industries LLC: www.nsiindustries.com/#sle.

H. Mechanical Connectors: Provide bolted type or set-screw type.

1. Manufacturers:

   a. Burndy: www.burndy.com.

   b. Ilsco: www.ilsco.com/#sle.

   c. Thomas & Betts Corporation: www.tnb.com/#sle.

I. Compression Connectors: Provide circumferential type or hex type crimp configuration.

1. Manufacturers:

   a. Burndy: www.burndy.com.

   b. Ilsco: www.ilsco.com/#sle.

   c. Thomas & Betts Corporation: www.tnb.com/#sle.

J. Crimped Terminals: Nylon-insulated, with insulation grip and terminal configuration suitable for connection to be made.

1. Manufacturers:

   a. Burndy: www.burndy.com.

   b. Ilsco: www.ilsco.com/#sle.

   c. Thomas & Betts Corporation: www.tnb.com/#sle.

2.5 ACCESSORIES

A. Electrical Tape:

1. Manufacturers:

   a. 3M: www.3m.com/#sle.

   b. Plymouth Rubber Europa: www.plymouthrubber.com/#sle.

2. Vinyl Color Coding Electrical Tape: Integrally colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 221 degrees F.

3. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F and suitable for continuous temperature environment up to 221 degrees F.

4. Rubber Splicing Electrical Tape: Ethylene Propylene Rubber (EPR) tape, complying with ASTM D4388; minimum thickness of 30 mil; suitable for continuous temperature environment up to 194 degrees F and short-term 266 degrees F overload service.

5. Electrical Filler Tape: Rubber-based insulating moldable putty, minimum thickness of 125 mil; suitable for continuous temperature environment up to 176 degrees F.

6. Moisture Sealing Electrical Tape: Insulating mastic compound laminated to flexible, all-weather vinyl backing; minimum thickness of 90 mil.

B. Heat Shrink Tubing: Heavy-wall, split-resistant, with factory-applied adhesive; rated 600 V; suitable for direct burial applications; listed as complying with UL 486D.

1. Manufacturers:

a. 3M: www.3m.com/#sle.

b. Burndy: www.burndy.com.

c. Thomas & Betts Corporation: www.tnb.com/#sle.

C. Wire Pulling Lubricant: Listed; suitable for use with the conductors or cables to be installed and suitable for use at the installation temperature.

1. Manufacturers:

a. 3M: www.3m.com/#sle.

b. American Polywater Corporation: www.polywater.com/#sle.

c. Ideal Industries, Inc: www.idealindustries.com/#sle.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that interior of building has been protected from weather.

B. Verify that work likely to damage wire and cable has been completed.

C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.

D. Verify that field measurements are as indicated.

E. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

3.3 INSTALLATION

A. Circuiting Requirements:

1. Unless dimensioned, circuit routing indicated is diagrammatic.

2. When circuit destination is indicated without specific routing, determine exact routing required.

3. Arrange circuiting to minimize splices.

4. Include circuit lengths required to install connected devices within 10 ft of location indicated.

5. Maintain separation of Class 1, Class 2, and Class 3 remote-control, signaling, and power-limited circuits in accordance with NFPA 70.

6. Maintain separation of wiring for emergency systems in accordance with NFPA 70.

7. Circuiting Adjustments: Unless otherwise indicated, when branch circuits are indicated as separate, combining them together in a single raceway is not permitted.

   a. Provide no more than six current-carrying conductors in a single raceway. Dedicated neutral conductors are considered current-carrying conductors.

   b. Increase size of conductors as required to account for ampacity derating.

   c. Size raceways, boxes, etc. to accommodate conductors.

8. Common Neutrals: Unless otherwise indicated, sharing of neutral/grounded conductors among up to three single phase branch circuits of different phases installed in the same raceway is not permitted. Provide dedicated neutral/grounded conductor for each individual branch circuit.

B. Install products in accordance with manufacturer's instructions.

C. Perform work in accordance with NECA 1 (general workmanship).

D. Installation in Raceway:

1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.

2. Pull all conductors and cables together into raceway at same time.

3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.

4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.

E. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.

F. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide

independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.

1. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conductors and cables to lay on ceiling tiles.

2. Installation in Vertical Raceways: Provide supports where vertical rise exceeds permissible limits.

G. Install conductors with a minimum of 12 inches of slack at each outlet.

H. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.

I. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.

J. Make wiring connections using specified wiring connectors.

1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.

2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.

3. Do not remove conductor strands to facilitate insertion into connector.

4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminates. Do not use wire brush on plated connector surfaces.

5. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.

6. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.

K. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.

1. Dry Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.

a. For taped connections, first apply adequate amount of rubber splicing electrical tape or electrical filler tape, followed by outer covering of vinyl insulating electrical tape.

2. Damp Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.

a. For connections with insulating covers, apply outer covering of moisture sealing electrical tape.

b. For taped connections, follow same procedure as for dry locations but apply outer covering of moisture sealing electrical tape.

3. Wet Locations: Use heat shrink tubing.

L. Insulate ends of spare conductors using vinyl insulating electrical tape.

M. Field-Applied Color Coding: Where vinyl color coding electrical tape is used in lieu of integrally colored insulation as permitted in Part 2 under "Color Coding", apply half overlapping turns of tape at each termination and at each location conductors are accessible.

N. Identify conductors and cables in accordance with Section 260553.

O. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 078400.

P. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

END OF SECTION

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Grounding and bonding requirements.

B. Conductors for grounding and bonding.

C. Connectors for grounding and bonding.

D. Ground bars.

E. Ground rod electrodes.

1.2 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

B. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems; 2021.

C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

D. UL 467 - Grounding and Bonding Equipment; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Verify exact locations of underground metal water service pipe entrances to building.

2. Coordinate the work with other trades to provide steel reinforcement complying with specified requirements for concrete-encased electrode.

3. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for grounding and bonding system components.

1.5 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 GROUNDING AND BONDING REQUIREMENTS

A. Do not use products for applications other than as permitted by NFPA 70 and product listing.

B. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.

C. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

D. Bonding and Equipment Grounding:

1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.

2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.

3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.

4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) bus.

6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.

2.2 GROUNDING AND BONDING COMPONENTS

A. General Requirements:

1. Provide products listed, classified, and labeled as suitable for the purpose intended.

2. Provide products listed and labeled as complying with UL 467 where applicable.

B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 260526:

1. Use insulated copper conductors unless otherwise indicated.

    a. Exceptions:

        1) Use bare copper conductors where installed underground in direct contact with earth.

        2) Use bare copper conductors where directly encased in concrete (not in raceway).

C. Connectors for Grounding and Bonding:

1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.

2. Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.

3. Unless otherwise indicated, use mechanical connectors, compression connectors, or exothermic welded connections for accessible connections.

4. Manufacturers - Mechanical and Compression Connectors:

    a. Advanced Lightning Technology (ALT): www.altfab.com/#sle.

    b. Burndy: www.burndy.com.

    c. Harger Lightning & Grounding: www.harger.com/#sle.

    d. Thomas & Betts Corporation: www.tnb.com/#sle.

5. Manufacturers - Exothermic Welded Connections:

    a. Burndy: www.burndy.com.

    b. Cadweld, a brand of Erico International Corporation: www.erico.com/#sle.

    c. thermOweld, subsidiary of Continental Industries; division of Burndy LLC : www.thermoweld.com/#sle.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that work likely to damage grounding and bonding system components has been completed.

B. Verify that field measurements are as indicated.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Make grounding and bonding connections using specified connectors.

1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.

2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.

3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.

4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.

5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.

D. Identify grounding and bonding system components in accordance with Section 260553.

3.3 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS except Section 4.

B. Perform inspections and tests listed in NETA ATS, Section 7.13.

C. Perform ground electrode resistance tests under normally dry conditions. Precipitation within the previous 48 hours does not constitute normally dry conditions.

D. Investigate and correct deficiencies where measured ground resistances do not comply with specified requirements.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Support and attachment requirements and components for equipment, conduit, cable, boxes, and other electrical work.

1.2 REFERENCE STANDARDS

A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2023.

D. MFMA-4 - Metal Framing Standards Publication; 2004.

E. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

G. UL 5B - Strut-Type Channel Raceways and Fittings; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.

2. Coordinate the work with other trades to provide additional framing and materials required for installation.

3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.

4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.

5. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

B. Sequencing:

1. Do not install products on or provide attachment to concrete surfaces until concrete has fully cured in accordance with Section 033000.

1.4 QUALITY ASSURANCE

A. Comply with NFPA 70.

B. Comply with applicable building code.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 SUPPORT AND ATTACHMENT COMPONENTS

A. General Requirements:

1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of electrical work.

2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.

3. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported with a minimum safety factor of 1.5. Include consideration for vibration, equipment operation, and shock loads where applicable.

4. Do not use products for applications other than as permitted by NFPA 70 and product listing.

5. Do not use wire, chain, perforated pipe strap, or wood for permanent supports unless specifically indicated or permitted.

6. Steel Components: Use corrosion resistant materials suitable for the environment where installed.

a. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.

b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel, stainless steel, or approved equivalent unless otherwise indicated.

c. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.

d. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.

e. Provide field galvanizing or equivalent to all ends of field-cut materials (struts, hangers, and rods).

f. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections

B. Conduit and Cable Supports: Straps, clamps, etc. suitable for the conduit or cable to be supported.

1. Conduit Straps: One-hole or two-hole type; steel or malleable iron.

2. Conduit Clamps: Bolted type unless otherwise indicated.

3. Manufacturers:

a. Cooper Crouse-Hinds, a division of Eaton Corporation: www.cooperindustries.com/#sle.

b. Erico International Corporation: www.erico.com/#sle.

c. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com/#sle.

d. Thomas & Betts Corporation: www.tnb.com/#sle.

C. Outlet Box Supports: Hangers, brackets, etc. suitable for the boxes to be supported.

1. Manufacturers:

a. Cooper Crouse-Hinds, a division of Eaton Corporation: www.cooperindustries.com/#sle.

b. Erico International Corporation: www.erico.com/#sle.

c. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com/#sle.

d. Thomas & Betts Corporation: www.tnb.com/#sle.

D. Metal Channel (Strut) Framing Systems: Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.

1. Comply with MFMA-4.

2. Channel (Strut) Used as Raceway (only where specifically indicated): Listed and labeled as complying with UL 5B.

3. Channel Material:

a. Indoor Dry Locations: Use painted steel, zinc-plated steel, or galvanized steel.

b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel.

4. Minimum Channel Thickness: Steel sheet, 12 gauge, 0.1046 inch.

5. Minimum Channel Dimensions: 1-5/8 inch width by 13/16 inch height.

6. Manufacturers:

a. Cooper B-Line, a division of Eaton Corporation: www.cooperindustries.com/#sle.

b. Thomas & Betts Corporation: www.tnb.com/#sle.

c. Unistrut, a brand of Atkore International Inc: www.unistrut.com/#sle.

d. Source Limitations: Furnish channels (struts) and associated fittings, accessories, and hardware produced by a single manufacturer.

E. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.

1. Minimum Size, Unless Otherwise Indicated or Required:

a. Equipment Supports: 1/2 inch diameter.

b. Busway Supports: 1/2 inch diameter.

c. Single Conduit up to 1 inch (27 mm) trade size: 1/4 inch diameter.

d. Single Conduit larger than 1 inch (27 mm) trade size: 3/8 inch diameter.

e. Trapeze Support for Multiple Conduits: 3/8 inch diameter.

f. Outlet Boxes: 1/4 inch diameter.

g. Luminaires: 1/4 inch diameter.

F. Anchors and Fasteners:

1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.

2. Concrete: Use preset concrete inserts, expansion anchors, or screw anchors.

3. Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.

4. Hollow Masonry: Use toggle bolts.

5. Hollow Stud Walls: Use toggle bolts.

6. Steel: Use beam clamps, machine bolts, or welded threaded studs.

7. Sheet Metal: Use sheet metal screws.

8. Wood: Use wood screws.

9. Plastic and lead anchors are not permitted.

10. Powder-actuated fasteners are not permitted.

a. Where approved by Engineer.

b. Use only threaded studs; do not use pins.

11. Hammer-driven anchors and fasteners are not permitted.

12. Preset Concrete Inserts: Continuous metal channel (strut) and spot inserts specifically designed to be cast in concrete ceilings, walls, and floors.

    a. Comply with MFMA-4.

    b. Channel Material: Use galvanized steel.

    c. Minimum Channel Thickness: Steel sheet, 12 gauge, 0.1046 inch minimum base metal thickness.

    d. Manufacturer: Same as manufacturer of metal channel (strut) framing system.

13. Post-Installed Concrete and Masonry Anchors: Evaluated and recognized by ICC Evaluation Service, LLC (ICC-ES) for compliance with applicable building code.

14. Manufacturers - Mechanical Anchors:

    a. Hilti, Inc: www.us.hilti.com/#sle.

    b. ITW Red Head, a division of Illinois Tool Works, Inc: www.itwredhead.com/#sle.

    c. Powers Fasteners, Inc: www.powers.com/#sle.

    d. Simpson Strong-Tie Company Inc: www.strongtie.com/#sle.

15. Manufacturers - Powder-Actuated Fastening Systems:

    a. Hilti, Inc: www.us.hilti.com/#sle.

    b. ITW Ramset, a division of Illinois Tool Works, Inc: www.ramset.com/#sle.

    c. Powers Fasteners, Inc: www.powers.com/#sle.

    d. Simpson Strong-Tie Company Inc: www.strongtie.com/#sle.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that mounting surfaces are ready to receive support and attachment components.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Install anchors and fasteners in accordance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.

D. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.

E. Unless specifically indicated or approved by Engineer, do not provide support from suspended ceiling support system or ceiling grid.

F. Unless specifically indicated or approved by Engineer, do not provide support from roof deck.

G. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.

H. Equipment Support and Attachment:

1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.

2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.

3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.

4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.

I. Conduit Support and Attachment: Also comply with Section 260533.13.

J. Interior Luminaire Support and Attachment: Also comply with Section 265100.

K. Exterior Luminaire Support and Attachment: Also comply with Section 265600.

L. Preset Concrete Inserts: Use manufacturer provided closure strips to inhibit concrete seepage during concrete pour.

M. Secure fasteners according to manufacturer's recommended torque settings.

N. Remove temporary supports.

O. Identify independent electrical component support wires above accessible ceilings (only where specifically indicated or permitted) with color distinguishable from ceiling support wires in accordance with NFPA 70.

3.3 FIELD QUALITY CONTROL

A. Inspect support and attachment components for damage and defects.

B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.

C. Correct deficiencies and replace damaged or defective support and attachment components.

END OF SECTION

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Galvanized steel rigid metal conduit (RMC).

B. Flexible metal conduit (FMC).

C. Liquidtight flexible metal conduit (LFMC).

D. Electrical metallic tubing (EMT).

E. Conduit fittings.

F. Accessories.

1.2 REFERENCE STANDARDS

A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC); 2020.

B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

C. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT); 2020.

D. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.

E. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Conduit; 2020.

F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

G. UL 1 - Flexible Metal Conduit; Current Edition, Including All Revisions.

H. UL 6 - Electrical Rigid Metal Conduit-Steel; Current Edition, Including All Revisions.

I. UL 360 - Liquid-Tight Flexible Metal Conduit; Current Edition, Including All Revisions.

J. UL 514B - Conduit, Tubing, and Cable Fittings; Current Edition, Including All Revisions.

K. UL 797 - Electrical Metallic Tubing-Steel; Current Edition, Including All Revisions.

L. UL 1203 - Explosion-Proof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate minimum sizes of conduits with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.

2. Coordinate the arrangement of conduits with structural members, ductwork, piping, equipment and other potential conflicts installed under other sections or by others.

3. Verify exact conduit termination locations required for boxes, enclosures, and equipment installed under other sections or by others.

4. Coordinate the work with other trades to provide roof penetrations that preserve the integrity of the roofing system and do not void the roof warranty.

5. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

B. Sequencing:

1. Do not begin installation of conductors and cables until installation of conduit is complete between outlet, junction and splicing points.

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduits and fittings.

B. Project Record Documents: Record actual routing for conduits installed underground, conduits embedded within concrete slabs, and conduits 2-inch (53 mm) trade size and larger.

1.5 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store conduit and fittings in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 CONDUIT APPLICATIONS

A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.

B. Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies,

comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use galvanized steel rigid metal conduit.

C. Underground:

1. Under Slab on Grade: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), PVC-coated galvanized steel rigid metal conduit, or rigid PVC conduit.

2. Exterior, Direct-Buried: Use galvanized steel rigid metal conduit or rigid PVC conduit.

3. Exterior, Embedded Within Concrete: Use galvanized steel rigid metal conduit or rigid PVC conduit.

4. Where rigid polyvinyl (PVC) conduit is provided, transition to galvanized steel rigid metal conduit where emerging from underground.

5. Where rigid polyvinyl (PVC) conduit larger than 2 inch (53 mm) trade size is provided, use galvanized steel rigid metal conduit elbows for bends.

6. Where steel conduit is installed in direct contact with earth where soil has a resistivity of less than 2000 ohm-centimeters or is characterized as severely corrosive based on soils report or local experience, use corrosion protection tape to provide supplementary corrosion protection or use PVC-coated galvanized steel rigid metal conduit.

D. Embedded Within Concrete:

1. Within Slab on Grade: Not permitted.

E. Concealed Within Masonry Walls: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or electrical metallic tubing (EMT).

F. Concealed Within Hollow Stud Walls: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or electrical metallic tubing (EMT).

G. Concealed Above Accessible Ceilings: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or electrical metallic tubing (EMT).

H. Interior, Damp or Wet Locations: Use galvanized steel rigid metal conduit.

I. Exposed, Interior, Not Subject to Physical Damage: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or electrical metallic tubing (EMT).

J. Exposed, Interior, Subject to Physical Damage: Use galvanized steel rigid metal conduit.

1. Locations subject to physical damage include, but are not limited to:

a. Where exposed below 8 feet, except within electrical and communication rooms or closets.

