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PROJECT MANUAL

**IRVINGTON UNION FREE SCHOOL DISTRICT
6 DOWS LANE
IRVINGTON, NEW YORK 10533**

MAIN STREET SCHOOL RENOVATIONS

SED Control #66-04-02-02-2-001-016

Project No: IRSD 1910

**CONTRACT G - GENERAL CONSTRUCTION & ASBESTOS
ABATEMENT WORK**

**SED FINAL BID SET
NOVEMBER 2021**

H2M Architects + Engineers

2700 Westchester Ave, Purchase, NY 10577
tel 914.358.5623 fax 914.358.5624

www.h2m.com

The design of this project conforms to all applicable provision of the New York State Uniform Fire Prevention and Building Code, the New York State Energy Conservation Code, and the building standards of the New York State Education Department.

IRVINGTON UNION FREE SCHOOL DISTRICT

MAIN STREET SCHOOL RENOVATIONS

SED Control No. 66-04-02-02-2-0001-016

CONTRACT G – GENERAL CONSTRUCTION WORK

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Notice is hereby given that **SEALED PROPOSALS** for:

Irvington Union Free School District

RENOVATIONS AT MAIN STREET SCHOOL

SED: #66-04-02-02-0-001-016

CONTRACT G - GENERAL CONSTRUCTION

will be received until **10:30 AM on 12/20/2021** at the Irvington Union Free School District Office located at **6 Dows Lane, Irvington, NY 10533, side entrance security desk. If the School District is closed to students for any reason that day, staff will be present to accept bid packets from 8am until posted bid time. Bids may also be mailed or accepted through express mail carriers.**

Complete sets of Hard Copy Bidding Documents, Drawings and Specifications, may be obtained beginning **11/18/2021**, from REVplans, 28 Church Street, Unit 7, Warwick, New York 10990, Tel: 1-877- 272-0216, upon depositing the sum of **One Hundred Dollars (\$100.00)** for each combined set of documents. Checks or money orders shall be made payable to Irvington Union Free School District. Plan deposit is refundable in accordance with the terms in the Instructions to Bidders to all submitting bids. Any bidder requiring documents to be shipped shall make arrangements with the printer and pay for all packaging and shipping costs.

As a convenience to the Contractor digital Bidding Documents, Drawings and Specifications may be obtained from the following website: www.revplans.com as an online download for a nonrefundable fee of **Forty-Nine Dollars (\$49.00)**, in form of credit card.

Please note REVplans and www.revplans.com are the designated locations and means for distributing and obtaining all bid package information. All bidders are urged to register to ensure receipt of all necessary information, including bid addenda.

All bid addenda will be transmitted to registered plan holders via email and will be available at www.revplans.com. Plan holders who have paid for hard copies of the bid documents will need to make the determination if hard copies of the addenda are required for their use, and coordinate directly with REVplans 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.

Bids must be made on the standard proposal form in the manner designated therein and as required by the specifications that must be enclosed in sealed opaque envelopes bearing the name of the job, contract type and name and address of the bidder on the outside, addressed to: "PURCHASING AGENT, Irvington Union Free School District", and clearly marked on the outside, "MAIN STREET SCHOOL RENOVATIONS". The School District is not responsible for bids opened prior to the bid opening if bid name, contract type 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 Irvington Union Free School District, as well as of improper hand delivery. The bid opening will be in the District office.

Each proposal submitted must be accompanied by a certified check or bid bond, made payable to the "Irvington Union Free School District", in an amount equal to ten percent (10%) of the total amount of the bid, as a commitment by the bidder that, if its bid is accepted, it will enter into a contract to perform the work and will execute such further security as may be required for the faithful performance of the contract.

Certification of bonding company is required for this bid. See Instructions for Bidders.

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

A pre-bid meeting and walk-thru shall be scheduled by appointment only as follows:

Tuesday, November 30th, 2021 at 10:30 am at the Main Street School, 101 Main Street, Irvington, NY 10533.

Potential bidders are asked to contact Kevin Sawyer, Vice President, Project Executive regarding any other site visits:

Kevin Sawyer
Vice President, Project Executive
Triton Construction Company
30 East 33rd Street - 11th Floor | New York, NY 10016 office 212.388.5700 | mobile 845.821.3354
e-mail: k-sawyer@tritonconstruction.net

Bidders are asked to follow NYS DOH and District directives during the pre-bid walk thru, including wearing a mask and be COVID-19 symptom free. Although the pre-bid meeting and walk-thru are **not** mandatory, it is highly recommended that all potential bidders make arrangements to visit the site.

It is the Board's intention to award the contract to the lowest responsible, responsive bidder in compliance with the specifications providing the required security who can meet the experience, technical and budget requirements. The Board reserves the right to reject any or all bids, waive any informality and to accept such bid which, in the opinion of the Board, is in the best interests of the School District.

By Order of the Board of Education
Irvington Union Free School District
6 Dows Lane
Irvington, NY 10533

BIDS FOR PROJECT

The Board of Education of the Irvington Union Free School District (hereafter called School District), will receive **SEALED PROPOSALS** for:

Irvington Union Free School District
Main Street School Renovations
SED: 66-05-01-06-0-001-016
CONTRACT G - GENERAL CONSTRUCTION

TIME AND PLACE

The sealed proposals are to be submitted at the:

Irvington Union Free School District
ADMINISTRATION OFFICE
6 Dows Lane
Irvington, New York 10533

See notice to bidders for all dates and times.

REQUIRED BID SUBMISSIONS

Each bid submission shall consist of three (3) sealed envelopes containing the following items. The bidder shall carefully remove all forms from the project specification. The project manual should not be submitted or included in the bid package.

Envelope No. 1 - BID PROPOSAL:

This envelope shall be clearly marked with the name of the project, bidders name and marked "**BID PROPOSAL**" in large lettering on the envelope and shall contain the following items:

1. Certified check or Bid Bond in the amount totaling 10% of the base bid.
2. Certified letter from Bonding Company, indicating that they meet the criteria set forth in article 11 of the General Conditions.
3. Certified letter that the company bidding this project has been in business under the same name for a period of five years or longer, and is not currently disbarred from bidding or working on public works projects by the New York State Department of Labor.
4. One (1) fully executed original and one (1) copy (marked "copy") of the following:
 - a. Proposal forms (P-sheets).

- b. Non-collusive form.
- c. Hold Harmless Agreement.
- d. Certification of Compliance with the Iran Divestment Act or Declaration of Bidder's Inability to provide Certification of Compliance with the Iran Divestment Act.
- e. Insurance Certification
- f. 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. Each bid must be accompanied by the Insurance Certification Form located in the specifications Failure to provide may result in the Owner finding the bidder "non-responsive" to the bid documents.
- g. Sexual Harassment Prevention Certification

5. Single Prime Contractor - Sealed Subcontractor List: The contract seeks bids from a single prime contractor. Each bidder shall submit with its bid a separate sealed list that names each subcontractor that the bidder will use to perform work on the contract, and the agreed-upon amount to be paid to each, for: (a) plumbing and gas fitting, (b) steam heating, hot water heating, ventilating and air conditioning apparatus and (c) electric wiring and standard illuminating fixtures. After the low bid is announced, the sealed list of subcontractors submitted with such low bid shall be opened and the names of such subcontractors shall be announced, and thereafter any change of subcontractor or agreed-upon amount to be paid to each shall require the approval of the school district, upon a showing presented to the school district of legitimate construction need for such change, which shall be open to public inspection. Legitimate construction need shall include, but not be limited to, a change in project specifications, a change in construction material costs, a change to subcontractor status as determined pursuant to paragraph (e) of subdivision two of section two hundred twenty-two of the labor law, or the subcontractor has become otherwise unwilling, unable or unavailable to perform the subcontract. The sealed lists of subcontractors submitted by all other bidders shall be returned to them unopened after the contract award.

Envelope No. 2 - BID QUALIFICATIONS:

This envelope shall be clearly marked with the name of the project, bidders name and marked "**BID QUALIFICATIONS**" in large lettering on the envelope and shall contain the following items:

1. A description of its experience with projects of comparative size, complexity and cost together with documentary evidence showing that said projects were completed to the Owner's satisfaction and were completed in a timely fashion.
2. Documentation from five projects completed within the past five years:
 - a. timeliness of performance of the work of the project.
 - b. evidence that the project was completed to the Owner's satisfaction.
 - c. whether any extensions of time were requested and if such requests were granted.
 - d. whether litigation and/or arbitration was commenced by either the Owner or the bidder as a result of the work of the project completed by the bidder.

- e. whether any liens were filed on the project by subcontractors or material suppliers of the bidder.
 - f. whether the bidder was defaulted on the project by the owner.
 - g. whether the bidder made any claims for extra work on the project, including whether said claim resulted in a change order.
3. Documentation evidencing the bidder's financial responsibility, including a certified financial statement.
 4. Fully completed statement of bidder's qualification.
 5. Fully completed list of subcontractors.

Envelope No. 3 SINGLE PRIME CONTRACTOR - SEALED SUB-CONTRACTOR LIST:

The contract seeks bids from a single prime contractor. Each bidder shall submit with its bid a separate sealed list that names each subcontractor that the bidder will use to perform work on the contract, and the agreed-upon amount to be paid to each, for: (a) plumbing and gas fitting, (b) steam heating, hot water heating, ventilating and air conditioning apparatus and (c) electric wiring and standard illuminating fixtures. After the low bid is announced, the sealed list of subcontractors submitted with such low bid shall be opened and the names of such subcontractors shall be announced, and thereafter any change of subcontractor or agreed-upon amount to be paid to each shall require the approval of the school district, upon a showing presented to the school district of legitimate construction need for such change, which shall be open to public inspection. Legitimate construction need shall include, but not be limited to, a change in project specifications, a change in construction material costs, a change to subcontractor status as determined pursuant to paragraph (e) of subdivision two of section two hundred twenty-two of the labor law, or the subcontractor has become otherwise unwilling, unable or unavailable to perform the subcontract. The sealed lists of subcontractors submitted by all other bidders shall be returned to them unopened after the contract award.

DETERMINATION OF BIDDERS

In the consideration and acceptance of any proposal, the School District shall be entitled to exercise every measure of lawful discretion in evaluating the financial history and ability of the Bidder and its past performance in ventures of this or similar nature. Such data will be considered either as a material or controlling factor in the acceptance of any bid submitted.

1. Bidders must prove to the satisfaction of the School District that they are reputable, reliable and responsible.
2. The School District may make any investigation it deems necessary to assure itself of the ability of the Bidder to perform the work.
3. The School District reserves the right to reject any or all proposals and to accept the proposal it deems in the best interest of the School District.
4. 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.

DEPOSITS

Bidders deposit will be refunded if the set is returned in good condition within thirty (30) days following the award of the contract or the rejection of the bids covered by such plans and specifications. Non-bidders shall receive partial reimbursement, in an amount equal to the amount of the deposit, less the actual cost of reproduction of the documents if the set is returned in good condition within thirty (30) days following the award of the contract or the rejection of the bids covered by such plans and specifications.

VERBAL ANSWERS

The School District, its agents, servants, employees and the Architect/Engineer shall not be responsible in any manner for **verbal** answers to inquiries made regarding the meaning of the contract documents, drawings or the specifications prior to the awarding of the contract.

For information with reference to the work and its location during bid phase by prospective bidders' questions shall be submitted in writing to:

Brian Paddack, RA

Senior Architect

H2M Architects + Engineers

2700 Westchester Avenue, Suite 415

Purchase New York 10577

Phone: (631) 756-8000 x 2064

Fax: (631) 694-4122

E-mail: bpaddack@h2m.com

To be given consideration, questions must be received in writing at least ten (10) days prior to the date fixed for the opening of bids.

ADDENDA AND INTERPRETATIONS

No interpretations of the meaning of the plans, specifications or other Contract Documents will be made to any bidder orally. Every request for such interpretation shall be made in writing, addressed to:

Brian Paddack, RA

Senior Architect

H2M Architects + Engineers

2700 Westchester Avenue, Suite 415

Purchase New York 10577

Phone: (631) 756-8000 x 2064

fax: (631) 694-4122

E-mail: bpaddack@h2m.com

To be given consideration, questions must be received in writing at least ten (10) days prior to the date fixed for the opening of bids. Any and all interpretations and any supplement instructions will be in the form of written addenda to the specifications, and will be sent by mail or faxed to each of the Contractors who has taken out the Drawings and Contract Documents.

All addenda so issued shall become part of the Contract Documents. If any addenda may materially affect the bid, as solely determined by the District, the District may extend the bid date.

PRE-BID INSPECTION OF SITE

Each bidder shall conduct on-site inspections of the referenced project site during the pre-bid walkthrough prior to submission of a bid proposal. The bidder shall acquaint himself/herself with all apparent conditions and characteristics of the facility with regard to assessment of required materials quantities, evaluation of quality of existing materials, access to the site and equipment's, location of underground utilities, clearances and all related information necessary to develop an understanding of the required scope of the work and all field conditions. Bidders must satisfy themselves by personal examination of the location of the proposed work and of the actual conditions and requirements of the work and shall not, at any time after the submission of the Proposal, dispute or complain of such estimate or assert there was any misunderstanding in regard to the depth or character or the nature of the work to be done. No consideration will be given for subsequent additional claims by the contractor of award after bidding with regard to apparent field conditions.

PRE-BID CONFERENCE

See Section "Notice to Bidders"

BIDDER TO BE FAMILIAR WITH PLANS AND REQUIREMENTS

It is the bidder's responsibility to examine carefully the plans and specifications, proposal and the site upon which the work is to be performed. A proposal submitted shall be prima facie evidence that the bidder has made such examination and that he/she is familiar with all of the conditions and requirements.

PREPARATION OF PROPOSAL

The Proposal forms for project contained herein must be used in preparing bids. Failure to use said Proposal forms or the inclusion of bids not requested shall result in rejection of the bid.

No proposal shall be received by the School District unless the bidder tendering same is known to be skilled in work of a similar nature to that envisaged in the Proposal.

Each bidder shall fill out in ink (in both words and figures) and signed by an officer of the corporation in the spaces provided, its unit or lump sum bid, as the case may be, for each item in the Proposal. If there is a discrepancy between the prices in words and figures, the prices in words shall govern as unit and lump sum prices.

No bid will be considered which does not include bids for all items listed in the proposal sheets.

NAME OF BIDDER

Each bidder must state in the Proposal its full name and business address, and the full name of every person, firm or corporation interested therein and the address of every person or firm, or president and secretary of every corporation interested with it; if no other person, firm or corporation be so interested, it must affirmatively state such fact. The Bidder must also state that the Proposal is made without any connection (directly or indirectly) with any other bidder for the work mentioned in its proposal and is (in all respects) without fraud or collusion; it has inspected the site of the work, has examined the Contract, General Conditions, Specifications, Plans, all addenda, and Information for Bidders; no person acting for or employed by the school district is directly or indirectly interested therein, or in the supplies or work to which it relates or in any portion of the prospective profits thereof; it proposes and agrees if its proposal or bid is accepted, to execute a contract with the school district to perform the work mentioned in the contract, plans and specifications attached; and the amount it will accept in full payment.

CERTIFIED CHECK OR BID BOND/BONDING CERTIFICATION

Each bid must be accompanied by either a certified check drawn on a solvent bank with an office in the State of New York, or a bid bond equal to ten percent (10 %) of the total amount of the project bid, and payable to the "Irvington Union Free School District". This amount shall be the measure of liquidated damages sustained by the School District as a result of the failure, negligence or refusal of the Bidder to whom the contract is awarded to execute and deliver the contract. Provide a certified statement that the bonding company meets or exceeds the requirements set forth in Article 11 of the General Conditions.

A Performance and Payment bond will be required for the work. Each shall be in the amount of 100% of the contract sum. Refer to Article 11 of the General Conditions for requirements associated with such bonds.

PERMITS AND REGULATIONS

Each Contractor shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the work as drawn and specified. Each Contractor is required to observe all laws and ordinances including, but not limited to, relating to the obstructing of streets, maintaining signals, keeping open passageways and protecting them where exposed to danger, and all general ordinances affecting him, his employees, or his work hereunder in his relations to the Owner or any person. Each contractor shall also obey all laws and ordinances controlling or limiting the Contractor while engaged in the prosecution of the work under this Contract.