K. Exposed, Interior, Subject to Severe Physical Damage: Use galvanized steel rigid metal conduit (RMC).

L. Exposed, Exterior: Use galvanized steel rigid metal conduit or PVC-coated galvanized steel rigid metal conduit.

M. Concealed, Exterior, Not Embedded in Concrete or in Contact With Earth: Use galvanized steel rigid metal conduit.

N. Hazardous (Classified) Locations: Use galvanized steel rigid metal conduit.

O. Connections to Luminaires Above Accessible Ceilings: Use flexible metal conduit.

1. Maximum Length: 6 feet.

P. Connections to Vibrating Equipment:

1. Dry Locations: Use flexible metal conduit.

2. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit.

3. Maximum Length: 6 feet unless otherwise indicated.

4. Vibrating equipment includes, but is not limited to:

a. Transformers.

b. Motors.

Q. Fished in Existing Walls, Where Necessary: Use flexible metal conduit (FMC) or galvanized steel electrical metallic tubing (EMT).

2.2 CONDUIT REQUIREMENTS

A. Existing Work: Where existing conduits are indicated to be reused, they may be reused only where they comply with specified requirements, are free from corrosion, and integrity is verified by pulling mandrel through them.

B. Communications Systems Conduits: Also comply with Section 271000.

C. Fittings for Grounding and Bonding: Also comply with Section 260526.

D. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.

E. Provide products listed, classified, and labeled as suitable for the purpose intended.

F. Minimum Conduit Size, Unless Otherwise Indicated:

1. Branch Circuits: 3/4 inch (21 mm) trade size.

2. Branch Circuit Homeruns: 3/4 inch (21 mm) trade size.

3. Control Circuits: 3/4 inch (21 mm) trade size.

4. Flexible Connections to Luminaires: 3/8 inch (12 mm) trade size.

5. Underground, Interior: 1 inch (27 mm) trade size.

6. Underground, Exterior: 1 inch (27 mm) trade size.

G. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.3 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

A. Manufacturers:

1. Allied Tube & Conduit, a division of Atkore International: www.alliedeg.com/#sle.

2. Nucor Tubular Products: www.nucortubular.com/#sle.

3. Wheatland Tube, a division of Zekelman Industries: www.wheatland.com/#sle.

B. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.

C. Fittings:

1. Manufacturers:

a. Bridgeport Fittings Inc: www.bptfittings.com/#sle.

b. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com/#sle.

c. Thomas & Betts Corporation: www.tnb.com/#sle.

2. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.

3. Hazardous (Classified) Locations: Use fittings listed and labeled as complying with UL 1203 for the classification of the installed location.

4. Material: Use steel or malleable iron.

a. Do not use die cast zinc fittings.

5. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.4 FLEXIBLE METAL CONDUIT (FMC)

A. Manufacturers:

1. AFC Cable Systems, Inc: www.afcweb.com.

2. Electri-Flex Company: www.electriflex.com.

3. International Metal Hose: www.metalhose.com.

B. Description: NFPA 70, Type FMC standard wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems to be used.

C. Fittings:

1. Manufacturers:

a. Bridgeport Fittings Inc: www.bptfittings.com/#sle.

b. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com/#sle.

c. Thomas & Betts Corporation: www.tnb.com/#sle.

2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.

3. Material: Use steel or malleable iron.

a. Do not use die cast zinc fittings.

2.5 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

A. Manufacturers:

1. AFC Cable Systems, Inc: www.afcweb.com.

2. Electri-Flex Company: www.electriflex.com.

3. International Metal Hose: www.metalhose.com.

B. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.

C. Fittings:

1. Manufacturers:

a. Bridgeport Fittings Inc: www.bptfittings.com/#sle.

b. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com/#sle.

c. Thomas & Betts Corporation: www.tnb.com/#sle.

2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.

3. Material: Use steel or malleable iron.

2.6 ELECTRICAL METALLIC TUBING (EMT)

A. Manufacturers:

1. Allied Tube & Conduit: www.alliedeg.com.

2. Nucor Tubular Products: www.nucortubular/#sle.

3. Wheatland Tube Company: www.wheatland.com.

B. Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.

C. Fittings:

1. Manufacturers:

a. Bridgeport Fittings Inc: www.bptfittings.com/#sle.

b. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com/#sle.

c. Thomas & Betts Corporation: www.tnb.com/#sle.

2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.

3. Material: Use steel or malleable iron.

4. Connectors and Couplings: Use compression (gland) or set-screw type.

a. Do not use indenter type connectors and couplings.

5. Damp or Wet Locations (where permitted): Use fittings listed for use in wet locations.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that mounting surfaces are ready to receive conduits.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.

D. Conduit Routing:

1. Unless dimensioned, conduit routing indicated is diagrammatic.

2. When conduit destination is indicated without specific routing, determine exact routing required.

3. Conceal all conduits unless specifically indicated to be exposed.

4. Conduits in the following areas may be exposed, unless otherwise indicated:

   a. Electrical rooms.

   b. Mechanical equipment rooms.

   c. Within joists in areas with no ceiling.

5. Unless otherwise approved, do not route conduits exposed:

   a. Across floors.

   b. Across roofs.

   c. Across top of parapet walls.

   d. Across building exterior surfaces.

6. Conduits installed underground or embedded in concrete may be routed in the shortest possible manner unless otherwise indicated. Route all other conduits parallel or perpendicular to building structure and surfaces, following surface contours where practical.

7. Arrange conduit to maintain adequate headroom, clearances, and access.

8. Arrange conduit to provide no more than the equivalent of four 90 degree bends between pull points.

9. Arrange conduit to provide no more than 150 feet between pull points.

10. Route conduits above water and drain piping where possible.

11. Arrange conduit to prevent moisture traps. Provide drain fittings at low points and at sealing fittings where moisture may collect.

12. Maintain minimum clearance of 6 inches between conduits and piping for other systems.

13. Maintain minimum clearance of 12 inches between conduits and hot surfaces. This includes, but is not limited to:

    a. Heaters.

    b. Hot water piping.

    c. Flues.

14. Group parallel conduits in the same area together on a common rack.

E. Conduit Support:

1. Secure and support conduits in accordance with NFPA 70 and Section 260529 using suitable supports and methods approved by the authority having jurisdiction.

2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.

3. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.

4. Use conduit strap to support single surface-mounted conduit.

   a. Use clamp back spacer with conduit strap for damp and wet locations to provide space between conduit and mounting surface.

5. Use metal channel (strut) with accessory conduit clamps to support multiple parallel surface-mounted conduits.

6. Use conduit clamp to support single conduit from beam clamp or threaded rod.

7. Use trapeze hangers assembled from threaded rods and metal channel (strut) with accessory conduit clamps to support multiple parallel suspended conduits.

8. Use non-penetrating rooftop supports to support conduits routed across rooftops (only where approved).

9. Use of spring steel conduit clips for support of conduits is not permitted.

   a. Support of electrical metallic tubing (EMT) up to 1 inch (27 mm) trade size concealed above accessible ceilings and within hollow stud walls.

10. Use of wire for support of conduits is not permitted.

11. Where conduit support intervals specified in NFPA 70 and NECA standards differ, comply with the most stringent requirements.

F. Connections and Terminations:

1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.

2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.

3. Use suitable adapters where required to transition from one type of conduit to another.

4. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.

5. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.

6. Where spare conduits stub up through concrete floors and are not terminated in a box or enclosure, provide threaded couplings equipped with threaded plugs set flush with finished floor.

7. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.

8. Secure joints and connections to provide maximum mechanical strength and electrical continuity.

G. Penetrations:

1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.

2. Make penetrations perpendicular to surfaces unless otherwise indicated.

3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.

4. Conceal bends for conduit risers emerging above ground.

5. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.

6. Provide suitable modular seal where conduits penetrate exterior wall below grade.

7. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.

8. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty. Include proposed locations of penetrations and methods for sealing with submittals.

9. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 078400.

H. Underground Installation:

1. Provide trenching and backfilling.

2. Minimum Cover, Unless Otherwise Indicated or Required:

a. Underground, Exterior: 24 inches.

b. Under Slab on Grade: 12 inches to bottom of slab.

3. Provide underground warning tape in accordance with Section 260553 along entire conduit length for service entrance where not concrete-encased.

I. Hazardous (Classified) Locations: Where conduits cross boundaries of hazardous (classified) locations, provide sealing fittings located as indicated or in accordance with NFPA 70.

J. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:

1. Where conduits cross structural joints intended for expansion, contraction, or deflection.

2. Where calculated in accordance with NFPA 70 for rigid polyvinyl chloride (PVC) conduit installed above ground to compensate for thermal expansion and contraction.

3. Where conduits are subject to earth movement by settlement or frost.

K. Condensation Prevention: Where conduits cross barriers between areas of potential substantial temperature differential, provide sealing fitting or approved sealing compound at an accessible point near the penetration to prevent condensation. This includes, but is not limited to:

1. Where conduits pass from outdoors into conditioned interior spaces.

2. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.

L. Provide pull string in all empty conduits and in conduits where conductors and cables are to be installed by others. Leave minimum slack of 12 inches at each end.

M. Provide grounding and bonding in accordance with Section 260526.

N. Identify conduits in accordance with Section 260553.

3.3 FIELD QUALITY CONTROL

A. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.

B. Correct deficiencies and replace damaged or defective conduits.

3.4 CLEANING

A. Clean interior of conduits to remove moisture and foreign matter.

3.5 PROTECTION

A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.

B. Run raceways concealed in finished areas. Raceways may be run exposed in unfinished areas such as mechanical and electrical rooms.

C. Flexible metal conduit may be used where conduit and wire installation requires "fishing" through confined chases.

D. Liquidtight flexible metal conduit may be used for final connections to equipment in wet or damp areas, maximum length six feet.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Outlet and device boxes up to 100 cubic inches, including those used as junction and pull boxes.

B. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches.

C. Underground boxes/enclosures.

1.2 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

B. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2016.

C. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.

D. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; 2013 (Reaffirmed 2020).

E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2020.

F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

G. SCTE 77 - Specifications for Underground Enclosure Integrity; 2023.

H. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.

I. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.

J. UL 508A - Industrial Control Panels; Current Edition, Including All Revisions.

K. UL 514A - Metallic Outlet Boxes; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.

2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.

3. Coordinate minimum sizes of boxes with the actual installed arrangement of conductors, clamps, support fittings, and devices, calculated according to NFPA 70.

4. Coordinate minimum sizes of pull boxes with the actual installed arrangement of connected conduits, calculated according to NFPA 70.

5. Coordinate the placement of boxes with millwork, furniture, devices, equipment, etc. installed under other sections or by others.

6. Coordinate the work with other trades to preserve insulation integrity.

7. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted boxes where indicated.

8. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for underground handhole enclosures, underground handhole enclosures, underground handhole enclosures, and underground handhole enclosures.

1. Underground Boxes/Enclosures: Include reports for load testing in accordance with SCTE 77 certified by a professional engineer or an independent testing agency upon request.

B. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

C. Project Record Documents: Record actual locations for underground handhole enclosures, underground handhole enclosures, underground handhole enclosures, underground handhole enclosures, and underground handhole enclosures.

D. Maintenance Materials: Furnish the following for Nanuet Union Free School District's use in maintenance of project.

1. Keys for Lockable Enclosures: Two of each different key.

1.5 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 BOXES

A. General Requirements:

1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.

2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.

3. Provide products listed, classified, and labeled as suitable for the purpose intended.

4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

5. Provide grounding terminals within boxes where equipment grounding conductors terminate.

B. Outlet and Device Boxes Up to 100 cubic inches, Including Those Used as Junction and Pull Boxes:

1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.

2. Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.

3. Use cast iron boxes or cast aluminum boxes where exposed galvanized steel rigid metal conduit is used.

4. Use suitable concrete type boxes where flush-mounted in concrete.

5. Use suitable masonry type boxes where flush-mounted in masonry walls.

6. Use raised covers suitable for the type of wall construction and device configuration where required.

7. Use shallow boxes where required by the type of wall construction.

8. Do not use "through-wall" boxes designed for access from both sides of wall.

9. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.

10. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.

11. Boxes for Supporting Luminaires and Ceiling Fans: Listed as suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.

12. Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes unless specifically indicated or permitted.

13. Minimum Box Size, Unless Otherwise Indicated:

    a. Wiring Devices (Other Than Communications Systems Outlets): 4 inch square by 1-1/2 inch deep (100 by 38 mm) trade size.

    b. Ceiling Outlets: 4 inch octagonal or square by 1-1/2 inch deep (100 by 38 mm) trade size.

14. Wall Plates: Comply with Section 262726.

15. Manufacturers:

    a. Cooper Crouse-Hinds, a division of Eaton Corporation: www.cooperindustries.com/#sle.

    b. Hubbell Incorporated; Bell Products: www.hubbell-rtb.com.

    c. Hubbell Incorporated; RACO Products: www.hubbell-rtb.com.

    d. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com/#sle.

    e. Thomas & Betts Corporation: www.tnb.com/#sle.

C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches:

1. Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E, or UL 508A.

2. NEMA 250 Environment Type, Unless Otherwise Indicated:

    a. Indoor Clean, Dry Locations: Type 1, painted steel.

    b. Outdoor Locations: Type 3R, painted steel.

3. Junction and Pull Boxes Larger Than 100 cubic inches:

    a. Provide screw-cover or hinged-cover enclosures unless otherwise indicated.

    b. Boxes 6 square feet and Larger: Provide sectionalized screw-cover or hinged-cover enclosures.

4. Cabinets and Hinged-Cover Enclosures, Other Than Junction and Pull Boxes:

a. Provide lockable hinged covers, all locks keyed alike unless otherwise indicated.

b. Back Panels: Painted steel, removable.

c. Terminal Blocks: Provide voltage/current ratings and terminal quantity suitable for purpose indicated, with 25 percent spare terminal capacity.

5. Finish for Painted Steel Enclosures: Manufacturer's standard grey unless otherwise indicated.

6. Manufacturers:

a. Cooper B-Line, a division of Eaton Corporation: www.cooperindustries.com/#sle.

b. Hoffman, a brand of Pentair Technical Products: www.hoffmanonline.com/#sle.

c. Hubbell Incorporated; Wiegmann Products: www.hubbell-wiegmann.com/#sle.

D. Underground Boxes/Enclosures:

1. Description: In-ground, open bottom boxes furnished with flush, non-skid covers with legend indicating type of service and stainless steel tamper resistant cover bolts.

2. Size: As indicated on drawings.

3. Depth: As required to extend below frost line to prevent frost upheaval, but not less than 12 inches.

4. Applications:

a. Do not use polymer concrete enclosures in areas subject to deliberate vehicular traffic.

5. Polymer Concrete Underground Boxes/Enclosures: Comply with SCTE 77.

a. Manufacturers:

1) Highline Products, a subsidiary of MacLean Power Systems: www.highlineproducts.com.

2) Hubbell Incorporated; Quazite Products: www.hubbellpowersystems.com/#sle.

3) Oldcastle Precast, Inc: www.oldcastleprecast.com/#sle.

b. Combination fiberglass/polymer concrete boxes/enclosures are acceptable.

c. Product(s):

1) MacLean Highline PHA Series: Straight wall, all-polymer concrete splice box/pull box; available Tier 8, Tier 15, and Tier 22 load ratings.

2) MacLean Highline CHA Series: Fiberglass/polymer concrete splice box/pull box; available Tier 8 and Tier 15 load ratings.

3) MacLean Highline CVA Series: Fiberglass/polymer concrete splice vault; available Tier 8, Tier 15, and Tier 22 load ratings.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that mounting surfaces are ready to receive boxes.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install boxes in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.

C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

D. Provide separate boxes for emergency power and normal power systems.

E. Unless otherwise indicated, provide separate boxes for line voltage and low voltage systems.

F. Flush-mount boxes in finished areas unless specifically indicated to be surface-mounted.

G. Unless otherwise indicated, boxes may be surface-mounted where exposed conduits are indicated or permitted.

H. Box Locations:

1. Locate boxes to be accessible. Provide access panels in accordance with Section 083100 as required where approved by the Architect.

2. Locate boxes to be accessible. Provide access panels in accordance with Section 08 31 13 as required where approved by the Architect.

3. Unless dimensioned, box locations indicated are approximate.

4. Locate boxes as required for devices installed under other sections or by others.

a. Switches, Receptacles, and Other Wiring Devices: Comply with Section 262726.

b. Communications Systems Outlets: Comply with Section 271000.

5. Locate boxes so that wall plates do not span different building finishes.

6. Locate boxes so that wall plates do not cross masonry joints.

7. Unless otherwise indicated, where multiple outlet boxes are installed at the same location at different mounting heights, install along a common vertical center line.

8. Do not install flush-mounted boxes on opposite sides of walls back-to-back. Provide minimum 6 inches horizontal separation unless otherwise indicated.

9. Acoustic-Rated Walls: Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches horizontal separation.

10. Fire Resistance Rated Walls: Install flush-mounted boxes such that the required fire resistance will not be reduced.

a. Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches separation where wall is constructed with individual noncommunicating stud cavities or protect both boxes with listed putty pads.

b. Do not install flush-mounted boxes with area larger than 16 square inches or such that the total aggregate area of openings exceeds 100 square inches for any 100 square feet of wall area.

11. Locate junction and pull boxes as indicated, as required to facilitate installation of conductors, and to limit conduit length and/or number of bends between pulling points in accordance with Section 260533.13.

12. Locate junction and pull boxes in the following areas, unless otherwise indicated or approved by the Architect:

a. Concealed above accessible suspended ceilings.

b. Within joists in areas with no ceiling.

c. Electrical rooms.

d. Mechanical equipment rooms.

I. Box Supports:

1. Secure and support boxes in accordance with NFPA 70 and Section 260529 using suitable supports and methods approved by the authority having jurisdiction.

2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit

connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.

3. Installation Above Suspended Ceilings: Do not provide support from ceiling grid or ceiling support system.

4. Use far-side support to secure flush-mounted boxes supported from single stud in hollow stud walls. Repair or replace supports for boxes that permit excessive movement.

J. Install boxes plumb and level.

K. Flush-Mounted Boxes:

1. Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface more than 1/4 inch or does not project beyond finished surface.

2. Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.

3. Repair rough openings around boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that there are no gaps or open spaces greater than 1/8 inch at the edge of the box.

L. Install boxes as required to preserve insulation integrity.

M. Metallic Floor Boxes: Install box level at the proper elevation to be flush with finished floor.

N. Underground Boxes/Enclosures:

1. Install enclosure on gravel base, minimum 6 inches deep.

2. Flush-mount enclosures located in concrete or paved areas.

3. Mount enclosures located in landscaped areas with top at 1 inch above finished grade.

4. Install additional bracing inside enclosures in accordance with manufacturer's instructions to minimize box sidewall deflections during backfilling. Backfill with cover bolted in place.

O. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.

P. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 13.

Q. Close unused box openings.

R. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.

S. Provide grounding and bonding in accordance with Section 260526.

T. Identify boxes in accordance with Section 260553.

3.3 CLEANING

A. Clean interior of boxes to remove dirt, debris, plaster and other foreign material.

3.4 PROTECTION

A. Immediately after installation, protect boxes from entry of moisture and foreign material until ready for installation of conductors.

END OF SECTION

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Surface raceway systems.

B. Wireways.

1.2 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2020.

D. UL 5 - Surface Metal Raceways and Fittings; Current Edition, Including All Revisions.

E. UL 111 - Outline of Investigation for Multioutlet Assemblies; Current Edition, Including All Revisions.

F. UL 870 - Wireways, Auxiliary Gutters, and Associated Fittings; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the placement of raceways with millwork, furniture, equipment, etc. installed under other sections or by others.

2. Coordinate rough-in locations of outlet boxes provided under Section 260533.16 and conduit provided under Section 260533.13 as required for installation of raceways provided under this section.

3. Verify minimum sizes of raceways with the actual conductors and components to be installed.

4. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

B. Sequencing:

1. Do not install raceways until final surface finishes and painting are complete.

2. Do not begin installation of conductors and cables until installation of raceways is complete between outlet, junction and splicing points.

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets including dimensions, knockout sizes and locations, materials, fabrication details, finishes, service condition requirements, and accessories.

1. Surface Raceway Systems: Include information on fill capacities for conductors and cables.

1.5 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 RACEWAY REQUIREMENTS

A. Provide all components, fittings, supports, and accessories required for a complete raceway system.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Do not use raceways for applications other than as permitted by NFPA 70 and product listing.

2.2 SURFACE RACEWAY SYSTEMS

A. Manufacturers:

1. Hubbell Incorporated: www.hubbell-wiring.com.

2. MonoSystems, Inc: www.monosystems.com/#sle.

3. Wiremold, a brand of Legrand North America, Inc: www.legrand.us/#sle.

B. Surface Metal Raceways: Listed and labeled as complying with UL 5.

C. Metal Channel (Strut) Used as Raceway: Comply with Section 260529.

D. Surface Raceway System:

1. Raceway Type: Single channel, painted steel.

2. Length: As indicated on the drawings.

3. Color: White.

4. Accessory Device Boxes: Suitable for the devices to be installed; color to match raceway.

2.3 WIREWAYS

A. Manufacturers:

1. Cooper B-Line, a division of Cooper Industries: www.cooperindustries.com/#sle.

2. Hoffman, a brand of Pentair Technical Products: www.hoffmanonline.com/#sle.

3. Schneider Electric; Square D Products: www.schneider-electric.us/#sle.

B. Description: Lay-in wireways and wiring troughs with removable covers; listed and labeled as complying with UL 870.

C. Wireway Type, Unless Otherwise Indicated:

1. Indoor Clean, Dry Locations: NEMA 250, Type 1, painted steel with screw-cover.

2. Outdoor Locations: NEMA 250, Type 3R, painted steel with screw-cover; include provision for padlocking.

D. Finish for Painted Steel Wireways: Manufacturer's standard grey unless otherwise indicated.

E. Minimum Wireway Size: 4 by 4 inches unless otherwise indicated.

F. Where wireway size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that outlet boxes and conduit terminations are installed in proper locations and are properly sized in accordance with NFPA 70 to accommodate raceways.

C. Verify that mounting surfaces are ready to receive raceways and that final surface finishes are complete, including painting.

D. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Install raceways plumb and level.

D. Arrange wireways and associated raceway connections to comply with NFPA 70, including but not limited to requirements for deflected conductors and wireways used as pullboxes. Increase size of wireway where necessary.

E. Secure and support raceways in accordance with Section 260529 at intervals complying with NFPA 70 and manufacturer's requirements.

F. Close unused raceway openings.

G. Provide grounding and bonding in accordance with Section 260526.

3.3 FIELD QUALITY CONTROL

A. Inspect raceways for damage and defects.

B. Correct wiring deficiencies and replace damaged or defective raceways.

3.4 CLEANING

A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.5 PROTECTION

A. Protect installed raceways from subsequent construction operations.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Electrical identification requirements.

B. Identification nameplates and labels.

C. Wire and cable markers.

D. Underground warning tape.

E. Warning signs and labels.

1.2 REFERENCE STANDARDS

A. ANSI Z535.2 - American National Standard for Environmental and Facility Safety Signs; 2011 (Reaffirmed 2017).

B. ANSI Z535.4 - American National Standard for Product Safety Signs and Labels; 2011 (Reaffirmed 2017).

C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

D. NFPA 70E - Standard for Electrical Safety in the Workplace; 2024.

E. UL 969 - Marking and Labeling Systems; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Verify final designations for equipment, systems, and components to be identified prior to fabrication of identification products.

B. Sequencing:

1. Do not conceal items to be identified, in locations such as above suspended ceilings, until identification products have been installed.

2. Do not install identification products until final surface finishes and painting are complete.

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product.

1.5 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

1.6 FIELD CONDITIONS

A. Do not install adhesive products when ambient temperature is lower than recommended by manufacturer.

PART 2 PRODUCTS

2.1 IDENTIFICATION REQUIREMENTS

A. Identification for Equipment:

1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.

a. Switchboards:

1) Identify ampere rating.

2) Identify power source and circuit number. Include location when not within sight of equipment.

3) Use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.

b. Panelboards:

1) Identify ampere rating.

2) Identify voltage and phase.

3) Identify power source and circuit number. Include location when not within sight of equipment.

4) Identify main overcurrent protective device. Use identification label for panelboards with a door. For power distribution panelboards without a door, use identification nameplate.

5) Use typewritten circuit directory to identify load(s) served for panelboards with a door. Identify spares and spaces using pencil.

6) For power panelboards, use identification nameplate to identify load(s) served for each branch device.

c. Enclosed switches, circuit breakers, and motor controllers:

1) Identify voltage and phase.

2) Identify power source and circuit number. Include location when not within sight of equipment.

3) Identify load(s) served. Include location when not within sight of equipment.

d. Time Switches:

1) Identify load(s) served and associated circuits controlled. Include location.

2) Identify source and circuit number.

e. Enclosed Contactors:

1) Identify ampere rating.

2) Identify voltage and phase.

3) Identify configuration, e.g., E.O.E.H. (electrically operated, electrically held) or E.O.M.H. (electrically operated, mechanically held).

4) Identify coil voltage.

5) Identify load(s) and associated circuits controlled. Include location.

6) Identify source and circuit number.

f. Transfer Switches:

1) Identify voltage and phase.

2) Identify power source and circuit number for both normal power source and standby power source. Include location when not within sight of equipment.

3) Identify load(s) served. Include location when not within sight of equipment.

4) Identify short circuit current rating based on the specific overcurrent protective device type and settings protecting the transfer switch.

2. Service Equipment:

a. Use identification nameplate to identify each service disconnecting means.

b. For buildings or structures supplied by more than one service, or any combination of branch circuits, feeders, and services, use identification nameplate or means of identification acceptable to authority having jurisdiction at each service disconnecting means to identify all other services, feeders, and branch circuits supplying that building or structure. Verify format and descriptions with authority having jurisdiction.

c. Use identification nameplate at each piece of service equipment to identify the available fault current and the date calculations were performed.

3. Emergency System Equipment:

a. Use identification nameplate or voltage marker to identify emergency system equipment in accordance with NFPA 70.

b. Use identification nameplate at each piece of service equipment to identify type and location of on-site emergency power sources.

c. Use identification nameplate to identify emergency operating instructions for emergency system equipment.

4. Use identification nameplate to identify disconnect location for equipment with remote disconnecting means.

5. Use identification label or handwritten text using indelible marker on inside of door at each fused switch to identify required NEMA fuse class and size.

6. Use identification label or handwritten text using indelible marker on inside of door at each motor controller to identify nameplate horsepower, full load amperes, code letter, service factor, voltage, and phase of motor(s) controlled.

7. Use identification label to identify overcurrent protective devices for branch circuits serving fire alarm circuits. Identify with text "FIRE ALARM CIRCUIT".

8. Available Fault Current Documentation: Use identification label to identify the available fault current and date calculations were performed at locations requiring documentation by NFPA 70 including but not limited to the following.

a. Service equipment.

b. Industrial control panels.

c. Motor control centers.

d. Elevator control panels.

e. Industrial machinery.

9. Arc Flash Hazard Warning Labels: Use warning labels to identify arc flash hazards for electrical equipment, such as switchboards, panelboards, industrial control panels, meter socket enclosures, and motor control centers that are likely to require examination, adjustment, servicing, or maintenance while energized.

a. Minimum Size: 3.5 by 5 inches.

b. Legend: Include orange header that reads "WARNING", followed by the word message "Arc Flash and Shock Hazard; Appropriate PPE Required; Do not operate controls or open covers without appropriate personal protection equipment; Failure to comply may result in injury or death; Refer to NFPA 70E for minimum PPE requirements" or approved equivalent.

c. Service Equipment: Include the following information in accordance with NFPA 70.

1) Nominal system voltage.

2) Available fault current.

3) Clearing time of service overcurrent protective device(s).

10. Use warning signs to identify electrical hazards for entrances to all rooms and other guarded locations that contain exposed live parts operating at 600 V nominal or less with the word message "DANGER; Electrical hazard; Authorized personnel only" or approved equivalent.

11. Use warning labels, identification nameplates, or identification labels to identify electrical hazards for equipment where multiple power sources are present with the word message "DANGER; Hazardous voltage; Multiple power sources may be present; Disconnect all electric power including remote disconnects before servicing" or approved equivalent.

B. Identification for Conductors and Cables:

1. Color Coding for Power Conductors 600 V and Less: Comply with Section 260519.

2. Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.

3. Use wire and cable markers to identify circuit number or other designation indicated for power, control, and instrumentation conductors and cables at the following locations:

a. At each source and load connection.

b. Within boxes when more than one circuit is present.

c. Within equipment enclosures when conductors and cables enter or leave the enclosure.

4. Use wire and cable markers to identify connected grounding electrode system components for grounding electrode conductors.

5. Use underground warning tape to identify direct buried cables.

C. Identification for Raceways:

1. Use color-coded bands to identify systems other than normal power system for accessible conduits at maximum intervals of 20 feet.

a. Color-Coded Bands: Use field-painting or vinyl color coding electrical tape to mark bands 3 inches wide.

1) Color Code:

(a) Emergency Power System: Red.

2) Field-Painting: Comply with Section 09 91 00.

3) Vinyl Color Coding Electrical Tape: Comply with Section 260519.

2. Use identification labels, handwritten text using indelible marker, or plastic marker tags to identify circuits enclosed for accessible conduits at wall penetrations, at floor penetrations, at roof penetrations, and at equipment terminations when source is not within sight.

3. Use identification labels, handwritten text using indelible marker, or plastic marker tags to identify spare conduits at each end. Identify purpose and termination location.

4. Use underground warning tape to identify underground raceways.

D. Identification for Cable Tray: Comply with Section 260536.

E. Identification for Boxes:

1. Use voltage markers to identify highest voltage present.

2. Use color coded boxes to identify systems other than normal power system.

a. Color-Coded Boxes: Field-painted in accordance with Section 09 91 00.

3. Use identification labels or handwritten text using indelible marker to identify circuits enclosed.

F. Identification for Devices:

1. Identification for Communications Devices: Comply with Section 271000.

2. Wiring Device and Wallplate Finishes: Comply with Section 262726.

3. Factory Pre-Marked Wallplates: Comply with Section 262726.

4. Use identification label to identify fire alarm system devices.

a. For devices concealed above suspended ceilings, provide additional identification on ceiling tile below device location.

5. Use identification label or engraved wallplate to identify serving branch circuit for all receptacles.

a. For receptacles in public areas or in areas as directed by Architect, provide identification on inside surface of wallplate.

6. Use identification label or engraved wallplate to identify load controlled for wall-mounted control devices controlling loads that are not visible from the control location and for multiple wall-mounted control devices installed at one location.

7. Use identification label to identify receptacles protected by upstream GFI protection, where permitted.

G. Identification for Luminaires:

1. Use permanent red dot on luminaire frame to identify luminaires containing emergency (battery) ballasts.

2.2 IDENTIFICATION NAMEPLATES AND LABELS

A. Identification Nameplates:

1. Manufacturers:

a. Brimar Industries, Inc: www.brimar.com/#sle.

b. Kolbi Pipe Marker Co: www.kolbipipemarkers.com.

c. Seton Identification Products: www.seton.com.

2. Materials:

a. Indoor Clean, Dry Locations: Use plastic nameplates.

b. Outdoor Locations: Use plastic, stainless steel, or aluminum nameplates suitable for exterior use.

3. Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch; engraved text.

a. Exception: Provide minimum thickness of 1/8 inch when any dimension is greater than 4 inches.

4. Stainless Steel Nameplates: Minimum thickness of 1/32 inch; engraved or laser-etched text.

5. Aluminum Nameplates: Anodized; minimum thickness of 1/32 inch; engraved or laser-etched text.

6. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch high; Four, located at corners for larger sizes.

B. Identification Labels:

1. Manufacturers:

a. Brady Corporation: www.bradyid.com.

b. Brother International Corporation: www.brother-usa.com/#sle.

c. Panduit Corp: www.panduit.com/#sle.

2. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
    a. Use only for indoor locations.
3. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.

C. Format for Equipment Identification:

1. Minimum Size: 1 inch by 2.5 inches.
2. Legend:
    a. System designation where applicable:
        1) Fire Alarm System: Identify with text "FIRE ALARM".
    b. Equipment designation or other approved description.
    c. Other information as indicated.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height:
    a. System Designation: 1 inch.
    b. Equipment Designation: 1/2 inch.
    c. Other Information: 1/4 inch.
    d. Exception: Provide minimum text height of 1 inch for equipment located more than 10 feet above floor or working platform.
5. Color:
    a. Normal Power System: White text on black background.

D. Format for General Information and Operating Instructions:

1. Minimum Size: 1 inch by 2.5 inches.
2. Legend: Include information or instructions indicated or as required for proper and safe operation and maintenance.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height: 1/4 inch.
5. Color: Black text on white background unless otherwise indicated.

E. Format for Caution and Warning Messages:

1. Minimum Size: 2 inches by 4 inches.

2. Legend: Include information or instructions indicated or as required for proper and safe operation and maintenance.

3. Text: All capitalized unless otherwise indicated.

4. Minimum Text Height: 1/2 inch.

5. Color: Black text on yellow background unless otherwise indicated.

F. Format for Receptacle Identification:

1. Minimum Size: 3/8 inch by 1.5 inches.

2. Legend: Power source and circuit number or other designation indicated.

3. Text: All capitalized unless otherwise indicated.

4. Minimum Text Height: 3/16 inch.

5. Color: Black text on clear background.

G. Format for Control Device Identification:

1. Minimum Size: 3/8 inch by 1.5 inches.

2. Legend: Load controlled or other designation indicated.

3. Text: All capitalized unless otherwise indicated.

4. Minimum Text Height: 3/16 inch.

5. Color: Black text on clear background.

H. Format for Fire Alarm Device Identification:

1. Minimum Size: 3/8 inch by 1.5 inches.

2. Legend: Designation indicated and device zone or address.

3. Text: All capitalized unless otherwise indicated.

4. Minimum Text Height: 3/16 inch.

5. Color: Red text on white background.

2.3 WIRE AND CABLE MARKERS

A. Manufacturers:

1. Brady Corporation: www.bradyid.com.

2. HellermannTyton: www.hellermanntyton.com.

3. Panduit Corp: www.panduit.com/#sle.

B. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth, wrap-around self-adhesive vinyl self-laminating, heat-shrink sleeve, plastic sleeve, plastic clip-on, or vinyl split sleeve type markers suitable for the conductor or cable to be identified.

C. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.

D. Legend: Power source and circuit number or other designation indicated.

E. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.

F. Minimum Text Height: 1/8 inch.

G. Color: Black text on white background unless otherwise indicated.

2.4 UNDERGROUND WARNING TAPE

A. Manufacturers:

1. Brady Corporation: www.bradyid.com.

2. Brimar Industries, Inc: www.brimar.com/#sle.

3. Seton Identification Products: www.seton.com.

B. Materials: Use foil-backed detectable type polyethylene tape suitable for direct burial, unless otherwise indicated.

C. Foil-backed Detectable Type Tape: 6 inches wide, with minimum thickness of 5 mil, unless otherwise required for proper detection.

D. Legend: Type of service, continuously repeated over full length of tape.

E. Color:

1. Tape for Buried Power Lines: Black text on red background.

2. Tape for Buried Communication, Alarm, and Signal Lines: Black text on orange background.

2.5 WARNING SIGNS AND LABELS

A. Manufacturers:

1. Brimar Industries, Inc: www.brimar.com/#sle.

2. Clarion Safety Systems, LLC: www.clarionsafety.com.

3. Seton Identification Products: www.seton.com.

B. Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.

C. Warning Signs:

1. Materials:

a. Indoor Dry, Clean Locations: Use factory pre-printed rigid plastic or self-adhesive vinyl signs.

b. Outdoor Locations: Use factory pre-printed rigid aluminum signs.

2. Rigid Signs: Provide four mounting holes at corners for mechanical fasteners.

3. Minimum Size: 7 by 10 inches unless otherwise indicated.

D. Warning Labels:

1. Materials: Use factory pre-printed or machine-printed self-adhesive polyester or self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant; produced using materials recognized to UL 969.

a. Do not use labels designed to be completed using handwritten text.

b. Provide polyester overlaminate to protect handwritten text.

2. Machine-Printed Labels: Use thermal transfer process printing machines and accessories recommended by label manufacturer.

3. Minimum Size: 2 by 4 inches unless otherwise indicated.

PART 3 EXECUTION

3.1 PREPARATION

A. Clean surfaces to receive adhesive products according to manufacturer's instructions.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:

1. Surface-Mounted Equipment: Enclosure front.

2. Flush-Mounted Equipment: Inside of equipment door.

3. Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.