If the Contractor observes that the drawings and specifications are at variance with laws and regulations, he/she shall promptly notify the Architect in writing and any necessary changes shall be adjusted as provided in the contract for changes in the work. If the Contractor performs any work knowing it be contrary to such laws, ordinances, rules, regulations, or specifications, or local, state or federal authorities without such notice to the Architect, he/she bear all costs arising there-from.

CONTRACTOR'S UNDERSTANDING

It is understood and agreed that the Contractor has, by careful examination, satisfied himself/herself as to the nature and location of the Work, and confirmation of the ground, the character, quality and quantity of the materials to be encountered, the character of equipment and facilities needed preliminary to and during the prosecution of the work, the general and local conditions, and all other matters which can in any way affect the work under this contract.

No official, officer or agent of the Owner is authorized to make any representations as to the materials or workmanship involved or the conditions to be encountered and the Contractor agrees that no such statement or the evidence of any documents or plans, not a part of this contract, shall constitute any grounds for claim as to conditions encountered. No verbal agreement or conversation with any officer, agent or employee of the Owner either before or after the execution of this Contract, shall affect or modify any of the terms or obligations herein contained.

It is understood and agreed that the Contractor has informed himself fully as to the conditions relating to construction and labor under which the work will be performed and agrees as far as possible to employ such methods and means in the performance of his work so as not to cause interruption or interference with any other Contractor.

EQUIVALENTS

A. 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, they shall indicate in writing when requested, and prior to award of contract, what kind, type, brand or manufacturer is included in the base bid for the specified item.

B. Submission for equivalents shall be submitted to the Architect prior to the award of the contract.

C. Refer to Article 6(W) of the General Conditions for submission requirements. Contractor shall provide the Architect with the same documentation as required for substituted materials as set forth in Article 6(X) of the General Conditions.

BID EVALUATION

The Owner and Architect may make such investigation as they deem necessary to determine the ability of the bidder to perform the work, and the bidder shall furnish the Owner with all such additional information and data for this purpose as may be requested. The Owner reserves the right to reject any bid if the evidence submitted by, or investigation of such bidder fails to satisfy the Owner that such bidder is properly qualified to carry out the obligations of the Contract and to complete the work contemplated therein.

BID WITHDRAWAL

No bids may be withdrawn for a period of forty-five (45) days after opening of bids, except as permitted by General Municipal Law 103(11). The Owner may request an extension in writing, if necessary, for bidders to hold their bid for an additional 45 days.

SCHOOL DISTRICT RESERVATION OF RIGHTS

The School District reserves the right to waive what it deems to be informalities relating to a specific bid, to waive what it deems to be technical defects, irregularities and omissions relating to a specific bid, to reject any or all bids, to request additional information from any bidder or to re-advertise and invite new bids. The School District reserves the right to award the contract on the basis of base bids, or by combining one or more alternates to determine the contract price.

CONTRACTOR'S QUALIFICATION STATEMENT (POST BID)

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

Triton Construction Company

Attn: Kevin Sawyer

30 East 33rd Street - 11th Floor

New York, NY 10016

Phone: 212-388-5700

Email: k-sawyer@tritonconstruction.net

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

- a. Fully execute AIA-A305 Contractors Qualification Statement.
- b. Most recent financial statement by CPA.
- c. References and experience:
 - (1) List of all past contracts with K-12 Public School Districts.
 - (2) Provide three (3) references (Name, Title, Phone Number and email) of persons 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:

- a. Sequential listing of specific project activities required to successfully complete the Work of the Contract.
 - (1) Include Schedule and list Critical Milestones.
 - (2) Include Phasing of the work, if required.
 - (3) Include listing of long lead-time items.
 - (4) Impact of weather and restricted work periods.
 - (5) Signed statement from a company officer that the Project can be completed in the established construction duration listed in the contract documents.
- b. Resumes for the contractor's proposed project site supervisor and staff including qualifications for specialized expertise or any certifications required to perform the Work.
- c. Names of proposed major sub-contractors (more than 15% of the bid amount) and a listing of the related trade work and value.
- d. Any special coordination requirements with other trades or ongoing contracts under separate contract(s).
- e. Any special storage and/ or staging requirements for construction materials required for the work.

- f. Any other special requirements including those noted in the contract documents or known to the contractor / subcontractor(s).
- 3. Detailed Cost Estimate:
 - a. A copy of Detailed Cost Estimate outlined in CSI format for the contract work.

NOTICE OF ACCEPTANCE

The School District shall give notice of acceptance of a bid by either registered or certified mail, sent within forty five (45) days after the bids have been opened.

SIGNING OF CONTRACT

Each Bidder to whom a contract is awarded, shall, at the office of the School District within ten (10) business days after the date of notification by either registered or certified mail of acceptance of its proposal furnish the required payment and performance bonds in an amount of 100% of the contract, and the required insurance as set forth in Article 10 of the General Conditions, and sign the contract for the work for its performance and maintenance. Notwithstanding the above, the bidder acknowledges that its bid is an offer to contract, and the Owner's award is an acceptance of the bidder's offer, thereby creating a binding agreement.

INSURANCE

The amounts, types and clauses to be included in the insurance is required to be carried by the successful bidder and its contractors, are listed as set forth in Article 10 of the General Conditions.

WAIVER OF IMMUNITY

Attention is directed to the statement of non-collusion required by Article 5A of the "General Municipal Law of the State of New York" concerning Waiver of Immunity and included in the attached Agreement.

RESPONSIBILITY OF BIDDER

The attention of Bidders is directed particularly to the contract provisions whereby the Contractor will be responsible for any loss or damage that may occur to the work or any part thereof during its progress and whereby the Contractor must make good any defects or faults in the work that may occur during the progress or within two (2) years after its acceptance.

Each Contractor shall provide for the continuation of the Performance Bond as a Maintenance Bond for two (2) full years after date of final payment request at the full contract price.

The work is to be performed and completed to the satisfaction of the Owner & Architect/Engineer and in accordance with the specifications annexed hereto and the plans referred to therein.

LABOR RATES

Attention is directed to the statement of non-collusion required by Article 5A of the "General Municipal Law of the State of New York" concerning Waiver of Immunity and included in the attached Agreement.

Each Contractor shall pay not less than the minimum hourly wage rates on those contracts as established in accordance with Section 220 of the Labor Law as shown in the schedule.

Article 8, Section 220 of the Labor Law, as amended by Chapter 750 of the Laws of 1956, provides (among other things) that it shall be the duty of the fiscal officer to make a determination of the schedule of wages to be paid to all laborers, workers and mechanics employed on public work projects, including supplements for welfare, pension, vacation and other benefits. These supplements include hospital, surgical or medical insurance, or benefits; life insurance or death benefits; accidental death or dismemberment insurance; and pension or retirement benefits. If the amount of supplements provided by the employer is less than the total supplements shown on the wage schedule, the difference shall be paid in cash to the employee.

Article 8, Section 220 of the Labor Law, as amended by Chapter 750 of the Laws of 1956, also provides that the supplements to be provided to laborers, workers and mechanics upon public work, "...shall be in accordance with the prevailing practices in the locality..." The amount for supplements listed on the enclosed schedule does not necessarily include all types of prevailing supplements in the locality, and a future determination of the Industrial Commissioner may require the Contractor to provide additional supplements.

The original payrolls or transcripts shall be preserved for three (3) years from the completion of the work on the awarded project by the Contracts. The School District shall receive such payroll record upon completion of project.

Irvington Union Free School District

Board of Education

6 Dows Lane

Irvington, New York 10533

QUALIFICATIONS OF BIDDERS

Experience and Qualifications of the Bidder: Each bidder is required to submit the following documentation to demonstrate its experience and qualifications for the work of the Project for which a bid is submitted:

- a. A description of its experience with projects of comparative size, complexity, and cost, together with documentary evidence showing that said projects were completed to the Owner's satisfaction and were completed in a timely fashion;
- b. Documentation from each of the projects it has performed capital work in the last five (5) years concerning the bidder's:
 - (i) timeliness of performance of the work of the project
 - (ii) evidence that the project was completed to the Owner's satisfaction;
 - (iii) whether or not any extensions of time were requested by the contractor and whether or not such requests were granted;
 - (iv) whether litigation and/or arbitration was commenced by either the Owner or the bidder as a result of the work of the project performed by the bidder;
 - (v) whether any liens were filed on the project by subcontractors or material suppliers of the bidder;
 - (vi) whether the bidder was defaulted on the project by the owner;
 - (vii) whether the bidder made any claims for extra work on the project, including whether said claim resulted in a change order;
- c. Documentation evidencing the bidder's financial responsibility, including a certified financial statement prepared by a certified public accountant.
- d. Documentation evidencing the bidder's existence under the same name for the last five (5) years.
- e. Documentation evidencing the bidder's Worker's Compensation Experience Modification.

STATEMENT OF BIDDER'S QUALIFICATIONS

IMPORTANT: BIDDERS ARE REQUIRED TO FURNISH A COMPLETE ANSWER TO ALL OF THE QUESTIONS IN THIS STATEMENT. IF ADDITIONAL SPACE IS REQUIRED TO FURNISH A COMPLETE ANSWER, BIDDER MAY ATTACH PAGES AS NECESSARY. IN THE EVENT THAT COMPLETE ANSWERS ARE NOT PROVIDED TO EVERY QUESTION, THE BID WILL BE REJECTED.

1. Name of Bidder

2. Type of Business Entity

3. If the bidder is a corporation, state the date and place of incorporation of the corporation.

4. For how many years has the bidder done business under its present name?

5. List the persons who are directors, officers, owners, managerial employees or partners in the bidder's business.

6. Have any of the persons listed in Number 5 owned/operated/been shareholders in any other companies? If so, please state name of names of the other companies and the individuals who owned, operated, or have been shareholders:

7. Has any director, officer, owner or managerial employee had any professional license suspended or revoked? If the answer to this question is yes, list the name of the individual, the professional license he/she formerly held, whether said license was revoked or suspended and the date of the revocation or suspension.

8. Has the bidder been found guilty of any OSHA Violations? If the answer to this question is yes, describe the nature of the OSHA violation, an explanation of remediation or other steps taken regarding such violation(s).

9. Has the bidder been charged with any claims pertaining to unlawful intimidation or discrimination against any employee by reason of race, creed, color, disability, sex or natural origin and/or violations of an employee's civil rights or equal employment opportunities? If the answer to this question is yes, list the persons making such claim against the bidder, a description of the claim, the status of the claim, and what disposition (if any) has been made regarding such claim.

10. Has the bidder been named as a party in any lawsuit arising from performance of work related to any project in which it has been engaged? If the answer to this question is yes, list all such lawsuits, the index number associated with said suit and the status of the lawsuit at the time of the submission of this bid.

11. Has the bidder been the subject of an investigation and/or proceedings before the Department of Labor for alleged violations of the Labor Law as it relates to the payment of prevailing wages and/or supplemental payment requirements? If the answer to this question is yes, please list each such instance of the commencement of a Department of Labor proceeding, for which project such proceeding was commenced, and the status of the proceeding at the time of the submission of this bid.

12. Has the bidder been the subject of an investigation and/or proceeding before any law enforcement agency, including, but not limited to any District Attorney's Office? If the answer to this question is yes, please list each such instance, the law enforcement agency, the nature of the proceeding, the project for which such proceeding was commenced, if applicable to a project, and the status of the proceeding at the time of the submission of this bid.

13. Has the bidder been the subject of proceedings involving allegations that it violated the Workers' Compensation Law, including but not limited to, the failure to provide proof of worker's compensation or disability coverage and/or any lapses thereof? If the answer to this question is yes, list each such instance of violation and the status of the claimed violation at the time of the submissions of this bid.

14. Has the bidder, its officers, directors, owner and/or managerial employees been convicted of a crime or been the subject of a criminal indictment? If the answer to this question is yes, list the name of the individual convicted or indicted, the charge against the individual and the date of disposition of the charge.

15. Has the bidder been charged with and/or found guilty of any violations of federal, state, or municipal environmental and/or health laws, codes, rules and/or regulations? If the answer to this question is yes, list the nature of the charge against the bidder, the date of the charge, and the status of the charge at the time of the submission of this bid.

16. Has the bidder bid on any projects for the period September 1, 2012 to present? If the answer to this question is yes, list the projects bid on, whether said bid was awarded to the bidder and the expected date of commencement of the work for said project. For those projects listed, if the bidder was not awarded the contract, state whether the bidder was the lowest monetary bidder.

IMPORTANT: BIDDERS ARE REQUIRED TO FURNISH A COMPLETE LIST OF PROJECTS AS REQUIRED BY THIS QUESTION #16 WITH ITS BID. IN THE EVENT THE LIST REQUESTED IS NOT SUBMITTED WITH THE BIDDER'S BID, THE BID WILL BE REJECTED.

17. Does the bidder have any projects ongoing at the time of the submission of this bid? If the answer to this question is yes, list the projects on which the bidder is currently working, the percentage complete, and the expected date of completion of said project.

IMPORTANT: BIDDERS ARE REQUIRED TO FURNISH A COMPLETE LIST OF PROJECTS AS REQUIRED BY THIS QUESTION #17 WITH ITS BID. IN THE EVENT THE LIST REQUESTED IS NOT SUBMITTED WITH THE BIDDER'S BID, THE BID WILL BE REJECTED.

18. Have the bidder and its bond surety ever been notified by a project Owner that the Owner is contemplating declaring a default and requested a conference to discuss the performance of the contract? If the answer to this question is yes, list the projects on which such a conference was held, and the result of the conference, and the status of the project in question.

19. Has the bidder ever been terminated from a Project by the Owner? If the answer to this question is yes, list the projects on which the bidder was terminated, the nature of the termination (convenience, suspension, for cause), and the date of said termination.

IMPORTANT: BIDDERS ARE REQUIRED TO FURNISH A COMPLETE LIST OF PROJECTS AS REQUIRED BY THIS QUESTION #19 WITH ITS BID. IN THE EVENT THE LIST REQUESTED IS NOT SUBMITTED WITH THE BIDDER'S BID, THE BID WILL BE REJECTED.

20. Has the bidder's surety ever been contacted to provide supervisory services in connection with an on-going project. If the answer to this question is yes, list the project(s) for which the surety provided supervisory services.

IMPORTANT: BIDDERS ARE REQUIRED TO FURNISH A COMPLETE LIST OF PROJECTS AS REQUIRED BY THIS QUESTION #20 WITH ITS BID. IN THE EVENT THE LIST REQUESTED IS NOT SUBMITTED WITH THE BIDDER'S BID, THE BID WILL BE REJECTED.

21. Bidder's Worker's Compensation Experience Modifier: _____

Dated:

By: _____
(Signature)

(Print Name and Title)

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

Notary Public

PROPOSAL (PA)
Irvington Union Free School District
Main Street School Renovations

Contract G - General Construction

To: **Irvington Union Free School District**
6 Dows Lane
Irvington, New York 10533

For the furnishing and installing of materials for all work included under contract as follows:

Made this _____ day of _____, 2021

Bidders Declaration:

The party named as Bidder declares that the only person or persons interested in this bid or proposal as principal or principals is or are named herein; and that no other person than herein named has any interest in this proposal or in the contract proposed to be taken; that this bid or proposal is made without any connections with any other person and persons making a bid or proposal for the same purpose; that the bid or proposal is in all respects fair and without collusion or fraud; that it has examined the site of the work, the contract and specifications and the drawings referred to; and has read the Information for Bidders hereto attached; and it proposes and agrees, if this proposal is accepted, it will contract in the form as approved to perform all the work mentioned in said contract and specifications; and it will accept in full payment therefor the following sums to wit:

Note: The bidder is asked to use either black ink or typewriter (black ribbon) in completing this proposal form. Each line item amount must be completed. Failure to do so will be grounds for disqualification of the bidder.