4. Elevated Equipment: Legible from the floor or working platform.

5. Branch Devices: Adjacent to device.

6. Interior Components: Legible from the point of access.

7. Conduits: Legible from the floor.

8. Boxes: Outside face of cover.

9. Conductors and Cables: Legible from the point of access.

10. Devices: Outside face of cover.

C. Install identification products centered, level, and parallel with lines of item being identified.

D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.

1. Do not use adhesives on exterior surfaces except where substrate cannot be penetrated.

E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.

F. Install underground warning tape above buried lines with one tape per trench at 3 inches below finished grade.

G. Secure rigid signs using stainless steel screws.

H. Mark all handwritten text, where permitted, to be neat and legible.

3.3 FIELD QUALITY CONTROL

A. Replace self-adhesive labels and markers that exhibit bubbles, wrinkles, curling or other signs of improper adhesion.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Occupancy sensors.

B. Room Controllers

1.2 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

B. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2016.

C. NEMA 410 - Performance Testing for Lighting Controls and Switching Devices with Electronic Drivers and Discharge Ballasts; 2023.

D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the placement of lighting control devices with millwork, furniture, equipment, etc. installed under other sections or by others.

2. Coordinate the placement of wall switch occupancy sensors with actual installed door swings.

3. Coordinate the placement of photo sensors for daylighting controls with windows, skylights, and luminaires to achieve optimum operation. Coordinate placement with ductwork, piping, equipment, or other potential obstructions to light level measurement installed under other sections or by others.

4. Notify Engineer of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.

B. Sequencing:

1. Do not install lighting control devices until final surface finishes and painting are complete.

1.4 SUBMITTALS

A. Product Data: Include ratings, configurations, standard wiring diagrams, dimensions, colors, service condition requirements, and installed features.

1. Occupancy Sensors: Include detailed motion detection coverage range diagrams.

B. Shop Drawings:

1. Occupancy Sensors: Provide lighting plan indicating location, model number, and orientation of each occupancy sensor and associated system component.

2. Daylighting Controls: Provide lighting plan indicating location, model number, and orientation of each photo sensor and associated system component.

C. Field Quality Control Reports.

D. Manufacturer's Installation Instructions: Include application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

E. Operation and Maintenance Data: Include detailed information on device programming and setup.

F. Maintenance Materials: Furnish the following for Nanuet Union Free School District's use in maintenance of project.

G. Project Record Documents: Record actual installed locations and settings for lighting control devices.

1.5 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.6 DELIVERY, STORAGE, AND PROTECTION

A. Store products in a clean, dry space in original manufacturer's packaging in accordance with manufacturer's written instructions until ready for installation.

1.7 FIELD CONDITIONS

A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.8 WARRANTY

A. Provide five year manufacturer warranty for all lighting control components.

PART 2 PRODUCTS

2.1 LIGHTING CONTROL DEVICES - GENERAL REQUIREMENTS

A. Provide products listed, classified, and labeled as suitable for the purpose intended.

B. Unless specifically indicated to be excluded, provide all required conduit, wiring, connectors, hardware, components, accessories, etc. as required for a complete operating system.

C. Products for Switching of Electronic Ballasts/Drivers: Tested and rated to be suitable for peak inrush currents specified in NEMA 410.

2.2 ROOM CONTROLLERS AND ACCESSORIES

A. Manufacturer: Eaton/Cooper Greengate RC3D

B. The Room Controllers are connected to a 120 VAC or 277 VAC 20 Amp circuit to provide unit power and input power to the individual relays. The wall stations, occupancy/vacancy sensors, and daylight sensors and receptacle control devices connect via QuickConnect cables providing a Class 2 connection. Upon power up the pre-engraved wall station automatically controls the On/Off relays adjust the dimming outputs. The daylight sensor will immediately adjust the lighting levels based on natural light.

C. Refer to drawing details for part numbers and components.

D. Provide manufacturer's pre-terminated cables.

E. Utilize daylight sensor where daylighting is required as indicated on the plans.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.

C. Verify that openings for outlet boxes are neatly cut and will be completely covered by devices or wall plates.

D. Verify that final surface finishes are complete, including painting.

E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to lighting control devices.

F. Verify that the service voltage and ratings of lighting control devices are appropriate for the service voltage and load requirements at the location to be installed.

G. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.3 INSTALLATION

A. Install lighting control devices in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.

B. Coordinate locations of outlet boxes provided under Section 260533.16 as required for installation of lighting control devices provided under this section.

1. Mounting Heights: As indicated on the drawings.

2. Orient outlet boxes for vertical installation of lighting control devices unless otherwise indicated.

3. Locate wall switch occupancy sensors on strike side of door with edge of wall plate 3 inches from edge of door frame. Where locations are indicated otherwise, notify Engineer to obtain direction prior to proceeding with work.

C. Install lighting control devices in accordance with manufacturer's instructions.

D. Unless otherwise indicated, connect lighting control device grounding terminal or conductor to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

E. Install lighting control devices plumb and level, and held securely in place.

F. Where required and not furnished with lighting control device, provide wall plate in accordance with Section 262726.

G. Provide required supports in accordance with Section 260529.

H. Where applicable, install lighting control devices and associated wall plates to fit completely flush to mounting surface with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.

I. Outdoor Photo Control Locations:

1. Where possible, locate outdoor photo controls with photo sensor facing north. If north facing photo sensor is not possible, install with photo sensor facing east, west, or down.

2. Locate outdoor photo controls so that photo sensors do not face artificial light sources, including light sources controlled by the photo control itself.

J. Install outdoor photo controls so that connections are weatherproof. Do not install photo controls with conduit stem facing up in order to prevent infiltration of water into the photo control.

K. Lamp Burn-In: Operate lamps at full output for minimum of 100 hours or prescribed period per manufacturer's recommendations prior to use with any dimming controls. Replace lamps that fail prematurely due to improper lamp burn-in.

L. Unless otherwise indicated, install power packs for lighting control devices above accessible ceiling or above access panel in inaccessible ceiling near the sensor location.

M. Where indicated, install separate compatible wall switches for manual control interface with lighting control devices or associated power packs.

N. Unless otherwise indicated, install switches on load side of power packs so that switch does not turn off power pack.

3.4 FIELD QUALITY CONTROL

A. Inspect each lighting control device for damage and defects.

B. Test time switches to verify proper operation.

C. Test outdoor photo controls to verify proper operation, including time delays where applicable.

D. Test daylighting controls to verify proper operation, including light level measurements and time delays where applicable. Record test results in written report to be included with submittals.

E. Correct wiring deficiencies and replace damaged or defective lighting control devices.

F. Comply with requirements of the New York State Energy Code.

3.5 ADJUSTING

A. Adjust devices and wall plates to be flush and level.

3.6 CLEANING

A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.7 CLOSEOUT ACTIVITIES

A. Demonstration: Demonstrate proper operation of lighting control devices to Engineer, and correct deficiencies or make adjustments as directed.

END OF SECTION

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Lighting and appliance panelboards.

B. Overcurrent protective devices for panelboards.

1.2 REFERENCE STANDARDS

A. FS W-C-375 - Circuit Breakers, Molded Case; Branch Circuit and Service; 2013e, with Amendments (2022).

B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

C. NECA 407 - Standard for Installing and Maintaining Panelboards; 2015.

D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2020.

E. NEMA PB 1 - Panelboards; 2011.

F. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 1000 Volts or Less; 2023.

G. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems; 2021.

H. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

I. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.

J. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.

K. UL 67 - Panelboards; Current Edition, Including All Revisions.

L. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures; Current Edition, Including All Revisions.

M. UL 943 - Ground-Fault Circuit-Interrupters; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.

2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.

3. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted panelboards where indicated.

4. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.

5. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for panelboards, enclosures, overcurrent protective devices, and other installed components and accessories.

1. Include characteristic trip curves for each type and rating of overcurrent protective device upon request.

B. Maintenance Materials: Furnish the following for Nanuet Union Free School District's use in maintenance of project.

1. Panelboard Keys: Two of each different key.

1.5 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store panelboards in accordance with manufacturer's instructions and NECA 407.

B. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

C. Handle carefully in accordance with manufacturer's written instructions to avoid damage to panelboard internal components, enclosure, and finish.

1.7 FIELD CONDITIONS

A. Maintain ambient temperature within the following limits during and after installation of panelboards:

1. Panelboards Containing Circuit Breakers: Between 23 degrees F and 104 degrees F.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Eaton Corporation: www.eaton.com.

B. General Electric Company: www.geindustrial.com.

C. Schneider Electric; Square D Products: www.schneider-electric.us.

2.2 PANELBOARDS - GENERAL REQUIREMENTS

A. Provide products listed, classified, and labeled as suitable for the purpose intended.

B. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:

1. Altitude: Less than 6,600 feet.

2. Ambient Temperature:

a. Panelboards Containing Circuit Breakers: Between 23 degrees F and 104 degrees F.

C. Short Circuit Current Rating:

1. Provide panelboards with listed short circuit current rating as indicated on the drawings.

2. Listed series ratings are not acceptable.

D. Mains: Configure for top or bottom incoming feed as indicated or as required for the installation.

E. Branch Overcurrent Protective Devices: Replaceable without disturbing adjacent devices.

F. Bussing: Sized in accordance with UL 67 temperature rise requirements.

1. Provide fully rated neutral bus unless otherwise indicated, with a suitable lug for each feeder or branch circuit requiring a neutral connection.

2. Provide solidly bonded equipment ground bus in each panelboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.

G. Conductor Terminations: Suitable for use with the conductors to be installed.

H. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.

1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:

    a. Indoor Clean, Dry Locations: Type 1.

    b. Outdoor Locations: Type 3R.

2. Boxes: Galvanized steel unless otherwise indicated.

    a. Provide wiring gutters sized to accommodate the conductors to be installed.

    b. Increase gutter space as required where sub-feed lugs, feed-through lugs, gutter taps, or oversized lugs are provided.

    c. Provide removable end walls for NEMA Type 1 enclosures.

    d. Provide painted steel boxes for surface-mounted panelboards, finish to match fronts.

3. Fronts:

    a. Fronts for Surface-Mounted Enclosures: Same dimensions as boxes.

    b. Fronts for Flush-Mounted Enclosures: Overlap boxes on all sides to conceal rough opening.

    c. Finish for Painted Steel Fronts: Manufacturer's standard grey unless otherwise indicated.

4. Lockable Doors: All locks keyed alike unless otherwise indicated.

I. Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.

J. Selectivity: Where the requirement for selectivity is indicated, furnish products as required to achieve selective coordination.

K. Multi-Section Panelboards: Provide enclosures of the same height, with feed-through lugs or sub-feed lugs and feeders as indicated or as required to interconnect sections.

L. Load centers are not acceptable.

2.3 LIGHTING AND APPLIANCE PANELBOARDS

A. Description: Panelboards complying with NEMA PB 1, lighting and appliance branch circuit type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.

B. Conductor Terminations:

1. Main and Neutral Lug Material: Copper suitable for terminating copper conductors only.

2. Main and Neutral Lug Type: Mechanical.

C. Bussing:

1. Phase Bus Connections: Arranged for sequential phasing of overcurrent protective devices.

2. Phase and Neutral Bus Material: Copper.

3. Ground Bus Material: Copper.

D. Circuit Breakers: Thermal magnetic bolt-on type unless otherwise indicated.

E. Enclosures:

1. Provide surface-mounted or flush-mounted enclosures as indicated.

2. Fronts: Provide door-in-door trim with hinged cover for access to load terminals and wiring gutters, and separate lockable hinged door with concealed hinges for access to overcurrent protective device handles without exposing live parts.

3. Provide clear plastic circuit directory holder mounted on inside of door.

2.4 OVERCURRENT PROTECTIVE DEVICES

A. Molded Case Circuit Breakers:

1. Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489, and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.

2. Interrupting Capacity:

a. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than:

1) 10,000 rms symmetrical amperes at 240 VAC or 208 VAC.

2) 14,000 rms symmetrical amperes at 480 VAC.

b. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.

3. Conductor Terminations:

a. Provide mechanical lugs unless otherwise indicated.

b. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.

4. Thermal Magnetic Circuit Breakers: For each pole, furnish thermal inverse time tripping element for overload protection and magnetic instantaneous tripping element for short circuit protection.

5. Multi-Pole Circuit Breakers: Furnish with common trip for all poles.

6. Provide the following circuit breaker types where indicated:

   a. Ground Fault Circuit Interrupter (GFCI) Circuit Breakers: Listed as complying with UL 943, class A for protection of personnel.

7. Provide listed switching duty rated circuit breakers with SWD marking for all branch circuits serving fluorescent lighting.

8. Do not use tandem circuit breakers.

9. Do not use handle ties in lieu of multi-pole circuit breakers.

10. Provide multi-pole circuit breakers for multi-wire branch circuits as required by NFPA 70.

11. Provide the following features and accessories where indicated or where required to complete installation:

    a. Handle Pad-Lock Provision: For locking circuit breaker handle in OFF position.

2.5 SOURCE QUALITY CONTROL

A. Factory test panelboards according to NEMA PB 1.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that the ratings and configurations of the panelboards and associated components are consistent with the indicated requirements.

C. Verify that mounting surfaces are ready to receive panelboards.

D. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Perform work in accordance with NECA 1 (general workmanship).

B. Install products in accordance with manufacturer's instructions.

C. Install panelboards in accordance with NECA 407 and NEMA PB 1.1.

D. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

E. Provide required support and attachment in accordance with Section 260529.

F. Install panelboards plumb.

G. Install flush-mounted panelboards so that trims fit completely flush to wall with no gaps and rough opening completely covered.

H. Mount panelboards such that the highest position of any operating handle for circuit breakers or switches does not exceed 79 inches above the floor or working platform.

I. Provide minimum of six spare 1 inch trade size conduits out of each flush-mounted panelboard stubbed into accessible space above ceiling and below floor.

J. Provide grounding and bonding in accordance with Section 260526.

1. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on isolated/insulated ground bus.

K. Install all field-installed branch devices, components, and accessories.

L. Where accessories are not self-powered, provide control power source as indicated or as required to complete installation.

M. Multi-Wire Branch Circuits: Group grounded and ungrounded conductors together in the panelboard as required by NFPA 70.

N. Set field-adjustable circuit breaker tripping function settingsas directed.

O. Provide filler plates to cover unused spaces in panelboards.

P. Identify panelboards in accordance with Section 260553.

3.3 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Molded Case Circuit Breakers: Perform inspections and tests listed in NETA ATS, Section 7.6.1.1for all main circuit breakers. Tests listed as optional are not required.

C. Test GFCI circuit breakers to verify proper operation.

D. Procure services of a qualified manufacturer's representative to observe installation and assist in inspection, testing, and adjusting. Include manufacturer's reports with field quality control submittals.

E. Correct deficiencies and replace damaged or defective panelboards or associated components.

3.4 ADJUSTING

A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

B. Adjust alignment of panelboard fronts.

C. Load Balancing: For each panelboard, rearrange circuits such that the difference between each measured steady state phase load does not exceed 20 percent and adjust circuit directories accordingly. Maintain proper phasing for multi-wire branch circuits.

3.5 CLEANING

A. Clean dirt and debris from panelboard enclosures and components according to manufacturer's instructions.

B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Circuit Breakers.

1.2 REFERENCES

A. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.3 SUBMITTALS

A. Not Required.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Match existing circuit breaker manufacturer.

2.2 CIRCUIT BREAKERS

A. Match existing make and model.

B. Compatible with existing panelboard.

C. Trip rating and number of poles as indicated on drawings.

2.3 ACCESSORIES

A. As required to complete installation:

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install circuit breakers in existing panelboard(s) as indicated on drawings.

C. Provide updated typewritten circuit directory reflecting each branch circuit load.

3.2 FIELD QUALITY CONTROL

A. Perform inspections and tests listed in NETA STD ATS, Section 7.6 for circuit breakers.

3.3 ADJUSTING

A. Measure steady state load currents at each panelboard feeder; rearrange circuits in the panelboard to balance the phase loads to within 10 percent of each other. Maintain proper phasing for multi-wire branch circuits.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Receptacles.

B. Wall plates.

1.2 REFERENCE STANDARDS

A. FS W-C-596 - Connector, Electrical, Power, General Specification for; 2014h, with Amendments (2017).

B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

C. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2016.

D. NEMA WD 1 - General Color Requirements for Wiring Devices; 1999 (Reaffirmed 2020).

E. NEMA WD 6 - Wiring Devices - Dimensional Specifications; 2021.

F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

G. UL 498 - Attachment Plugs and Receptacles; Current Edition, Including All Revisions.

H. UL 514D - Cover Plates for Flush-Mounted Wiring Devices; Current Edition, Including All Revisions.

I. UL 943 - Ground-Fault Circuit-Interrupters; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the placement of outlet boxes with millwork, furniture, equipment, etc. installed under other sections or by others.

2. Coordinate wiring device ratings and configurations with the electrical requirements of actual equipment to be installed.

3. Coordinate the installation and preparation of uneven surfaces, such as split face block, to provide suitable surface for installation of wiring devices.

4. Notify Engineer of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.

B. Sequencing:

1. Do not install wiring devices until final surface finishes and painting are complete.

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.

B. Maintenance Materials: Furnish the following for Nanuet Union Free School District's use in maintenance of project.

1. Screwdrivers for Tamper-Resistant Screws: Two for each type of screw.

2. Extra Wall Plates: One of each style, size, and finish.

1.5 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

D. Products: Listed, classified, and labeled as suitable for the purpose intended.

E. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.6 DELIVERY, STORAGE, AND PROTECTION

A. Store in a clean, dry space in original manufacturer's packaging until ready for installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Hubbell Incorporated: www.hubbell-wiring.com.

B. Leviton Manufacturing Company, Inc: www.leviton.com.

C. Lutron Electronics Company, Inc: www.lutron.com.

D. Pass & Seymour, a brand of Legrand North America, Inc: www.legrand.us

E. Source Limitations: Where possible, provide products for each type of wiring device produced by a single manufacturer and obtained from a single supplier.

F. Source Limitations: Where wall controls are furnished as part of lighting control system, provide accessory matching receptacles and wallplates by the same manufacturer in locations indicated.

2.2 WIRING DEVICE APPLICATIONS

A. Provide wiring devices suitable for intended use and with ratings adequate for load served.

B. For single receptacles installed on an individual branch circuit, provide receptacle with ampere rating not less than that of the branch circuit.