BASE BID: Contract G – General Construction Work

ITEM 1 – BONDS and INSURANCES

(written in words) _____ (\$)

ITEM 2 – DIVISION 1 – GENERAL REQUIREMENTS

(written in words) _____ (\$)

ITEM 3 – DIVISION 1 – PROJECT SUPERVISION

(written in words) _____ (\$)

ITEM 4 – DIVISION 2 – EXISTING CONDITIONS & DEMOLITION WORK

(written in words) _____ (\$)

ITEM 5 – DIVISION 2 – ASBESTOS REMOVAL

(written in words) _____ (\$)

ITEM 6 – DIVISION 3 – CONCRETE

(written in words) _____ (\$)

ITEM 7 – DIVISION 4 – MASONRY

(written in words) _____ (\$)

ITEM 8 – DIVISION 5 – METALS

(written in words) _____ (\$)

ITEM 9 – DIVISION 6 – WOOD, PLASTICS AND COMPOSITES

(written in words) _____ (\$)

ITEM 10 – DIVISION 7 – THERMAL AND MOISTURE PROTECTION

(written in words) _____ (\$)

ITEM 11 – DIVISION 7 – PENETRATION FIRESTOPPING

(written in words) _____ (\$)

ITEM 12 – DIVISION 8 - OPENINGS

(written in words) _____ (\$)

ITEM 13 – DIVISION 9 - FINISHES

(written in words) _____ (\$)

ITEM 14 – DIVISION 32 – WATER SUPPLY SYSTEM

(written in words) _____ (\$)

ITEM 15 – DIVISION 22 – PLUMBING EQUIPMENT

(written in words) _____ (\$)

ITEM 16 – DIVISION 22 – ALL OTHER PLUMBING CONTRACT ITEMS

(written in words) _____ (\$)

ITEM 17 – DIVISION 23 – SHEET METAL WORK

(written in words) _____ (\$)

ITEM 18 – DIVISION 23 – DIFFUSERS, REGISTERS & GRILLES

(written in words) _____ (\$)

ITEM 19 – DIVISION 23 – HVAC CONTROLS

(written in words) _____ (\$)

ITEM 20 – DIVISION 23 – ALL OTHER MECHANICAL CONTRACT ITEMS

(written in words) _____ (\$)

ITEM 21 – DIVISION 26 – CONDUIT, CONDUCTORS, BOXES & WIRE TROUGHS

(written in words) _____ (\$)

ITEM 22 – DIVISION 26 – WIRING DEVICES

(written in words) _____ (\$)

ITEM 23 – DIVISION 26 – ELECTRIC SERVICE AND PANEL BOARDS

(written in words) _____ (\$)

ITEM 24 – DIVISION 26 – LIGHTING

(written in words) _____ (\$)

ITEM 25 – DIVISION 28 – ALARM, SIGNAL & DETECTION

(written in words) _____ (\$)

ITEM 26 – DIVISION 26– ALL OTHER ELECTRICAL CONTRACT ITEMS

(written in words) _____ (\$)

ITEM 27 – DIVISION 31 – EARTHWORK

(written in words) _____ (\$ _____)

ITEM 28 – DIVISION 32 – EXTERIOR IMPROVEMENTS

(written in words) _____ (\$ _____)

ITEM 29 – PROJECT CLOSEOUT

(written in words) _____ (\$ _____)

ALLOWANCE G1 – ALLOWANCE FOR GENERAL CONTINGENCY

(written in words) Thirty Thousand Dollars and 00 Cents (\$30,000.00)

TOTAL BASE BID (ITEMS 1 – 29 INCLUSIVE, PLUS ALLOWANCE G1)

(written in words) _____ (\$ _____)

Note: The IRVINGTON UNION FREE SCHOOL DISTRICT is exempt from Federal, New York State and local taxes. TOTAL AMOUNT BID shall be exclusive of all taxes.

EACH BIDDER SHALL SUBMIT WITH IT'S BID A SEPARATE SEALED LIST THAT NAMES THE SUBCONTRACTORS THAT THE BIDDER WILL USE TO PERFORM WORK AND THE AGREED UPON AMOUNT TO BE PAID FOR A.) HEATING, VENTILATION AND AIR-CONDITIONING WORK, B.) PLUMBING WORK AND C.) ELECTRICAL WORK. AFTER THE LOW BID IS ANNOUNCED, THE SEALED LIST OF SUBCONTRACTORS SUBMITTED BY THE APPARENT LOW BIDDER SHALL BE OPENED AND THE NAMES OF THE SUBCONTRACTORS ANNOUNCED. ANY CHANGE OF SUBCONTRACTOR OR AGREED UPON AMOUNT TO BE PAID SHALL REQUIRE THE APPROVAL OF THE PUBLIC OWNER, UPON A SHOWING OF "LEGITIMATE CONSTRUCTION NEED" FOR SUCH CHANGE.

"LEGITIMATE CONSTRUCTION NEED" SHALL INCLUDE, BUT NOT BE LIMITED TO:

A CHANGE IN PROJECT SPECIFICATIONS,
A CHANGE IN CONSTRUCTION MATERIAL COSTS,
A CHANGE IN SUBCONTRACTOR STATUS, OR
THE SUBCONTRACTOR HAS BECOME UNWILLING, UNABLE OR UNAVAILABLE TO PERFORM THE SUBCONTRACT.

THE SEALED LISTS OF SUBCONTRACTORS SUBMITTED BY ALL OTHER BIDDERS SHALL BE RETURNED TO THEM UNOPENED AFTER THE CONTRACT AWARD.

PAYMENTS TO SUBCONTRACTORS AND MATERIAL MEN MUST BE MADE WITHIN 7 CALENDAR DAYS AS OPPOSED TO 15 CALENDAR DAYS OF THE RECEIPT OF PAYMENT FROM THE PUBLIC OWNER. FAILURE TO PAY WITHIN 7 CALENDAR DAYS WILL RESULT IN INTEREST DUE FOR ALL CALENDAR DAYS SUBSEQUENT TO THE SEVENTH DAY THROUGH THE DATE THAT PAYMENT IS MADE.

THE BIDDER UNDERSTANDS THAT THE OWNER RESERVES THE RIGHT TO REJECT ANY OR ALL BIDS AND TO WAIVE ANY INFORMALITIES IN THE BIDDING.

THE BIDDER AGREES THAT THE BID SHALL BE GOOD AND MAY NOT BE WITHDRAWN FOR A PERIOD OF **FORTY-FIVE (45)** CALENDAR DAYS AFTER THE SCHEDULED CLOSING TIME FOR RECEIVING BIDS.

THE BIDDER HAS SUBMITTED ALL REQUESTS FOR OTHER BRAND NAMES OR PRODUCTS NOT LISTED IN THE SPECIFICATIONS IN ACCORDANCE WITH ARTICLE 6(W) OF THE GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION.

ALTERNATE WORK

THE CONTRACTOR SHALL CLEARLY STATE WHETHER COST INDICATED IS TO BE ADDED TO OR DEDUCTED FROM THE BASE BID COST. FAILURE TO CLEARLY STATE SAME WILL BE GROUNDS FOR DISQUALIFICATION OF THE BIDDER.

ALL WORK INCLUDED UNDER THIS HEADING SHALL BE SUBJECT TO THE GENERAL CONDITIONS OF THE PROJECT. ALL CONSTRUCTION, WORKMANSHIP AND FINISHES REQUIRED BY THE ALTERNATES SHALL BE AS SPECIFIED IN THE APPLICABLE SECTIONS OF THE SPECIFICATIONS MANUAL.

THE BIDDER PROPOSES AND AGREES THAT SHOULD THE FOLLOWING ALTERNATES BE ACCEPTED AND INCLUDED IN THE CONTRACT, THE AMOUNT OF THE TOTAL BASE BID WILL BE REVISED AS FOLLOWS. THE UNDERSIGNED FURTHER AGREES THAT SHOULD THE FOLLOWING ALTERNATES BE ACCEPTED, THE ALTERNATE BID PRICES INDICATED SHALL BE HELD AND HONORED FOR A PERIOD OF ONE YEAR FROM THE DATE OF CONTRACT SIGNING.

NUMBER	DESCRIPTION	COST
G-1	WALKWAY ENCLOSURE Provide all labor, material and equipment required and as specified for work related to enclosing the existing walkway including new fence panels, gates, hardware, card readers, concrete walkway extensions, roofing (u.o.n.) and electrical work (fire alarm, power and lighting)	\$ _____Is
G-2	WINDOW FILM Provide all labor, material and equipment required and as specified for work related to new security and solar film applied to windows and doors including repair work to existing fenestration.	\$ _____Is
G-3	PORTABLE AIR CONDITIONER Provide all labor, material and equipment required and as specified for work related to new portable air conditioning unit including connection to existing ducts, etc. for a complete installation.	\$ _____Is

TOTAL BID (ITEMS 1 – 29 INCLUSIVE, PLUS ALLOWANCE G1 AND ALTERNATE G-1, G-2 & G-3)
(written in words) _____ (\$ _____)

SITE SUPERVISION

THE SUCCESSFUL CONTRACTOR IS TO PROVIDE FULL TIME SITE SUPERVISION FOR HIS OR HER STAFF, SUBCONTRACTORS AND SUPPLIERS FOR THE DURATION OF THIS PROJECT. A COMPETENT SUPERINTENDENT SHALL BE IN ATTENDANCE AT THE JOB SITE AT ALL TIMES WHEN WORK IS BEING PERFORMED UNDER THEIR CONTRACT. THE SUPERINTENDENT IS RESPONSIBLE TO VISIT THE JOB SITE DAILY WHEN WORK IS NOT BEING PERFORMED UNDER THEIR CONTRACT AND TO MONITOR THE OVERALL CONSTRUCTION PROGRESS. A QUALIFIED SITE SUPERINTENDENT MUST HAVE THE AUTHORITY TO REPRESENT AND MAKE DECISIONS FOR HIS OR HER COMPANY WITH REGARDS TO THE SUBJECT JOB, MUST BE ABLE TO GIVE GUIDANCE AND DIRECTION TO EMPLOYEES, SUBCONTRACTORS AND SUPPLIERS, AND MUST BE KNOWLEDGEABLE ABOUT THE WORK TO BE PROVIDED. FAILURE TO PROVIDE A QUALIFIED SITE SUPERINTENDENT AT THE JOB SITE SHALL SUBJECT SAID PRIME CONTRACTOR TO A PENALTY OF \$1,000 PER DAY FOR EVERY OCCURRENCE.

TIME OF COMPLETION

ALL WORK UNDER THIS CONTRACT SHALL BE COMPLETED BETWEEN THE FOLLOWING HOURS, IN ACCORDANCE WITH THE FOLLOWING DATES:

WORK DAYS:	MONDAY – FRIDAY
WORK HOURS:	7:00 AM – 5:00 PM
WEEKEND WORK DAYS:	SATURDAY
WEEKEND WORK HOURS:	9:00 AM – 5:00 PM
CONSTRUCTION START DATE:	MONDAY, JUNE 27, 2022
SUBSTANTIAL COMPLETION:	TUESDAY, AUGUST 30, 2022
FINAL COMPLETION:	FRIDAY, SEPTEMBER 30, 2022

IF NECESSARY, WEEKEND, HOLIDAY AND EVENING WORK SHALL BE PROVIDED TO ENSURE THE COMPLETION DATES LISTED ABOVE, AT THE SOLE COST AND EXPENSE OF THE BIDDER.

FAILURE OF THE CONTRACTOR TO COMPLETE WORK BY THE SPECIFIED TIME SHALL SUBJECT HIM/HER TO LIQUIDATED DAMAGES AS SET FORTH IN ARTICLE 13 OF THE GENERAL CONDITIONS.

THE ARCHITECT/ENGINEER SHALL ACT AS THE RECORD KEEPER OF CONTRACT DAYS; HE WILL BE THE SOLE JUDGE OF DELAYS CAUSED BY WEATHER. ONLY WEATHER DELAYS, AS ADJUDGED BY THE ARCHITECT/ENGINEER, WILL BE CONSIDERED FOR EXTENSIONS OF THE CONSTRUCTION PERIOD. THE CONTRACTOR SHALL SUBMIT A BI-WEEKLY REQUEST FOR DELAYS DUE TO WEATHER TO THE ARCHITECT/ENGINEER FOR APPROVAL. NO OTHER DELAY CLAIMS WILL BE ACCEPTED, FOR CREDIT TOWARDS THE PROJECT COMPLETION SCHEDULE, REGARDLESS OF THE SOURCE OF THE DELAY.

FAILURE OF THE CONTRACTOR TO COMPLETE ALL WORK SHOWN AND SPECIFIED IN THE CONTRACT DOCUMENTS, BY ALL OF THE SPECIFIED TIME FRAMES, SHALL SUBJECT THE CONTRACTOR TO LIQUIDATED DAMAGES, AS SET FORTH IN ARTICLE 13 OF THE GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, IN THE SUM OF ONE THOUSAND DOLLARS (\$1,000.00) PER CALENDAR DAY. SUCH DAMAGES WILL COMMENCE ON THE DAY AFTER THE COMPLETION DATE OR THE DAY AFTER ANY LISTED MILESTONE DATE IN THE NOTICE TO PROCEED.

WITHIN TEN (10) CONSECUTIVE CALENDAR DAYS AFTER THE DATE OF THE NOTICE OF AWARD, THE BIDDER SHALL EXECUTE THE CONTRACT AND FURNISH THE REQUIRED PERFORMANCE BOND, PAYMENT BOND AND INSURANCES.

THE BOARD OF EDUCATION OF THE DISTRICT RESERVES THE RIGHT TO AWARD THIS CONTRACT TO OTHER THAN THE LOW BIDDER IF THE LAW SO PERMITS.

THE UNDERSIGNED HEREBY ACKNOWLEDGES RECEIPT OF THE FOLLOWING ADDENDA (IF ANY):

ADDENDUM NO.

DATED

SPECIFIC DAMAGES WILL BE ASSESSED AND DEDUCTED FROM AMOUNTS OTHERWISE DUE THE CONTRACTOR FOR ADDITIONAL INSPECTION (FIELD) AND CONTRACT ADMINISTRATION (OFFICE) TIME EXPENDED BY THE ARCHITECT/ENGINEER AND/OR OTHER CONSTRUCTION EMPLOYEE(S) HIRED TO ADMINISTER OR OBSERVE THE CONTRACT, SHOULD THE CONTRACTOR COMPLETE THE CONTRACT BEYOND THE CONTRACT COMPLETION PERIOD SPECIFIED ABOVE.

SUCH DEDUCTION SHALL BE IN ACCORDANCE WITH THE ARCHITECT, ENGINEER'S, AND/OR OTHER CONSTRUCTION EMPLOYEE(S) STANDARD HOURLY BILLING RATES IN EFFECT AT THE TIME FOR THE SCHOOL DISTRICT.

THE REQUIREMENTS OF THE PROPOSAL HAVE BEEN COMPLETELY READ, UNDERSTOOD AND ACKNOWLEDGED BY THE BIDDER.

BIDDER: _____

BIDDER'S ADDRESS: _____

SIGNED BY: _____ TITLE: _____

DATE: _____

Telephone number where the contractor or a competent representative can accept a telephone message and provide a reasonable reply as soon as possible, but not later than twenty-four (24) hours:

DAY: () _____ NIGHT: () _____

FAX: () _____

FEDERAL I.D. NO. OR SOCIAL SECURITY NO.: _____

PROPOSAL (PC)
Irvington Union Free School District
Facilities Storage Building at Irvington Campus

Enclosed in the bid package is a certified check or bid bond for ten percent (10%) of the total amount of each of the school project bid as required by the foregoing "Information for Bidders."

On the signing of such contract by the Bidder, the bidder hereby agrees to furnish the indemnifying bonds as provided in the General Conditions.

The Bidder hereby further agrees that in the event of its failure or refusal to enter into a contract in accordance with this bid within ten (10) business days after due notice from the Board of Education that the contract has been awarded to it and is ready for signature, as given in accordance with the Information for Bidders and/or its failure to execute and deliver the bond for the full amount of the contract price, as provided in said Information for Bidders, the Bidder's check or bid bond which is herewith deposited with the Board shall (at the option of said Board) become due and payable as ascertained and liquidated damages for such default; otherwise, said check or bid bond will be returned to the undersigned.

The full names and residences of all persons and parties interested in the foregoing bid as principals are as follows:

Name	Address
_____	_____
_____	_____
_____	_____

Name of Bidder: _____

Business Address of Bidder: _____

INSURANCE CERTIFICATION

Your insurance representative must complete the form below 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 this Insurance Certification for must accompany your bid submission for your bid to be considered.

Insurance Representative's Acknowledgement:

We have reviewed the insurance requirements set forth in the Supplementary Conditions Article 10 & 11 of the specifications and can provide 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's 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 this Insurance Certification form must be submitted with my bid and my inability to provide the required insurances may result in the rejection of my bid, and the Irvington Union Free School District may award the contract to the next lowest/responsive bidder.