C. Provide weather resistant GFCI receptacles with specified weatherproof covers for receptacles installed outdoors or in damp or wet locations.

D. Provide GFCI protection for receptacles installed within 6 feet of sinks.

E. Provide GFCI protection for receptacles installed in kitchens.

F. Provide GFCI protection for receptacles serving electric drinking fountains.

G. Unless noted otherwise, do not use combination switch/receptacle devices.

2.3 WIRING DEVICE FINISHES

A. Provide wiring device finishes as described below unless otherwise indicated.

B. Wiring Devices, Unless Otherwise Indicated: White with white nylon wall plate.

C. Wiring Devices Installed in Finished Spaces: White with white nylon wall plate.

D. Wiring Devices Installed in Unfinished Spaces: Gray with galvanized steel wall plate.

E. Wiring Devices Installed in Wet or Damp Locations: White with specified weatherproof cover.

F. Wiring Devices Connected to Emergency Power: Red with red nylon wall plate.

2.4 RECEPTACLES

A. Manufacturers:

1. Hubbell Incorporated: www.hubbell-wiring.com.

2. Leviton Manufacturing Company, Inc: www.leviton.com/#sle.

3. Lutron Electronics Company, Inc; Designer Style: www.lutron.com/#sle.

4. Pass & Seymour, a brand of Legrand North America, Inc: www.legrand.us/#sle.

5. Source Limitations: Where wall controls are furnished as part of lighting control system, provide accessory matching receptacles and wallplates by the same manufacturer in locations indicated.

B. Receptacles - General Requirements: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498and where applicable FS W-C-596; types as indicated on the drawings.

1. Wiring Provisions: Terminal screws for side wiring or screw actuated binding clamp for back wiring with separate ground terminal screw.

C. Convenience Receptacles:

1. Standard Convenience Receptacles: Commercial specification grade, 20A, 125V, NEMA 5-20R; single or duplex as indicated on the drawings.

2. Weather Resistant Convenience Receptacles: Commercial specification grade, 20A, 125V, NEMA 5-20R, listed and labeled as weather resistant type complying with UL 498 Supplement SE suitable for installation in damp or wet locations; single or duplex as indicated on the drawings.

D. GFCI Receptacles:

1. GFCI Receptacles - General Requirements: Self-testing, with feed-through protection and light to indicate ground fault tripped condition and loss of protection; listed as complying with UL 943, class A.

a. Provide test and reset buttons of same color as device.

2. Standard GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style.

3. Weather Resistant GFCI Receptacles: Commercial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style, listed and labeled as weather resistant type complying with UL 498 Supplement SE suitable for installation in damp or wet locations.

2.5 WALL PLATES

A. Manufacturers:

1. Hubbell Incorporated: www.hubbell-wiring.com/#sle.

2. Leviton Manufacturing Company, Inc: www.leviton.com/#sle.

3. Lutron Electronics Company, Inc: www.lutron.com.

4. Pass & Seymour, a brand of Legrand North America, Inc: www.legrand.us/#sle.

5. Source Limitations: Where wall controls are furnished as part of a pre-engineered lighting system, provide accessory matching wallplates by the same manufacturer.

B. Wall Plates: Comply with UL 514D.

1. Configuration: One piece cover as required for quantity and types of corresponding wiring devices.

2. Size: Standard.

3. Screws: Metal with slotted heads finished to match wall plate finish.

4. Provide screwless wallplates with concealed mounting hardware where indicated.

C. Nylon Wall Plates: Smooth finish, high-impact thermoplastic.

D. Stainless Steel Wall Plates: Brushed satin finish, Type 302 stainless steel.

E. Galvanized Steel Wall Plates: Rounded corners and edges, with corrosion resistant screws.

F. Premarked Wall Plates: Factory labeled as indicated; hot stamped for nylon wall plates and engraved for metal wall plates.

G. Weatherproof Covers for Damp Locations: Gasketed, cast aluminum, with self-closing hinged cover and corrosion-resistant screws; listed as suitable for use in wet locations with cover closed.

H. Weatherproof Covers for Wet Locations: Gasketed, cast aluminum, with hinged lockable cover and corrosion-resistant screws; listed as suitable for use in wet locations while in use with attachment plugs connected and identified as extra-duty type.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.

C. Verify that wall openings are neatly cut and will be completely covered by wall plates.

D. Verify that final surface finishes are complete, including painting.

E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

F. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.3 INSTALLATION

A. Perform work in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.

B. Coordinate locations of outlet boxes provided under Section 260533.16 as required for installation of wiring devices provided under this section.

1. Mounting Heights: Unless otherwise indicated, as follows:

2. Orient outlet boxes for vertical installation of wiring devices unless otherwise indicated.

3. Where multiple receptacles are installed at the same location and at the same mounting height, gang devices together under a common wall plate.

4. Locate receptacles for electric drinking fountains concealed behind drinking fountain according to manufacturer's instructions.

C. Install wiring devices in accordance with manufacturer's instructions.

D. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.

E. Where required, connect wiring devices using pigtails not less than 6 inches long. Do not connect more than one conductor to wiring device terminals.

F. Connect wiring devices by wrapping conductor clockwise 3/4 turn around screw terminal and tightening to proper torque specified by the manufacturer. Where present, do not use push-in pressure terminals that do not rely on screw-actuated binding.

G. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

H. Provide GFCI receptacles with integral GFCI protection at each location indicated. Do not use feed-through wiring to protect downstream devices.

I. Install wiring devices plumb and level with mounting yoke held rigidly in place.

J. Install wall switches with OFF position down.

K. Install vertically mounted receptacles with grounding pole on top and horizontally mounted receptacles with grounding pole on left.

L. Install wall plates to fit completely flush to wall with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.

M. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.

N. Identify wiring devices in accordance with Section 260553.

3.4 FIELD QUALITY CONTROL

A. Inspect each wiring device for damage and defects.

B. Operate each wall switch and wall dimmer with circuit energized to verify proper operation.

C. Verify that each receptacle device is energized.

D. Test each receptacle to verify operation and proper polarity.

E. Test each GFCI receptacle for proper tripping operation according to manufacturer's instructions.

F. Correct wiring deficiencies and replace damaged or defective wiring devices.

3.5 ADJUSTING

A. Adjust devices and wall plates to be flush and level.

B. Adjust presets for wall dimmers according to manufacturer's instructions as directed by Engineer.

3.6 CLEANING

A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

END OF SECTION

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fuses.

1.2 REFERENCE STANDARDS

A. NEMA FU 1 - Low Voltage Cartridge Fuses; 2012.

B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

C. UL 248-1 - Low-Voltage Fuses - Part 1: General Requirements; Current Edition, Including All Revisions.

D. UL 248-8 - Low-Voltage Fuses - Part 8: Class J Fuses; Current Edition, Including All Revisions.

E. UL 248-12 - Low-Voltage Fuses - Part 12: Class R Fuses; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate fuse clips furnished in equipment provided under other sections for compatibility with indicated fuses.

a. Fusible Enclosed Switches: See Section 262816.16.

b. Fusible Switches for Enclosed Motor Controllers: See Section 262913.

2. Coordinate fuse requirements according to manufacturer's recommendations and nameplate data for actual equipment to be installed.

3. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's standard data sheets including voltage and current ratings, interrupting ratings, time-current curves, and current limitation curves.

B. Maintenance Materials: Furnish the following for Nanuet Union Free School District's use in maintenance of project.

1. Extra Fuses: One set(s) of three for each type and size installed.

2. Fuse Pullers: One set(s) compatible with each type and size installed.

1.5 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Bussmann, a division of Eaton Corporation: www.cooperindustries.com.

B. Littelfuse, Inc: www.littelfuse.com.

C. Mersen: ep-us.mersen.com.

2.2 APPLICATIONS

A. General Purpose Branch Circuits: Class RK1, time-delay or Class J where noted.

B. Individual Motor Branch Circuits: Class RK1, time-delay or Class J where noted.

2.3 FUSES

A. Provide products listed, classified, and labeled as suitable for the purpose intended.

B. Unless specifically indicated to be excluded, provide fuses for all fusible equipment as required for a complete operating system.

C. Provide fuses of the same type, rating, and manufacturer within the same switch.

D. Comply with UL 248-1.

E. Unless otherwise indicated, provide cartridge type fuses complying with NEMA FU 1, Class and ratings as indicated.

F. Voltage Rating: Suitable for circuit voltage.

G. Class R Fuses: Comply with UL 248-12.

1. Class RK1, Time-Delay Fuses.

H. Class J Fuses: Comply with UL 248-8.

1. Class J, Time-Delay Fuses.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that fuse ratings are consistent with circuit voltage and manufacturer's recommendations and nameplate data for equipment.

B. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Do not install fuses until circuits are ready to be energized.

B. Install fuses with label oriented such that manufacturer, type, and size are easily read.

END OF SECTION

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Enclosed safety switches.

1.2 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

B. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2020.

C. NEMA KS 1 - Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum); 2013.

D. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems; 2021.

E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

F. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.

G. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.

H. UL 98 - Enclosed and Dead-Front Switches; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the work with other trades. Avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and within working clearances for electrical equipment required by NFPA 70.

2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.

3. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.

4. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for enclosed switches and other installed components and accessories.

1.5 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

B. Handle carefully in accordance with manufacturer's written instructions to avoid damage to enclosed switch internal components, enclosure, and finish.

1.7 FIELD CONDITIONS

A. Maintain ambient temperature between -22 degrees F and 104 degrees F during and after installation of enclosed switches.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Eaton Corporation: www.eaton.com.

B. General Electric Company: www.geindustrial.com.

C. Schneider Electric; Square D Products: www.schneider-electric.us.

2.2 ENCLOSED SAFETY SWITCHES

A. Description: Quick-make, quick-break enclosed safety switches listed and labeled as complying with UL 98; heavy duty; ratings, configurations, and features as indicated on the drawings.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:

1. Altitude: Less than 6,600 feet.

2. Ambient Temperature: Between -22 degrees F and 104 degrees F.

D. Horsepower Rating: Suitable for connected load.

E. Voltage Rating: Suitable for circuit voltage.

F. Short Circuit Current Rating:

1. Minimum Ratings:

G. Provide with switch blade contact position that is visible when the cover is open.

H. Conductor Terminations: Suitable for use with the conductors to be installed.

I. Provide insulated, groundable fully rated solid neutral assembly where a neutral connection is required, with a suitable lug for terminating each neutral conductor.

J. Provide solidly bonded equipment ground bus in each enclosed safety switch, with a suitable lug for terminating each equipment grounding conductor.

K. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.

1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:

a. Indoor Clean, Dry Locations: Type 1.

b. Outdoor Locations: Type 3R.

2. Finish for Painted Steel Enclosures: Manufacturer's standard, factory applied grey unless otherwise indicated.

L. Provide safety interlock to prevent opening the cover with the switch in the ON position with capability of overriding interlock for testing purposes.

M. Heavy Duty Switches:

1. Comply with NEMA KS 1.

2. Conductor Terminations:

a. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.

3. Provide externally operable handle with means for locking in the OFF position, capable of accepting three padlocks.

a. Provide means for locking handle in the ON position.

N. Provide the following features and accessories where indicated or where required to complete installation:

1. Hubs: As required for environment type; sized to accept conduits to be installed.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that the ratings of the enclosed switches are consistent with the indicated requirements.

C. Verify that mounting surfaces are ready to receive enclosed safety switches.

D. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

D. Provide required support and attachment in accordance with Section 260529.

E. Install enclosed switches plumb.

F. Except where indicated to be mounted adjacent to the equipment they supply, mount enclosed switches such that the highest position of the operating handle does not exceed 79 inches above the floor or working platform.

G. Provide grounding and bonding in accordance with Section 260526.

H. Where accessories are not self-powered, provide control power source as indicated or as required to complete installation.

I. Identify enclosed switches in accordance with Section 260553.

3.3 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Perform inspections and tests listed in NETA ATS, Section 7.5.1.1.

C. Correct deficiencies and replace damaged or defective enclosed safety switches or associated components.

3.4 ADJUSTING

A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

3.5 CLEANING

A. Clean dirt and debris from switch enclosures and components according to manufacturer's instructions.

B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Enclosed NEMA controllers for low-voltage (600 V and less) applications:

1. Manual motor starters.

B. Overcurrent protective devices for motor controllers, including overload relays.

1.2 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

B. NEMA ICS 2 - Industrial Control and Systems Controllers, Contactors and Overload Relays Rated 600 Volts; 2008 (Reaffirmed 2020).

C. NEMA ICS 6 - Industrial Control and Systems: Enclosures; 1993 (Reaffirmed 2016).

D. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems; 2021.

E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.3 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for motor controllers, enclosures, overcurrent protective devices, and other installed components and accessories.

B. Product Data: Provide catalog sheets showing voltage, controller size, ratings and size of switching and overcurrent protective devices, short circuit ratings, dimensions, and enclosure details.

1.4 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

C. Products: Listed, classified, and labeled as suitable for the purpose intended.

D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Eaton Corporation: www.eaton.com.

B. General Electric Company: www.geindustrial.com.

C. Schneider Electric; Square D Products: www.schneider-electric.us.

2.2 OVERCURRENT PROTECTIVE DEVICES

A. Overload Relays:

1. Provide overload relays and, where applicable, associated current elements/heaters, selected according to actual installed motor nameplate data, in accordance with manufacturer's recommendations and NFPA 70; include consideration for motor service factor and ambient temperature correction, where applicable.

2. Inverse-Time Trip Class Rating: Class 20 unless otherwise indicated or required.

3. Trip-free operation.

4. Visible trip indication.

5. Resettable.

a. Employ manual reset unless otherwise indicated.

b. Do not employ automatic reset with two-wire control.

2.3 MANUAL CONTROLLERS

A. Manual Motor Controllers: NEMA ICS 2, AC general-purpose, Class A, manually operated, full-voltage controller with overload element, and toggle operator.

B. Fractional Horsepower Manual Controllers: NEMA ICS 2, AC general-purpose, Class A, manually operated, full-voltage controller for fractional horsepower induction motors, with thermal overload unit, red pilot light, and toggle operator.

C. Enclosures: NEMA ICS 6, Type as required to meet conditions of installation.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install controllers in accordance with NECA 1 (general workmanship).

C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

D. Provide required support and attachment in accordance with Section 260529.

E. Install enclosed controllers plumb and level.

F. Provide grounding and bonding in accordance with Section 260526.

G. Install all field-installed devices, components, and accessories.

H. Height: 5 ft to operating handle.

I. Where accessories are not self-powered, provide control power source as indicated or as required to complete installation.

J. Set field-adjustable controllers and associated components according to installed motor requirements, in accordance with manufacturer's recommendations and NFPA 70.

K. Select and install overload heater elements in motor controllers to match installed motor characteristics.

L. Identify enclosed controllers in accordance with Section 260553.

3.2 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for additional requirements.

B. Inspect and test in accordance with NETA ATS, except Section 4.

C. Motor Starters: Perform inspections and tests listed in NETA ATS, Section 7.16.1.1. Tests listed as optional are not required.

D. Correct deficiencies and replace damaged or defective enclosed controllers or associated components.

E. Perform inspections and tests listed in NETA ATS, Section 7.16.1.

3.3 CLEANING

A. Clean dirt and debris from controller enclosures and components according to manufacturer's instructions.

B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Variable-frequency motor controllers for low-voltage (600 V and less) AC motor applications.

B. Overcurrent protective devices for motor controllers, including overload relays.

1.2 REFERENCE STANDARDS

A. IEC 60529 - Degrees of Protection Provided by Enclosures (IP Code); 1989 (Corrigendum 2019).

B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2020.

D. NEMA ICS 6 - Industrial Control and Systems: Enclosures; 1993 (Reaffirmed 2016).

E. NEMA ICS 7 - Industrial Control and Systems: Adjustable-Speed Drives; 2020.

F. NEMA ICS 7.1 - Safety Standards for Construction and Guide for Selection, Installation, and Operation of Adjustable-Speed Drive Systems; 2022.

G. NEMA ICS 7.2 - Application Guide for AC Adjustable Speed Drive Systems; 2021.

H. NEMA ICS 61800-2 - Adjustable Speed Electrical Power Drive Systems, Part 2: General Requirements-Rating Specifications for Low Voltage Adjustable Frequency AC Power Drive Systems; 2005.

I. NEMA MG 1 - Motors and Generators; 2021.

J. NEMA ICS 7 - Industrial Control and Systems: Adjustable-Speed Drives; 2020.

K. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2020.

L. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems; 2021.

M. IEEE 519 - Harmonic analysis for particular jobsite including total harmonic voltage distortion and total harmonic current distortion (TDD).

N. IEC 61800-3 - EMC Product Standard for Power Drive Systems.

O. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

P. UL 508A - Industrial Control Panels; Current Edition, Including All Revisions.

Q. UL 61800-5-1 - Standard for Adjustable Speed Electrical Power Drive Systems - Part 5-1: Safety Requirements – Electrical, Thermal, and Energy (Ed. 2); Current Edition, Including All Revisions.

1.3 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for motor controllers, enclosures, overcurrent protective devices, and other installed components and accessories.

B. Shop Drawings: Indicate dimensions, voltage, controller sizes, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.

C. Calculations: IEEE 519. Include manufacturer calculations specific to the installation, showing total harmonic voltage distortion is less than 5%, with minimum of 5% equivalent impedance reactors.

D. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

E. Field quality control test reports.

F. Operation Data: NEMA ICS 7.1. Include instructions for starting and operating controllers, and describe operating limits that may result in hazardous or unsafe conditions.

G. Maintenance Data: NEMA ICS 7.1. Include routine preventive maintenance schedule.

H. Programming Data: After installation, provide three copies of operator's manual with field programmed values entered into parameter tables.

1.4 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience and with service facilities within 250 miles of Project.

C. Products: Listed, classified, and labeled as suitable for the purpose intended.

D. Products shall include options and be UL listed as a complete assembly. Products shall not require additional hardware (i.e. fuses, additional branch circuit protection) to be UL listed.

E. Shall be UL listed for 100 KAIC without the need for input fusing.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store in clean, dry space. Maintain factory wrapping or provide additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

B. Handle carefully in accordance with manufacturer's written instructions to avoid damage to internal components, enclosure, and finish.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. ABB; Model ACH-550: www.abb-drives.com .