Name: _____

Address: _____

Date: _____

Bidder's Signature

NON-COLLUSIVE FORM BIDDING CERTIFICATE
BID PROPOSAL CERTIFICATIONS

Firm Name _____

Business Address _____

Telephone Number _____ Date of Bid _____

I. General Bid Certification

The bidder certifies that he will furnish, at the prices quoted, the materials, equipment and/or services as proposed on this Bid.

II. Non-Collusive Bidding Certification

The following statement is made pursuant to Section 103-D of the General Municipal Law, as amended by Chapter 675 of the Laws of 1966, and Section 139-D of the State Finance Law, as amended by Chapter 675 of the Laws of 1966, and Section 2604 of the Public Authorities Law, as amended by Chapter 675 of the Laws of 1966.

By submission of this bid proposal, the bidder certifies that he/she is complying with Section 103-d of the General Municipal Law as follows:

Statement of non-collusion in bids and proposals to political subdivision of the state. 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.

- (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 its knowledge and belief:

1. The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor;

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 furnish with the reasons therefor. 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.

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 lists for such items, or (c) has sold the same items to other customers at the same prices being bid, does not constitute, without more, a disclosure within the meaning of subparagraph one (a).

- (c) 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 certifications referred to in subdivision II 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 corporation.

- (d) The person signing this Bid or Proposal certifies that he has fully informed himself/herself 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/her behalf."

Signature of Bidder: _____
(Signature of bidder or authorized representative of a corporation)

Title: _____

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

HOLD HARMLESS AGREEMENT

In accordance with Article 12 of the General Conditions, Indemnification, the Contractor will be required to sign the following "Hold Harmless" Agreement with the BOARD OF EDUCATION. Compliance with the foregoing requirements for insurance shall not relieve the Contractor from liability set forth under the Indemnity Agreement.

The undersigned hereby agrees to defend, indemnify, and save harmless the BOARD OF EDUCATION, its officers and employees from and against any and all liability, loss, damages, claims for bodily injury and/or property damages, cost and expense, including counsel fees, to the extent permissible by law, that may occur or that may be alleged to have occurred in the course of the performance of this agreement by the contractor, whether such claims shall be made by an employee of the contractor or by a third party, the contractor covenants and agrees that he / she will pay all costs and expenses arising therefrom and in connection therewith, and if any judgment shall be rendered against the Owner, Architect/Engineer & Construction manager, in any such litigation, the Contractor shall at his / her own expense satisfy and discharge the same.

By: _____
(Signature of Authorized Representative of Corporation)

(Print Name and Title)

(Date)

CERTIFICATION OF COMPLIANCE WITH THE IRAN DIVESTMENT ACT

As a result of the Iran Divestment Act of 2012 (the "Act"), Chapter 1 of the 2012 Laws of New York, a new provision has been added to State Finance Law (SFL) § 165-a and New York General Municipal Law § 103-g, both effective April 12, 2012. Under the Act, the Commissioner of the Office of General Services (OGS) will be developing a list of "persons" who are engaged in "investment activities in Iran" (both are defined terms in the law) (the "Prohibited Entities List"). Pursuant to SFL § 165-a(3)(b), the initial list is expected to be issued no later than 120 days after the Act's effective date at which time it will be posted on the OGS website.

By submitting a bid in response to this solicitation or by assuming the responsibility of a Contract awarded hereunder, each Bidder/Contractor, any person signing on behalf of any Bidder/Contractor and any assignee or subcontractor and, in the case of a joint bid, each party thereto, certifies, under penalty of perjury, that once the Prohibited Entities List is posted on the OGS website, that to the best of its knowledge and belief, that each Bidder/Contractor and any subcontractor or assignee is not identified on the Prohibited Entities List created pursuant to SFL § 165-a(3)(b).

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

During the term of the Contract, should the School District receive information that a Bidder/Contractor is in violation of the above-referenced certification, the School District will offer the person or entity an opportunity to respond. If the person or entity fails to demonstrate that he/she/it has ceased engagement in the investment which is in violation of the Act within 90 days after the determination of such violation, then the School District shall take such action as may be appropriate including, but not limited to, imposing sanctions, seeking compliance, recovering damages or declaring the Bidder/Contractor in default. The School District reserves the right to reject any bid or request for assignment for a Bidder/Contractor that appears on the Prohibited Entities List prior to the award of a contract and to pursue a responsibility review with respect to any Bidder/Contractor that is awarded a contract and subsequently appears on the Prohibited Entities List.

I, _____, being duly sworn, deposes and says that he/she is the
_____ of the _____ Corporation and that neither
the Bidder/ Contractor nor any proposed subcontractor is identified on the Prohibited Entities List.

(SIGNED)

SWORN to before me this

_____ day of _____

20____

Notary Public: _____

**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.

SWORN to before me this

SIGNED

_____ day of _____

20____

Notary Public: _____

LIST OF SUBCONTRACTORS

List of Subcontractors

The Bidder shall list the subcontractors, if any, to be used for this project. Provide the required information for each proposed subcontractor. Make appropriate copies of this form should the Bidder propose more than five (5) subcontractors. List at least five projects for each subcontractor that demonstrates the subcontractor's qualifications to perform the work of the project. The projects shall be similar size and complexity and have been completed within the last five (5) years by the subcontractor.

(NOTE THIS FORM MUST BE COMPLETED BY BIDDER AND INCLUDED IN ENVELOPE MARKED QUALIFICATIONS)

Subcontractor Name: _____

Type of Work: _____

<u>Owner</u>	<u>Contact Name</u>	<u>Phone Number</u>	<u>Location</u>	<u>Contract Amount</u>

LIST OF SUBCONTRACTORS

Subcontractor Name: _____

Type of Work: _____

<u>Owner</u>	<u>Contact Name</u>	<u>Phone Number</u>	<u>Location</u>	<u>Contract Amount</u>

Subcontractor Name: _____

Type of Work: _____

<u>Owner</u>	<u>Contact Name</u>	<u>Phone Number</u>	<u>Location</u>	<u>Contract Amount</u>

AGREEMENT
IRVINGTON UNION FREE SCHOOL DISTRICT
FACILITIES STORAGE BUILDING AT IRVINGTON CAMPUS

AGREEMENT made as of the day of in the year of Two Thousand and Twenty-one.

BETWEEN the Owner
(Name and address)

Irvington Union Free School District
6 Dows Lane
Irvington, New York 10954

and the Contractor:
(Name and address)

The Project is:
(Name and location)

FACILITIES STORAGE BUILDING AT IRVINGTON CAMPUS
40 N. BROADWAY
Irvington, NY 10533

The Architect is:
(Name and address)

H2M architects + engineers
2700 Westchester Avenue
Suite 415
Purchase, NY 10577

The Owner and Contractor agree as set forth below.

ARTICLE 1

THE CONTRACT DOCUMENTS

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

ARTICLE 2 **THE WORK OF THIS CONTRACT**

The Contractor shall execute the entire Work described in the Contract Documents or reasonably inferable by the Contractor as necessary to produce the results intended by the Contract Documents, except to the extent specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 **DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION**

3.1 The date of commencement of the work and substantial completion of the work of this contract shall be in accordance with the schedule set forth in the Project Manual.

3.2 Time is of the essence respecting the contract documents and all obligations thereunder.

3.3 Upon the execution of this Agreement, the Contractor shall provide the Owner with copies of all contracts entered into between the Contractor and subcontractors or material suppliers. The Contractor's obligation to provide the Owner with said contracts shall continue for the duration of the Project.

ARTICLE 4 **CONTRACT SUM**

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

4.2 The Contract Sum is based upon the following alternates, if any, which are described in the Bid Proposal Form (attached hereto) and are hereby accepted by the Owner:
(Insert Alternates)

4.3 Unit prices are as set forth in the proposal sheets.

ARTICLE 5 **PROGRESS PAYMENTS**

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

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

AGREEMENT
IRVINGTON UNION FREE SCHOOL DISTRICT
FACILITIES STORAGE BUILDING AT IRVINGTON CAMPUS

All progress payments shall be based upon an estimate and a certificate, made by the Architect, of the materials furnished, installed and suitably stored at the site and the work done by the Contractor, and payment shall be made in installments of ninety-five percent (95%) of the amount certified as earned so that, at the completion of the work, there will be a retainage of five percent (5%) of the Total Contract Sum. Retainage shall be paid to the Contractor upon final completion of the work of this contract. 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.