B. GE Industrial; Model AF-300 P11: www.geindustrial.com.

C. Allen Bradley; Model Powerflex 400: www.ab.com.

2.2 VARIABLE-FREQUENCY MOTOR CONTROLLERS

A. Provide variable-frequency motor control system consisting of required controller assemblies, operator interfaces, control power transformers, instrumentation and control wiring, sensors, accessories, system programming, etc. as necessary for complete operating system.

B. Provide products listed, classified, and labeled as suitable for purpose intended.

C. Controller Assemblies: Comply with NEMA ICS 7, NEMA ICS 7.1, and NEMA ICS 61800-2; list and label as complying with UL 61800-5-1 or UL 508A as applicable.

D. Provide controllers selected for actual installed motors and coupled mechanical loads in accordance with NEMA ICS 7.2, NEMA MG 1 Part 30, and recommendations of manufacturers of both controller and load, where not in conflict with specified requirements; considerations include, but are not limited to:

1. Motor type (e.g., induction, reluctance, and permanent magnet); consider NEMA MG 1 design letter or inverter duty rating for induction motors.

2. Motor load type (e.g., constant torque, variable torque, and constant horsepower); consider duty cycle, impact loads, and high inertia loads.

3. Motor nameplate data.

4. Requirements for speed control range, speed regulation, and braking.

5. Motor suitability for bypass starting method, where applicable.

E. Devices on Load Side of Controller: Suitable for application across full controller output frequency range.

F. Operating Requirements:

1. Input Voltage Tolerance: Plus/minus 10 percent of nominal.

2. Input Frequency Tolerance: Plus/minus 5 percent of nominal.

3. Efficiency: Minimum of 96 percent at full speed and load.

4. Input Displacement Power Factor: Minimum of 0.96 throughout speed and load range.

5. Overload Rating:

   a. Variable Torque Loads: Minimum of 110 percent of nominal for 60 seconds.

   b. Constant Torque Loads: Minimum of 150 percent of nominal for 60 seconds.

G. Power Conversion System: Microprocessor-based, pulse width modulation type consisting of rectifier/converter, DC bus/link, and inverter.

1. Rectifier/Converter: Diode-based, 6-pulse type unless otherwise indicated.

H. Control System:

1. Provide microprocessor-based control system for automatic control, monitoring, and protection of motors. Include sensors, wiring, and connections necessary for functions and status/alarm indications specified.

2. Provide integral operator interface for controller programming, display of status/alarm indications, fault reset, and local control functions including motor run/stop, motor forward/reverse selection, motor speed increase/decrease, and local/remote control selection.

3. Control Functions:

   a. Control Method: Selectable vector and scalar/volts per hertz unless otherwise indicated.

      1) Scalar/Volts per Hertz Control: Provide IR compensation for improved low-speed torque.

      2) Vector Control: Provide selectable autotuning function.

   b. Adjustable acceleration and deceleration time; linear and S-curve ramps; selectable coast to stop.

   c. Selectable braking control; DC injection or flux braking.

   d. Adjustable minimum/maximum speed limits.

   e. Adjustable pulse width modulation switching carrier frequency.

   f. Adjustable motor slip compensation.

   g. Selectable autorestart after noncritical fault; programmable number of time delay between restart attempts.

4. Status Indications:

   a. Motor run/stop status.

b. Motor forward/reverse status.

c. Local/remote control status.

d. Output voltage.

e. Output current.

f. Output frequency.

g. DC bus voltage.

h. Motor speed.

5. Protective Functions/Alarm Indications:

a. Overcurrent.

b. Motor overload.

c. Undervoltage.

d. Overvoltage.

e. Controller overtemperature.

f. Input/output phase loss.

g. Output short circuit protection.

h. Output ground fault protection.

6. Inputs:

a. Digital Input(s): Three.

b. Analog Input(s): Two.

7. Outputs:

8. Features:

a. Password-protected security access.

b. Event log.

I. Power Conditioning/Filtering:

1. Provide DC link choke or input/line reactor for each controller unless otherwise indicated or required.

2. Reactor Impedance: 3 percent, unless otherwise indicated or required.

J. Packaged Controllers: Controllers factory-mounted in separate enclosure with externally operable disconnect and specified accessories.

1. Disconnects: Circuit breaker or disconnect switch type.

    a. Disconnect Switches: Fusible type or nonfusible type with separate input fuses.

    b. Provide externally operable handle with means for locking in OFF position. Provide safety interlock to prevent opening cover with disconnect in ON position with capability of overriding interlock for testing purposes.

    c. Provide auxiliary interlock for disconnection of external control power sources where applicable.

2. Provide door-mounted remote operator interface.

K. Service Conditions:

1. Provide controllers and associated components suitable for operation under following service conditions without derating:

    a. Altitude: Less than 3,300 feet.

    b. Ambient Temperature: Between 32 degrees F and 104 degrees F.

2. Provide controllers and associated components suitable for operation at indicated ratings under service conditions at installed location.

L. Short Circuit Current Rating:

1. Provide line/input reactors where specified by manufacturer for required short circuit current rating.

M. Conductor Terminations: Suitable for use with conductors to be installed.

N. Enclosures:

1. Comply with NEMA ICS 6.

2. NEMA 250 Environment Type or Equivalent IEC 60529 Rating: Unless otherwise indicated, as specified for following installation locations:

3. Finish: Manufacturer's standard unless otherwise indicated.

4. Cooling: Forced air or natural convection as determined by manufacturer.

2.3 OVERCURRENT PROTECTIVE DEVICES

2.4 DESCRIPTION

A. Variable Frequency Controllers: Enclosed controllers suitable for operating the indicated loads, in conformance with requirements of NEMA ICS 7. Select unspecified features and options in accordance with NEMA ICS 3.1.

1. Employ microprocessor-based inverter logic isolated from power circuits.

2. Employ pulse-width-modulated inverter system.

3. Shall have internal 5% impedance reactors to reduce the harmonics to the power line and to add protection from AC line transients. The 5% impedance may be from dual (positive and negative DC bus) reactors, or 5% AC line reactors. VFD's with only one DC reactor shall add an AC line reactor.

4. Design for ability to operate controller with motor disconnected from output.

5. Design to attempt five automatic restarts following fault condition before locking out and requiring manual restart.

6. Design for user selectable restart after power outage or interruption.

B. AC transient protection system consisting of 4-120 joule rated MOV's (phase-to-phase and phase-to-ground), capacitor clamp, and 5% equivalent impedance internal reactors.

C. Enclosures: NEMA 250, Type 1, suitable for equipment application in places restricted to persons employed on the premises.

D. Finish: Manufacturer's standard enamel.

2.5 OPERATING REQUIREMENTS

A. Rated Input Voltage: 208 or 480 volts, three phase, 48-63 Hertz, +30%/-35% as indicated on the plans

B. Motor Nameplate Voltage: 200 or 460 volts, three phase, 60 Hertz as indicated on the plans.

C. Displacement Power Factor: Between 1.0 and 0.95, lagging, over entire range of operating speed and load.

D. Operating Ambient: 0 degrees C to 40 degrees C.

E. Current Limit Adjustment: 60 to 110 percent of rated.

F. Acceleration Rate Adjustment: minimum range 0.5 to 30 seconds.

G. Deceleration Rate Adjustment: minimum range 1 to 30 seconds.

H. Input Signal: two analog inputs, user selectable 0 to 10 VDC, 4 to 20 mA DC.

I. Output Signal: analog output signal proportional to motor speed, user selectable 0 to 10 VDC, 4 to 20 mA DC.

J. Suitable for variable torque loads.

K. Regenerative braking feature to permit direction of of regenerative energy from the motor back into the AC line.

L. DC injection brake feature, user selectable.

M. Suitable for operating on a circuit capable of delivering 100,000 AIC fault current.

N. Emergency Stop Interface: Input to receive dry contact closure to signal drive stop on alarm condition.

O. NEMA 1 enclosure.

2.6 COMPONENTS

A. Display with Keypad: Provide integral digital LCD back-lit display to indicate input power ON, output voltage, output frequency, output current, other operating parameters, programming parameters, faults, and configurations. Display shall be capable of indicating complete English words for programming and fault diagnostics (LED and alpha-numeric codes are not acceptable).

B. Include undervoltage protection/release, input phase loss protection, motor overcurrent protection, and ground fault protection.

C. Control Power Source: integral 24VDC, 250ma on-board source.

D. Output relays: Three output relays with programmable function, Form C, 250VAC/2Arms, programmable to respond to drive faults, drive current output level low, and drive current output level high. Programmable to read Form C relay output as proof of flow, signaling condition via keypad warning, relay output, and/or serial communications bus. Outputs shall include programmable time delays that shall allow acceleration from zero speed, without signaling a false underload condition.

E. Digital inputs: Six digital inputs, user programmable

F. Frequency rejection: Three independent programmable bands, user selectable width and mid-points, to prevent drive output of rejected frequencies.

G. PID Setpoint Controllers: Provide two (2) PID setpoint controllers to allow pressure and flow signals to be connected, closed loop controlled from the microprocessor.

H. Filters: Provide DV/DT filtering on drive output as recommended by drive manufacturer, motor manufacturer, or cooling tower manufacturer.

I. Filters: Provide EMI/RFI filtering in compliance with standard EN 61800-3 for the First Environment, restricted level with up to 100' of motor cables.

J. Disconnecting Means: Include integral fused disconnect switch on the line side of each controller.

K. Wiring Terminations: Match conductor materials and sizes indicated.

2.7 SOURCE QUALITY CONTROL

A. See Section 014000 - Quality Requirements for additional requirements.

B. Factory test controllers in accordance with NEMA ICS 61800-2.

C. Shop inspect and perform standard productions tests for each controller.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that ratings of controllers are consistent with indicated requirements.

C. Verify that mounting surfaces are ready to accept controllers.

D. Verify that conditions are satisfactory for installation prior to starting work.

E. Do not install controller until building environment can be maintained within the service conditions required by the manufacturer.

F. Inspect drives prior to installation; advise Owner's representative and Engineer of damage, conditions that will affect drive performance, or conditions that will void manufacturer's warranty.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install controllers in accordance with NECA 1 (general workmanship).

C. Install in accordance with NEMA ICS 7.1 and manufacturer's instructions.

D. Do not exceed manufacturer's recommended maximum cable length between controller and motor.

E. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

F. Provide required support and attachment in accordance with Section 260529.

G. Install controllers plumb and level.

H. Provide grounding and bonding in accordance with Section 260526.

I. Install field-installed devices, components, and accessories.

J. Where accessories are not self-powered, provide control power source as indicated or as required to complete installation.

K. Set field-adjustable settings of controllers and associated components according to installed motor requirements, in accordance with recommendations of manufacturers of controller and load.

L. Tighten accessible connections and mechanical fasteners after placing controller.

M. Provide fuses in separate fusible disconnect switches; refer to Section 26 2813 for product requirements.

N. Program drive overload protection in motor controllers to match installed motor characteristics. Program motor current low alarm levels and motor current high alarm levels.

O. Neatly type label identifying motor served, nameplate horsepower, full load amperes, code letter, service factor, and voltage/phase rating. Place in clear plastic holder mounted securely next to drive(s).

P. Install load side conductors in conduit separate from load side conductors of other variable frequency drives, separate from line side conductors, and separate from control conductors.

Q. Make connections for proper rotation of motor. Motor shall rotate in the proper direction with the drive programmed for forward rotation. Do not use the drive "reverse-run" programming feature to obtain proper motor rotation.

R. Record all drive settings on a copy of the manufacturer's settings charts. Provide one copy with each set of maintenance manuals delivered to the Owner.

S. Coordinate with the installer of the cooling tower to determine what, if any, frequency bands should be avoided due to vibration in the cooling tower. Program the drive to avoid rejected frequency bands.

3.3 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Perform inspections and tests listed in NETA ATS, Section 7.17. Insulation-resistance test on control wiring listed as optional is not required.

C. Correct deficiencies and replace damaged or defective controllers or associated components.

3.4 ADJUSTING

A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

B. Make final adjustments and programming changes to installed controller to assure proper operation of load system. Obtain performance requirements from installer of driven loads.

3.5 CLOSEOUT ACTIVITIES

A. Demonstrate operation of controllers in automatic and manual modes.

B. Provide computer based training CD or 8-hour professionally generated video (DVD format) to the owner. The training shall include installation, programming and operation of the VFD, bypass and serial communication.

3.6 MAINTENANCE

A. Provide service and maintenance of controllers for one year from Date of Substantial Completion.

B. Provide two hours on-site training for Owner's maintenance staff.

END OF SECTION

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Interior luminaires.

B. Emergency lighting units.

C. Exit signs.

D. Ballasts and drivers.

E. Accessories.

1.2 REFERENCE STANDARDS

A. IEEE C62.41.2 - IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits; 2002 (Corrigendum 2012).

B. IES LM-79 - Approved Method: Optical and Electrical Measurements of Solid-State Lighting Products; 2019.

C. IES LM-79 - Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products; Illuminating Engineering Society; 2008.

D. IES LM-80 - Approved Method: Measuring Maintenance of Light Output Characteristics of Solid-State Light Sources; 2021.

E. NECA/IESNA 500 - Standard for Installing Indoor Lighting Systems; 2006.

F. NECA/IESNA 502 - Standard for Installing Industrial Lighting Systems; 2006.

G. NEMA 410 - Performance Testing for Lighting Controls and Switching Devices with Electronic Drivers and Discharge Ballasts; 2023.

H. NEMA LE 4 - Recessed Luminaires, Ceiling Compatibility; 2012 (Reaffirmed 2018).

I. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

J. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

K. UL 1598 - Luminaires; Current Edition, Including All Revisions.

L. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the installation of luminaires with mounting surfaces installed under other sections or by others. Coordinate the work with placement of supports,

anchors, etc. required for mounting. Coordinate compatibility of luminaires and associated trims with mounting surfaces at installed locations.

2. Coordinate the placement of luminaires with structural members, ductwork, piping, equipment, diffusers, fire suppression system components, and other potential conflicts installed under other sections or by others.

3. Notify Engineer of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, installed accessories, and ceiling compatibility; include model number nomenclature clearly marked with all proposed features.

1. LED Luminaires:

a. Include estimated useful life, calculated based on IES LM-80 test data.

b. Submit only LED fixtures that are Energy Star or DLC listed.

c. Include IES LM-79 test report upon request.

B. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

C. Operation and Maintenance Data: Instructions for each product including information on replacement parts.

D. Maintenance Materials: Furnish the following for Nanuet Union Free School District's use in maintenance of project.

1. Extra Lenses and Louvers: Two percent of total quantity installed for each type, but not less than one of each type.

2. Extra LED Engines: Two percent of total quantity installed for each type, but not less than two of each type.

3. Extra Drivers: Two percent of total quantity installed for each type, but not less than one of each type.

E. Project Record Documents: Record actual connections and locations of luminaires and any associated remote components.

1.5 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.6 DELIVERY, STORAGE, AND PROTECTION

A. Receive, handle, and store products according to NECA/IESNA 500 (commercial lighting), NECA/IESNA 502 (industrial lighting), and manufacturer's written instructions.

B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

1.7 FIELD CONDITIONS

A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.8 WARRANTY

A. Provide three year manufacturer warranty for LED luminaires, including drivers.

B. Provide five year pro-rata warranty for batteries for emergency lighting units.

C. Provide ten year pro-rata warranty for batteries for self-powered exit signs.

PART 2 PRODUCTS

2.1 LUMINAIRE TYPES

A. Furnish products as indicated in luminaire schedule included on the drawings.

2.2 LUMINAIRES

A. Provide products that comply with requirements of NFPA 70.

B. Provide products that are listed and labeled as complying with UL 1598, where applicable.

C. Provide products listed, classified, and labeled as suitable for the purpose intended.

D. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.

E. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.

F. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

G. Recessed Luminaires:

1. Ceiling Compatibility: Comply with NEMA LE 4.

2. Luminaires Recessed in Insulated Ceilings: Listed and labeled as IC-rated, suitable for direct contact with insulation and combustible materials.

H. LED Luminaires:

1. Components: UL 8750 recognized or listed as applicable.

2. Tested in accordance with IES LM-79 and IES LM-80.

3. LED Estimated Useful Life: Minimum of 50,000 hours at 70 percent lumen maintenance, calculated based on IES LM-80 test data.

I. Luminaires Mounted in Continuous Rows: Provide quantity of units required for length indicated, with all accessories required for joining and aligning.

2.3 BALLASTS AND DRIVERS

A. Dimmable LED Drivers:

1. Dimming Range: Continuous dimming from 100 percent to one percent relative light output unless dimming capability to lower level is indicated, without flicker.

2. Control Compatibility: Fully compatible with the dimming controls to be installed.

a. Wall Dimmers: See Section 262726.

b. Wall Dimmers: See Section 26 09 23.

c. Daylighting Controls: See Section 260923.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.

C. Verify that suitable support frames are installed where required.

D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.

E. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.3 INSTALLATION

A. Coordinate locations of outlet boxes provided under Section 260533.16 as required for installation of luminaires provided under this section.

B. Install products in accordance with manufacturer's instructions.

C. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 500 (commercial lighting) and NECA 502 (industrial lighting).

D. Provide required support and attachment in accordance with Section 260529.

E. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.

F. Suspended Ceiling Mounted Luminaires:

1. Do not use ceiling tiles to bear weight of luminaires.

2. Do not use ceiling support system to bear weight of luminaires unless ceiling support system is certified as suitable to do so.

3. Secure lay-in luminaires to ceiling support channels using listed safety clips at four corners.

4. In addition to ceiling support wires, provide two galvanized steel safety wire(s), minimum 12 gauge, connected from opposing corners of each recessed luminaire to building structure.

G. Recessed Luminaires:

1. Install trims tight to mounting surface with no visible light leakage.

2. Non-IC Rated Luminaires: Maintain required separation from insulation and combustible materials according to listing.

H. Wall-Mounted Luminaires: Unless otherwise indicated, specified mounting heights are to center of luminaire.

I. Support recessed luminaires larger than 1 x 2 size independent of ceiling framing using two 12 gauge slack wires at opposite corners connected directly to structure.

J. Install accessories furnished with each luminaire.

K. Bond products and metal accessories to branch circuit equipment grounding conductor.

L. Identify luminaires connected to emergency power system in accordance with Section 260553.

M. Install lamps in each luminaire.

3.4 FIELD QUALITY CONTROL

A. Inspect each product for damage and defects.

B. Operate each luminaire after installation and connection to verify proper operation.

C. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Engineer.

3.5 ADJUSTING

A. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by Engineer. Secure locking fittings in place.

3.6 CLEANING

A. Clean surfaces according to NECA 500 (commercial lighting), NECA 502 (industrial lighting), and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

3.7 CLOSEOUT ACTIVITIES

A. Demonstration: Demonstrate proper operation of luminaires to Engineer, and correct deficiencies or make adjustments as directed.

B. Just prior to Substantial Completion, replace all fixtures that have failed.

3.8 PROTECTION

A. Protect installed luminaires from subsequent construction operations.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Communications system design requirements.

B. Communications pathways.

C. Copper cable and terminations.

D. Communications equipment room fittings.

E. Communications outlets.

F. Communications identification.

1.2 REFERENCE STANDARDS

A. BICSI N1 - Installation Practices for Telecommunications and ICT Cabling and Related Cabling Infrastructure, 1st Edition; 2019.

B. ICEA S-90-661 - Category 3 and 5E Individually Unshielded Twisted Pairs, Indoor Cables (With or Without an Overall Shield) for Use in General Purpose and LAN Communication Wiring Systems; 2021.

C. NECA/BICSI 568 - Standard for Installing Commercial Building Telecommunications Cabling; 2006.

D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

E. TIA-492AAAB-A - Detail Specification for 50-um Core Diameter/125-um Cladding Diameter Class Ia Graded-Index Multimode Optical Fibers; 2009a.

F. TIA-568 (SET) - Commercial Building Telecommunications Cabling Standard Set; 2020.

G. TIA-568.2 - Balanced Twisted-Pair Telecommunications Cabling and Components Standards; 2018d, with Addenda (2020).

H. TIA-569 - Telecommunications Pathways and Spaces; 2019e, with Addendum (2022).

I. TIA-568-C.2 - Balanced Twisted-Pair Telecommunications Cabling and Components Standards; 2009, with Addendum (2016).

J. TIA-568-C.3 - Optical Fiber Cabling Components Standard; 2016.

K. TIA-569-D - Telecommunications Pathways and Spaces; 2015d, with Addendum (2016).

L. TIA-607 - Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises; 2019d, with Addendum (2021).

M. TIA-606-B - Administration Standard for Telecommunications Infrastructure; Rev B, 2012 (with Addenda; 2015).

N. TIA-607-C - Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises; 2015c, with Addendum (2017).

O. UL 444 - Communications Cables; Current Edition, Including All Revisions.

P. UL 514C - Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers; Current Edition, Including All Revisions.

Q. UL 1863 - Communications-Circuit Accessories; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate requirements for service entrance and entrance facilities with Nanuet Central School District's IT representative.

2. Coordinate the work with other trades to avoid placement of other utilities or obstructions within the spaces dedicated for communications equipment.

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product.

B. Mock-Up. Prior to terminating cabling in MDF or IDF indicate proposed installation of cabling, rack, conduits, and wire management including required 20 foot slack and proper lacing and training of cables to the equipment rack. Indicate support methods to be used.

C. Evidence of qualifications for installer. Must be a certified installer with 5 years experience installing Cat 6 cabling systems of specified manufactuers.

D. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and operation of product.

E. Test Plan: Complete and detailed plan, with list of test equipment, procedures for inspection and testing, and intended test date; submit at least 60 days prior to intended test date.

F. Field Test Reports. Provide test results and include 20 year warranty for cable system.

G. Project Record Documents (As-Builts): Prepared and approved by BICSI Registered Communications Distribution Designer (RCDD).

1. Record actual locations of outlet boxes and distribution frames.

2. Show as-installed color coding, pair assignment, polarization, and cross-connect layout.

3. Identify distribution frames and equipment rooms by room number on drawings.

H. Operation and Maintenance Data: List of all components with part numbers, sources of supply, and operation and maintenance instructions; include copy of project record documents.

1.5 QUALITY ASSURANCE

A. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

B. Manufacturer Qualifications: At least 3 years experience manufacturing products of the type specified.

C. Installer Qualifications: A company having at least 3 years experience in the installation and testing of the type of system specified, and:

1. Employing a BICSI Registered Communications Distribution Designer (RCDD).

2. Supervisors and installers factory certified by manufacturers of products to be installed.

3. Employing BICSI Registered Cabling Installation Technicians (RCIT) for supervision of all work.

D. Products: Listed, classified, and labeled as suitable for the purpose intended.

E. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Keep stored products clean and dry.

1.7 WARRANTY

A. Correct defective Work within a 2 year period after Date of Substantial Completion.

B. Provide manufacturer's 20 year warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Cabling and Equipment:

1. Siemon Company: www.siemon.com.

2. ADC/Krone/Commscope.

3. Belden: www.belden.com.

4. Panduit.

5. Superior Essex: ce.superioressex.com.

6. Ortronics.

2.2 SYSTEM DESIGN

A. Provide a complete permanent system of cabling and pathways for voice and data communications, including cables, conduits and wireways, pull wires, support structures, enclosures and cabinets, and outlets.

1. Comply with TIA-568 (SET) (cabling) and TIA-569 (pathways) (commercial standards).

2. Comply with Communications Service Provider requirements.

3. Provide fixed cables and pathways that comply with NFPA 70 and TIA-607 and are UL listed or third party independent testing laboratory certified.

4. Provide connection devices that are rated for operation under conditions of 32 to 140 degrees F at relative humidity of 0 to 95 percent, noncondensing.

5. In this project, the term plenum is defined as return air spaces above ceilings, inside ducts, under raised floors, and other air-handling spaces.

B. System Description:

1. Offices and Work Areas: Provide one voice outlet and one data outlet in each work area or as indicated on the drawings.

C. Intermediate Distribution Frames (IDF): Support structures for terminating horizontal cables that extend to telecommunications outlets.

1. Locate intermediate distribution frames as indicated on the drawings.

D. Cabling to Outlets: Specified horizontal cabling, wired in star topology to distribution frame located at center hub of star; also referred to as "links".

2.3 PATHWAYS

A. Conduit: As specified in Section 260534. Use concealed in walls or where cabling must be run exposed or is subject to damage. Use J Hooks above accessible ceilings.

B. Firestop Sleeves: Listed; provide as required to preserve fire resistance rating of building elements.

1. Products:

a. HoldRite, a brand of Reliance Worldwide Corporation; HydroFlame Pro Series/HydroFlame Custom Built: www.holdrite.com/#sle.

2.4 COPPER CABLE AND TERMINATIONS

A. Copper Horizontal Cable:

1. Description: 100 ohm, balanced twisted pair cable complying with TIA-568.2 and listed and labeled as complying with UL 444.

2. Cable Type - Voice and Data: TIA-568 Category 6 UTP (unshielded twisted pair); 23 AWG.

a. Minimum compliance Cat 6 cable is not acceptable.

3. Cable Capacity: 4-pair.

4. Cable Applications:

a. Plenum Applications: Use listed NFPA 70 Type CMP plenum cable.

5. Cable Jacket Color -Data Cable: Blue.

a. Additional Colors willl be required depenednt on system: White, Yellow, and Green.

6. Product(s):

a. Commscope CMP-00423TE-7RB-06 (Formerly TE Connectivity TE620P-BL).

B. Copper Cable Terminations: Insulation displacement connection (IDC) type using appropriate tool; use screw connections only where specifically indicated.

C. Jacks and Connectors: Modular RJ-45, non-keyed, terminated with 110-style insulation displacement connectors (IDC); high impact thermoplastic housing; suitable for and complying with same standard as specified horizontal cable; UL 1863 listed.

1. Performance: 500 mating cycles.

2. Voice and Data Jacks: 8-position modular jack, color-coded for both T568A and T568B wiring configurations.

D. Copper Patch Cords:

1. Description: Factory-fabricated 4-pair cable assemblies with 8-position modular connectors terminated at each end.

2. Patch Cords for Patch Panels:

a. Quantity: For each cable installed as part of the work.

b. Length: 6 feet.

3. Patch Cords for Work Areas:

a. Quantity: For each cable installed as part of the work.

b. Length: 6 feet.

2.5 COMMUNICATIONS OUTLETS

A. Outlet Boxes: Comply with Section 260533.16.

1. Provide depth as required to accommodate cable manufacturer's recommended minimum conductor bend radius.

2. Minimum Size, Unless Otherwise Indicated:

a. Voice Only Outlets: 4 inch by 2 inch by 2-1/8 inch deep (100 by 50 by 54 mm) trade size.

b. Data or Combination Voice/Data Outlets: 4 inch square by 2-1/8 inch deep (100 by 54 mm) trade size.

B. Wall Plates:

1. Comply with system design standards and UL 514C.

2. Accepts modular jacks/inserts.

3. Capacity:

a. Voice Only Outlets: 1 ports.

b. Data or Combination Voice/Data Outlets: 2 ports.

c. Data Outlets in Computer Labs: Maximum 6 per faceplate.

4. Wall Plate Material/Finish - Flush-Mounted Outlets: Match wiring device and wall plate finishes specified on the drawings.

2.6 GROUNDING AND BONDING COMPONENTS

A. Comply with TIA-607.

B. Comply with Section 260526.

2.7 IDENTIFICATION PRODUCTS

A. Comply with TIA-606-B.

B. Comply with Section 260553.

2.8 SOURCE QUALITY CONTROL

A. Factory test cables according to TIA-568.

PART 3 EXECUTION

3.1 INSTALLATION - GENERAL

A. Comply with latest editions and addenda of TIA-568 (SET) (cabling), TIA-569 (pathways), TIA-607 (grounding and bonding), BICSI N1, NFPA 70, and SYSTEM DESIGN as specified in PART 2.

B. Comply with Nanuet Central School Districs's requirements.

C. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 078400.

3.2 INSTALLATION OF PATHWAYS

A. Install pathways with the following minimum clearances:

1. 48 inches from motors, generators, frequency converters, transformers, x-ray equipment, and uninterruptible power systems.

2. 12 inches from power conduits and cables and panelboards.

3. 5 inches from fluorescent and high frequency lighting fixtures.

4. 6 inches from flues, hot water pipes, and steam pipes.

B. Conduit, in Addition to Requirements of Section 260533.13:

1. Arrange conduit to provide no more than the equivalent of two 90 degree bend(s) between pull points.

2. Conduit Bends: Inside radius not less than 10 times conduit internal diameter.

3. Arrange conduit to provide no more than 100 feet between pull points.

4. Do not use conduit bodies.

C. Outlet Boxes:

1. Coordinate locations of outlet boxes provided under Section 260533.16 as required for installation of telecommunications outlets provided under this section.

a. Mounting Heights: Unless otherwise indicated, as follows:

1) Telephone and Data Outlets: 18 inches above finished floor.

2) Telephone Outlets for Side-Reach Wall-Mounted Telephones: 54 inches above finished floor to top of telephone.

3) Telephone Outlets for Forward-Reach Wall-Mounted Telephones: 48 inches above finished floor to top of telephone.

b. Orient outlet boxes for vertical installation of wiring devices unless otherwise indicated.

c. Provide minimum of 24 inches horizontal separation between flush mounted outlet boxes installed on opposite sides of fire rated walls.

d. Unless otherwise indicated, provide separate outlet boxes for line voltage and low voltage devices.

e. Locate outlet boxes so that wall plate does not span different building finishes.

f. Locate outlet boxes so that wall plate does not cross masonry joints.

3.3 INSTALLATION OF EQUIPMENT AND CABLING

A. Cabling:

1. Do not bend cable at radius less than manufacturer's recommended bend radius; for unshielded twisted pair use bend radius of not less than 4 times cable diameter.

2. Do not over-cinch or crush cables.

3. Do not exceed manufacturer's recommended cable pull tension.

4. When installing in conduit, use only lubricants approved by cable manufacturer and do not chafe or damage outer jacket.

B. Service Loops (Slack or Excess Length): Provide the following minimum extra length of cable, looped neatly:

1. At Distribution Frames (Copper): 180 inches.

2. At Distribution Frames (Fiber): 240 inches.

3. At Outlets - Copper: 12 inches.

C. Copper Cabling:

1. For 4-pair cables in conduit, do not exceed 25 pounds pull tension.

2. Use T568B wiring configuration.

D. Wall-Mounted Racks and Enclosures:

1. Install to plywood backboards only, unless otherwise indicated.

2. Mount so height of topmost panel does not exceed 78 inches above floor.

E. Identification:

1. Use wire and cable markers to identify cables at each end.

2. Use manufacturer-furnished label inserts, identification labels, or engraved wallplate to identify each jack at communications outlets with unique identifier.

3. Obtain the district's preferred labeling convention from district staff and provide proposed labeling for approval. Typical arrangement will be MDF-1, 2,3,4; IDF1-1,2,3,4; IDF2-1,2,3,4 where MDF or IDF corresponds to the location of the patch panel and the number corresponds to the sequential drop fed from that location.

3.4 FIELD QUALITY CONTROL

A. Comply with inspection and testing requirements of specified installation standards.

B. Visual Inspection:

1. Inspect cable jackets for certification markings.

2. Inspect cable terminations for color coded labels of proper type.

3. Inspect outlet plates and patch panels for complete labels.

C. Testing - Copper Cabling and Associated Equipment:

1. Category 5e and Above Links: Perform tests for wire map, length, attenuation, NEXT, and propagation delay.

D. Final Testing: After all work is complete, including installation of telecommunications outlets, and telephone dial tone service is active, test each voice jack for dial tone.

END OF SECTION

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fire alarm system design and installation, including all components, wiring, and conduit.

B. Removal and relocation of existing system components as indicated on drawings; including conduit and wiring. drawings.

C. Maintenance of fire alarm system under contract for specified warranty period.

1.2 REFERENCE STANDARDS

A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.

B. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

C. IEEE C62.41.2 - IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits; 2002 (Corrigendum 2012).

D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

E. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

F. NFPA 72 - National Fire Alarm and Signaling Code; 2013.

1.3 SUBMITTALS

A. Evidence of designer qualifications.

B. Fire Watch / Impairment Plan.

C. Design Documents: Submit all information required for plan review and permitting by authorities having jurisdiction, including but not limited to floor plans, riser diagrams, and description of operation:

1. Copy (if any) of list of data required by authority having jurisdiction.

2. NFPA 72 "Record of Completion", filled out to the extent known at the time.

3. Clear and concise description of operation, with input/output matrix similar to that shown in NFPA 72 Appendix A-7-5-2.2(9), and complete listing of software required.

4. System zone boundaries and interfaces to fire safety systems.

5. Location of all components, circuits, and raceways; mark components with identifiers used in control unit programming.

6. Circuit layouts; number, size, and type of raceways and conductors; conduit fill calculations; spare capacity calculations; notification appliance circuit voltage drop calculations.

7. List of all devices on each signaling line circuit, with spare capacity indicated.

8. Manufacturer's detailed data sheet for each component, including wiring diagrams, installation instructions, and circuit length limitations.

9. Description of power supplies; if secondary power is by battery include calculations demonstrating adequate battery power.

10. Certification by either the manufacturer of the control unit or by the manufacturer of each other component that the components are compatible with the control unit.

11. Certification by the manufacturer of the control unit that the system design complies with Contract Documents.

12. Certification by Contractor that the system design complies with Contract Documents.

13. Do not show existing components to be removed.

D. Evidence of installer qualifications.

E. Evidence of instructor qualifications; training lesson plan outline.

F. Evidence of maintenance contractor qualifications, if different from installer.

G. Inspection and Test Reports:

1. Submit inspection and test plan prior to closeout demonstration.

2. Submit documentation of satisfactory inspections and tests.

3. Submit NFPA 72 "Inspection and Test Form," filled out.

H. Operating and Maintenance Data: Revise and resubmit until acceptable; have one set available during closeout demonstration:

1. Complete set of specified design documents, as approved by authority having jurisdiction.

2. Additional printed set of project record documents and closeout documents, bound or filed in same manuals.

3. Contact information for firm that will be providing contract maintenance and trouble call-back service.

4. List of recommended spare parts, tools, and instruments for testing.

5. Replacement parts list with current prices, and source of supply.

6. Detailed troubleshooting guide and large scale input/output matrix.

7. Preventive maintenance, inspection, and testing schedule complying with NFPA 72; provide printed copy and computer format acceptable to Nanuet Union Free School District.

8. Detailed but easy to read explanation of procedures to be taken by non-technical administrative personnel in the event of system trouble, when routine testing is being conducted, for fire drills, and when entering into contracts for remodeling.

I. Project Record Documents: Have one set available during closeout demonstration:

1. Complete set of floor plans showing actual installed locations of components, conduit, and zones.

2. "As installed" wiring and schematic diagrams, with final terminal identifications.

3. "As programmed" operating sequences, including control events by device, updated input/output chart, and voice messages by event.

J. Closeout Documents:

1. Certification by manufacturer that the system has been installed in compliance with manufacturer's installation requirements, is complete, and is in satisfactory operating condition.

2. NFPA 72 "Record of Completion", filled out completely and signed by installer and authorized representative of authority having jurisdiction.

3. Certificate of Occupancy.

4. Report on training results.

1.4 QUALITY ASSURANCE

A. Designer Qualifications: NICET Level III or IV (3 or 4) certified fire alarm technician or registered fire protection engineer, employed by fire alarm control panel manufacturer or installer with experience designing fire alarm systems in the jurisdictional area of the authorities having jurisdiction.

B. Installer Qualifications: Firm with minimum 3 years documented experience installing fire alarm systems of the specified type and providing contract maintenance service as a regular part of their business.

1. Authorized representative of control unit manufacturer; submit manufacturer's certification that installer is authorized; include name and title of manufacturer's representative making certification.

2. Installer Personnel: At least 2 years of experience installing fire alarm systems.

3. Supervisor: NICET level III or IV (3 or 4) certified fire alarm technician; furnish name and address.

4. Licensed in New York as fire alarm installer.

C. Maintenance Contractor Qualifications: Same entity as installer or different entity with specified qualifications.

D. Instructor Qualifications: Experienced in technical instruction, understanding fire alarm theory, and able to provide the required training; trained by fire alarm control unit manufacturer.

1.5 WARRANTY

A. Provide control panel manufacturer's warranty that system components other than wire and conduit are free from defects and will remain so for 1 year after date of Substantial Completion.

B. Provide installer's warranty that the installation is free from defects and will remain so for 1 year after date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Fire Alarm Control Units: High School is existing Edwards EST3 Voice Evacuation System. Elementary and Middle schools will be new Voice Evacuation Systems.

B. Fire Alarm Control Units and Accessories - Other Acceptable Manufacturers:

1. Honeywell Security & Fire Solutions/Notifier: www.notifier.com/#sle.

2. Simplex, a brand of Johnson Controls: www.simplex-fire.com/#sle.

C. Initiating Devices and Notification Appliances:

1. Provide initiating devices and notification appliances made by the same manufacturer, where possible.

2.2 FIRE ALARM SYSTEM

A. Fire Alarm System: Provide a new fire detection and alarm system for the middle school and elementary school. The high school will be extensions and modifications to the existing fire alarm system.

B. There are several different buildings, each with their own existing fire detection and alarm system. There are several different existing systems in the buildings. Refer to the drawings for information on each existing system. All components provided must be compatible with the existing system that they will be connected to.

1. Provide all components necessary, regardless of whether shown in the contract documents or not.

2. Protected Premises: Entirity of each building shown on the drawings.

3. Comply with the following:

a. 2020 New York State Building Code.

b. 2020 Fire Code of New York.

c. ADA Standards.

d. ICC / ANSI A117.1.

e. The requirements of the State Fire Marshal.

f. The requirements of the local authority having jurisdiction.

g. Applicable local codes.

h. Contract Documents (drawings and specifications).

i. NFPA 72; where the word "should" is used consider that provision mandatory; where conflicts between requirements require deviation from NFPA 72, identify deviations clearly on design documents.

4. Evacuation Alarm: Single smoke zone; general evacuation of entire premises.

5. Hearing Impaired Occupants: Provide visible notification devices where shown on the plans.

6. Master Control Unit (Panel): New, located where indicated on drawings. High school is existing.

7. Combined Systems: Do not combine fire alarm system with other non-fire systems.

C. Supervising Stations and Fire Department Connections:

1. Public Fire Department Notification: By remote supervising station.

2. Remote Supervising Station: UL-listed central station under contract to facility.

3. Means of Transmission to Remote Supervising Station: Digital alarm communicator transmitter (DACT), 2 telephone lines.

D. Circuits:

1. Initiating Device Circuits (IDC): Class B, Style A.

2. Signaling Line Circuits (SLC) Within Single Building: Class B, Style 0.5.

3. Signaling Line Circuits (SLC) Between Buildings: Class A, Style 2.

4. Notification Appliance Circuits (NAC): Class B, Style W.

E. Spare Capacity:

1. Initiating Device Circuits: Minimum 50 percent spare capacity.

2. Notification Appliance Circuits: Minimum 50 percent spare capacity.

3. Fire Alarm Control Units: Capable of handling all circuits utilized to capacity without requiring additional components other than plug-in control modules.

F. Power Sources:

1. Primary: Dedicated branch circuits of the facility power distribution system.

2. Secondary: Storage batteries.

3. Capacity: Sufficient to operate entire system for period specified by NFPA 72.

4. Each Computer System: Provide uninterruptible power supply (UPS).

2.3 EXISTING COMPONENTS

A. Existing Fire Alarm System (Elementary and Middle School): Remove existing system completely after new system is fully operational and tested.

B. Existing Fire Alarm System (High School): Remove existing components indicated. Provide new components indicated and connect to existing system. Do not take existing portions of system out of service until new portions are fully operational, tested, and connected to existing system.

C. Remove components that are "Not In Service."

D. Remove unused existing components and materials from site and dispose of properly.

2.4 FIRE SAFETY SYSTEMS INTERFACES

A. Trouble Alarms: Provide trouble signals in accordance with NFPA 72 for the following:

1. AC Power Failure.

2. Fire alarm system low battery.

3. Open circuit, short circuit, ground fault.

4. Device fault such as dirty smoke detector, malfunctioning monitor module, etc.

5. Other faults of a monitored circuit, system, or component.

B. Supervision: Provide supervisory signals in accordance with NFPA 72 for the following:

1. Sprinkler water control valves.

2. Dry-pipe sprinkler system pressure.

3. Fire pump(s).

4. Elevator shut-down control circuits.

5. Diesel fire pump control panel.

6. CO detector Alarm.

C. Alarm: Provide alarm initiation in accordance with NFPA 72 for the following:

1. Any smoke or heat detector.

2. Any manual pull station.

3. Sprinkler water flow.

4. Kitchen hood suppression activation; also disconnect fuel source from cooking equipment.

5. Elevator lobby, elevator hoistway, and elevator machine room smoke detectors.

6. Fire pump room heat detector.

7. Duct smoke detectors.

8. Upon alarm of fire alarm system shut down HVAC equipment that is connected to the fire alarm system as indicated on the plans.

D. CO Detector Activation.

1. CO detectors shall report to the fire alarm panel alarm, supervisory, and trouble conditions. An alarm or supervisory signal from a CO detector shall appear at the main FACU as a supervisory alarm and will not cause the building fire alarm system to activate. A CO detector alarm will cause that CO detector to alarm (Temporal 4) and all CO detectors on the floor to alarm and transmit the location of the CO detector to the FACU. A CO alarm will be transmitted to the central supervising station. The CO alarms will be self restoring in that if the CO alarm that activated clears an alarm condition all CO detectors will stop alarming unless the presence of CO is detected again by a CO detector.

E. Elevators:

1. Elevator lobby, hoistway, and machine room smoke detectors: Elevator recall for fire fighters' service.

a. Upon alarm of any of those detector return elevator the primary recall floor unless the detector in alarm is on the primary recall floor. In that case recall elevator to secondary recall floor.

2. Elevator Machine Room Heat Detector: Shut down elevator power prior to hoistway sprinkler activation.

3. Sprinkler pressure or waterflow: Shut down elevator power prior to hoistway sprinkler activation.

F. HVAC:

1. Duct Smoke Detectors: Close dampers indicated; shut down air handlers indicated.

2. Exhaust and/or Transfer fans over 1000 CFM indicated on the plans: shut down upon general alarm of building.

G. Doors:

1. Smoke Barrier Door Magnetic Holders: Release upon activation of smoke detectors in smoke zone on either side of door, upon alarm from manual pull station on same floor, and upon sprinkler activation on same floor.

2. Electromagnetic Door Locks on Egress Doors: Unlock upon activation of any alarm initiating device or suppression system in smoke zone that doors serve as egress from.

3. Overhead Coiling Fire Doors: Release upon activation of smoke detectors in smoke zone on either side of door, upon alarm from manual pull station on same floor, and upon sprinkler activation on same floor.

2.5 COMPONENTS

A. General:

1. Provide flush mounted units where installed in finish areas; in unfinished areas, surface mounted unit are acceptable.

2. Provide legible, permanent labels for each control device, using identification used in operation and maintenance data.

B. Fire Alarm Control Units: Analog, addressable type; listed, classified, and labeled as suitable for the purpose intended.

C. Manual Fire Alarm Stations:

1. Semi-Flush mounted, dual action manual station and manufacturer's standard backbox.

2. Each manual station shall store the address of that unit.

D. Analog Smoke and Heat Sensors:

1. Analog Photo Sensors:

a. Each sensor shall store the sensor address and operating characteristics in non-volatile memory at the sensor. Sensor shall use a threshold received from the control unit to determine when an alarm condition exists.

b. Each sensor shall have two alarm LED's for 360 degree viewing. The alarm LED's shall flash when communicating with the control panel and shall illuminate steady during alarm conditions.

c. Sensitivity settings for photoelectric sensors shall be set and displayed on the LCD in percent obscuration per foot.

d. Each sensor shall be capable of compensating for dust and dirt accumulation within the sensing chamber.

e. A calibrated light source shall be used to calibrate the fire level of the photoelectric sensor. Sensors which use a fixed fire level limit are not acceptable.

f. Provide two-wire detector with common power supply and signal circuits.

2. Analog Thermal Sensors:

a. Each sensor shall store the sensor address and operating characteristics in non-volatile memory at the sensor; sensor shall use a threshold received from the control unit to determine when an alarm condition exists.

b. Each sensor shall have two alarm LED's for 360 degree viewing. The alarm LED's shall flash when communicating with the control panel and shall illuminate steady during alarm conditions.

c. Sensitivity settings for thermal sensors shall be set and displayed on the LCD in degrees fahrenheit. The set point for the thermal sensor shall be adjustable between 135 degrees and 200 degrees. The thermal detector shall operate on a combination rate of rise and fixed temperature principle adjustable at the fire alarm panel.

d. Provide two-wire detector with common power supply and signal circuits.

3. Analog Duct Mounted Smoke Detectors:

a. Each sensor shall store the sensor address and operating characteristics in non-volatile memory at the sensor; sensor shall use a threshold received from the control unit to determine when an alarm condition exists.

b. Sensitivity settings for photoelectric sensors shall be set and displayed on the LCD in percent obscuration per foot.

c. Equip duct smoke detectors with auxiliary SPDT relay contact and indication of detector actuation via an in duct-mounted housing and remote indicator indicating Normal and Alarm conditions.

d. Duct sampling tubes extending width of duct.

e. Provide two-wire detector with common power supply and signal circuits.

4. Addressable Combination Fire/Smoke//Carbon Monoxide (CO) Detector.

a. Ability to sense smoke, CO, and/or Heat.

b. Automatic drift compensation of smoke sensor and CO cell.

c. Separate CO detection signal.

d. Use in conjunction with intelligent sounder base, which can generate either a Temp 3 pattern for fire or a Temp 4 pattern for CO alarm indication.

E. Peripheral Fire Alarm Equipment:

1. Fast Response Contact Module:

a. Contact modules shall provide monitoring of dry contacts as initiating devices.

b. Each module shall store the sensor address and operating characteristics in non-volatile memory at the module.

c. Mount module to a standard junction box and provide visual indication of status via a status LED. Optional mounting shall be available to allowing mounting the module in a junction box with a monitored contact.

2. Supervised Output Module:

a. Each supervised output module shall be rated to operate listed notification appliances.

b. Circuit shall be rated for 2.0 amps at 24 VDC.

c. Each module shall store the sensor address and operating characteristics in non-volatile memory at the module.

d. Each module shall operate under up to 16 different conditions occurring in the system. These conditions include combining various zones and zone states.

3. Dual Relay Module:

a. Module shall provide two independently operating and configurable relays.

b. Each relay shall be rated for 2.0 amps at 24 VDC.

c. Each module shall store the sensor address and operating characteristics in non-volatile memory at the module.

d. Each module shall operate under up to 16 different conditions occurring in the system. These conditions include combining various zones and zone states.

e. Module shall operate both relays without requiring a separate power source.

F. Fire Alarm Notification Appliances:

1. Strobes: NFPA 72 lamp and flasher with red lettered "FIRE" on clear clear lens.

a. Meeting requirements of NFPA/ANSI standards and ADA Accessibility Guidelines.

b. Field adjustable from 15, 30, 75, and 110 candela.

2. Speakers: NFPA 72 Flush type fire alarm speaker.

a. High quality voice and tone reproduction with taps for 1/4 W, 1/2 W , 1W, or 2 W, at 25 VRMS or 70.7 VRMS.

b. Minimum rating of 76 decibels, field adjustable up to 86 decibels.

3. Speaker/Strobes.

a. Combination units with ratings of horn and strobe units specified.

G. Initiating Devices

1. Addressable Systems:

a. Addressable Devices: Individually identifiable by addressable fire alarm control unit.

b. Provide suitable addressable interface modules as indicated or as required for connection to conventional (non-addressable) devices and other components that provide a dry closure output.

2. Manual Pull Stations:Provide 2% extra.

3. Smoke Detectors: Provide 2% extra.

4. Duct Smoke Detectors: Provide 4 extra.

5. Heat Detectors: Provide 2% extra.

6. CO Detectors: Provide 2 extra.

7. Addressable Monitoring Devices: Provide 5 extra.

8. Addressable Control Devices: Provide 5 extra.

H. Notification Appliances:

1. Combination Speaker Strobe Unit: Provide 3 extra.

2. Strobes: Provide 2 extra.

I. Circuit Conductors: Copper.

J. Fire Alarm Wire and Cable.

1. Fire Alarm Power Branch Circuits: Building wire as specified in Section 16123.

2. Initiating Device and Indicating Appliance Circuits: Power limited fire-protective signaling cable classified for fire and smoke characteristics, copper conductor, 300 volts insulation rated 105 degrees C, suitable for use in air handling ducts, hollow spaces used as ducts, and plenums.

K. Surge Protection: In accordance with IEEE C62.41.2 category B combination waveform and NFPA 70; except for optical fiber conductors.

1. Equipment Connected to Alternating Current Circuits: Maximum let through voltage of 350 V(ac), line-to-neutral, and 350 V(ac), line-to-line; do not use fuses.

2. Initiating Device Circuits, Notification Appliance Circuits, and Communications Circuits: Provide surge protection at each point where circuit exits or enters a building; rated to protect applicable equipment; for 24 V(dc) maximum dc clamping voltage of 36 V(dc), line-to-ground, and 72 V(dc), line-to-line.

L. Instruction Charts: Printed instruction chart for operators, showing steps to be taken when a signal is received (normal, alarm, supervisory, and trouble); easily readable from normal operator's station.

1. Frame: Stainless steel or aluminum with polycarbonate or glass cover.

2. Provide one for each control unit where operations are to be performed.

3. Obtain approval of Nanuet Union Free School District prior to mounting; mount in location acceptable to Nanuet Union Free School District.

4. Provide extra copy with operation and maintenance data submittal.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with applicable codes, NFPA 72, NFPA 70, and Contract Documents.

B. Conceal all wiring, conduit, boxes, and supports where installed in finished areas or where wiring must be run in walls concealed provide conduit and cable. Where installed above drop ceilings fire alarm Type MC Cable may be used and must be colored red.

C. Install instruction cards and labels.

3.2 INSPECTION AND TESTING FOR COMPLETION

A. Notify Nanuet Union Free School District 7 days prior to beginning completion inspections and tests.

B. Notify authorities having jurisdiction and comply with their requirements for scheduling inspections and tests and for observation by their personnel.

C. Provide the services of the installer's supervisor or person with equivalent qualifications to supervise inspection and testing, correction, and adjustments.

D. Prepare for testing by ensuring that all work is complete and correct; perform preliminary tests as required.

E. Provide all tools, software, and supplies required to accomplish inspection and testing.

F. Perform inspection and testing in accordance with NFPA 72 and requirements of local authorities; document each inspection and test.

G. Correct defective work, adjust for proper operation, and retest until entire system complies with Contract Documents.

H. Diagnostic Period: After successful completion of inspections and tests, Operate system in normal mode for at least 14 days without any system or equipment malfunctions.

1. Record all system operations and malfunctions.

2. If a malfunction occurs, start diagnostic period over after correction of malfunction.

3. Nanuet Union Free School District will provide attendant operator personnel during diagnostic period; schedule training to allow Nanuet Union Free School District personnel to perform normal duties.

4. At end of successful diagnostic period, fill out and submit NFPA 72 "Inspection and Testing Form."

3.3 NANUET UNION FREE SCHOOL DISTRICT PERSONNEL INSTRUCTION

A. Provide the following instruction to designated Nanuet Union Free School District personnel:

1. Hands-On Instruction: On-site, using operational system.

2. Classroom Instruction: Nanuet Union Free School District furnished classroom, on-site or at other local facility.

B. Basic Operation: One-hour sessions for attendant personnel, security officers, and engineering staff; combination of classroom and hands-on:

1. Initial Training: 1 session pre-closeout.

C. Detailed Operation: Two-hour sessions for engineering staff; assume NICET level I qualifications or equivalent; combination of classroom and hands-on:

1. Initial Training: 1 session pre-closeout.

D. Provide means of evaluation of trainees suitable to type of training given; report results to Nanuet Union Free School District.

3.4 CLOSEOUT

A. Closeout Demonstration: Demonstrate proper operation of all functions to Nanuet Union Free School District.

1. Be prepared to conduct any of the required tests.

2. Have at least one copy of operation and maintenance data, preliminary copy of project record drawings, input/output matrix, and operator instruction chart(s) available during demonstration.

3. Have authorized technical representative of control unit manufacturer present during demonstration.

4. Demonstration may be combined with inspection and testing required by authority having jurisdiction; notify authority having jurisdiction in time to schedule demonstration.

5. Repeat demonstration until successful.

B. Substantial Completion of the project cannot be achieved until inspection and testing is successful and:

1. Specified diagnostic period without malfunction has been completed.

2. Approved operating and maintenance data has been delivered.

3. All aspects of operation have been demonstrated to Nanuet Union Free School District.

4. Final acceptance of the fire alarm system has been given by authorities having jurisdiction.

5. Occupancy permit has been granted.

6. Specified pre-closeout instruction is complete.

C. Perform post-occupancy instruction within 3 months after Substantial Completion.

3.5 MAINTENANCE

A. Provide to Nanuet Union Free School District, a proposal for later acceptance, for a maintenance contract for entire warranty period, to include the work described below; include the total cost of contract, proposal to be valid at least until 30 days after date of Substantial Completion.

B. Perform routine inspection, testing, and preventive maintenance required by NFPA 72, including:

1. Maintenance of fire safety interface and supervisory devices connected to fire alarm system.

2. Repairs required, unless due to improper use, accidents, or negligence beyond the control of the maintenance contractor.

3. Record keeping required by NFPA 72 and authorities having jurisdiction.

C. Provide trouble call-back service upon notification by Nanuet Union Free School District:

1. Provide on-site response within 2 hours of notification.

2. Include allowance for call-back service during normal working hours at no extra cost to Nanuet Union Free School District.

3. Nanuet Union Free School District will pay for call-back service outside of normal working hours on an hourly basis, based on actual time spent at site and not including travel time; include hourly rate and definition of normal working hours in maintenance contract.

D. Provide a complete description of preventive maintenance, systematic examination, adjustment, cleaning, inspection, and testing, with a detailed schedule.

E. Maintain a log at each fire alarm control unit, listing the date and time of each inspection and call-back visit, the condition of the system, nature of the trouble, correction performed, and parts replaced. Submit duplicate of each log entry to Nanuet Union Free School District's representative upon completion of site visit.

F. Comply with Nanuet Union Free School District's requirements for access to facility and security.

END OF SECTION

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