The Contractor shall submit with each application for payment the following:

1. A current Sworn Statement from the Contractor setting forth all subcontractors and materialmen with whom the Contractor has subcontracted, the amount of such subcontract, the amount requested for any subcontractor or materialman in the application for payment and the amount to be paid to the Contractor from such progress payment;
2. Commencing with the second (2nd) Application for Payment submitted by the Contractor, duly executed so-called "after the fact" waivers of mechanics' and materialmen's liens from all subcontractors, materialmen and, when appropriate, from lower tier subcontractors, establishing receipt of payment or satisfaction of payment of all amounts requested on behalf of such entities and disbursed prior to submittal by the Contractor of the current Application for Payment, plus sworn statements from all subcontractors, materialmen and, where appropriate, from lower tier subcontractors, covering all amounts described in this Paragraph 5.2;
3. Such other information, documentation and materials as the Owner or the Architect may require.

5.3 Payment shall not be released to the Contractor until the Owner receives the following documentation:

1. Certified payroll for employees and employees of subcontractors performing work on the Project.
2. Copies of invoices submitted to the Contractor by its subcontractors and/or material suppliers.

ARTICLE 6
FINAL PAYMENT

Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when (1) the Contract has been fully performed including compliance with all provisions of the Contract Documents except for the Contractor's responsibility to correct nonconforming Work under Article 15(B) of the General Conditions and to satisfy other requirements, if any, which necessarily survive final payment; and (2) a final 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 Architect's final Certificate for Payment, or as follows or as soon thereafter as is practicable.

ARTICLE 7
MISCELLANEOUS PROVISIONS

7.1 Where reference is made in this Agreement to a provision of the General Conditions or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

7.2 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 Contract 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 Paragraph 7.2, 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 8
TERMINATION OR SUSPENSION

8.1 The Contract may be terminated by the Owner as provided in the General Conditions.

8.2 The Work may be suspended by the Owner as provided in the General Conditions.

ARTICLE 9
ENUMERATION OF CONTRACT DOCUMENTS

9.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated as follows:

9.1.1 The Agreement is this executed Agreement Between Owner and Contractor.

9.1.2 The General Conditions are the General Conditions of the Contract for Construction as set forth in the Project Manual and attached hereto.

9.1.3 The Specifications are as set forth in the Project Manual and indexed in Exhibit "B" hereto.

9.1.4 The Drawings are those as indexed in Exhibit "C" hereto.

9.1.5 The Addenda, if any, are as follows:

This Agreement is entered into as of the day and year first written above and is executed in at least three original copies of which one is to be delivered to the Contractor, one to the Architect for use in the administration of the Contract, and the remainder to the Owner.

OWNER

CONTRACTOR

Irvington Union Free School District
6 Dows Lane
Irvington, NY 10533

By _____
(Signature)

By _____
(Signature)

(Printed name and title)

(Printed name and title)

GENERAL CONDITIONS
of the
CONTRACT for CONSTRUCTION

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GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

The within document includes detailed provisions concerning the capital improvement work to be performed by the Contractors engaged by the School District. This document contains provisions which relate particularly to capital improvement projects in the school district setting in New York State. The document is incorporated by reference into all contracts to be awarded and should be reviewed carefully by the Contractor to whom the award of contract is made. Consultation with an attorney and insurance representative is advised.

ARTICLE 1 DEFINITIONS

- A. "Addendum" or "Addenda" refers to revised drawings and/or written requirements for the capital improvement work issued by the Architect prior to the time indicated for submission of a bid by a contractor.
- B. The "Architect" is the design professional engaged by the School District to perform design related functions respecting the capital improvement projects to be performed in the School District.
- C. "Board of Education" refers to the Board of Education of the School District.
- D. "Central Administration" refers to the Superintendent of Schools, his/her Assistant Superintendents, and Director of Plant & Facilities.
- E. The "Construction Manager" is the entity engaged by the School District to act as its representative during the course of construction of the Project.
- F. The "Contractor" refers to the entity engaged by the School District to perform all or a part of the capital improvement project on its behalf.
- G. The "Drawings" are the plans, elevations, sections, details, schedules and diagrams developed by the Architect for the capital improvement projects to be performed in accordance with the project manual of which these General Conditions of the Contract for Construction form a part.
- H. The "Project" refers to the entire capital improvement project to be performed in accordance with the project manual and may include work by the Owner.
- I. The "Project Manual" is the bound document which is issued simultaneously with the project Drawings and includes the Notice to Bidders, Information to Bidders, Bid Proposal Form, Prevailing Wage Rate schedule and the written requirements for labor, materials, equipment, construction systems and the like necessary for the Contractor to complete the capital improvement work for which it has been engaged.

J. The "Owner" refers to the School District, the Board of Education, its officers, agents and employees.

K. A "Subcontractor" is a person or entity who has a direct contract with the Contractor to provide material and/or labor for the project on or off the site, or to otherwise furnish labor, material or other services with respect to a portion of the Contractor's work. A "Sub-subcontractor" is a person or entity who has a direct or indirect contract with a Subcontractor engaged by the Contractor to perform a portion of the Subcontractor's work at the site, or to otherwise furnish labor, material or other services with respect to a portion of the Subcontractor's work.

L. The term "Specialist" or "Specialty Contractor" as used in these specifications shall mean an individual or firm of established reputation, or, if newly organized, whose personnel have previously established a reputation in the same field, which is regularly engaged in, and which maintains a regular force of workers skilled in either manufacturing or fabricating items required by the Contract, installing items required by the Contract, or otherwise performing work required by the Contract.

M. "Accepted", "directed" "permitted," "requested," "required," and "selected" mean, unless otherwise explained, "accepted by the Architect and/or Owner" "directed by the Architect and/or Owner," "permitted by the Architect and/or Owner," "requested by the Architect and/or Owner," "required by the Architect and/or Owner," and "selected by the Architect and/or Owner." However, no such implied meaning will be interpreted to extend the Architect's responsibility into the Contractor's area of construction supervision.

N. "As accepted" "or acceptable substitute", and "for review" mean the Architect is the sole judge of the quality and suitability of the proposed substitutions. Where used in conjunction with the Architect's response to submittals, requests, applications, inquiries, reports, and claims by the Contractor, the meaning will be held to the limitations of the Architect's responsibilities and duties as stated in the General Conditions. In no case will "accepted by the Architect" be interpreted as an assurance to the Contractor that the requirements of the Contract Documents have been fulfilled.

O. "Furnish" means supply and deliver to the Project site or other designated location, ready for unloading, unpacking, storing, assembly, installation, application, erection, or other form of incorporation into the Project, and maintained ready for use. Supply and deliver products requiring additional or supplemental fitting, assembly, fabrication, or incorporation into other elements of the Project directly to the fabricator, installer or manufacturer as required.

P. "Install" means unload, unpack, use, fit, attach, assemble, apply, place, anchor, erect, finish, cure, protect, clean, and similar operations required to properly incorporate work into the Project.

Q. "Provide" means furnish and install.

R. "Replace" means remove designated, damaged, rejected, defective, unacceptable, or non-conforming work from the Project and provide new work meeting the requirements of the Contract Documents in place thereof.

S. The word "include", in any form other than "inclusive", is non-limiting and is not intended to mean all-inclusive.

ARTICLE 2 CONTRACTOR'S REPRESENTATIONS

A. Upon submission of its bid to the Owner, the Contractor expressly represents:

1. The Contractor represents and warrants that it performed a detailed investigation of the site(s) and that such investigation was sufficient to disclose the conditions of the site(s) at which work is to be performed by it and all improvements thereon, and the conditions under which the work is to be performed, including, but not limited to (a) the location, condition, layout and nature of the project site and surrounding areas; (b) the cost of labor, materials and equipment necessary to perform the work, the availability; (c) the areas of the work which will cause a disruption to the necessary and proper operation of the facilities by the Owner; and (d) other pertinent limitations on the performance of its work.

2. The Contractor represents and warrants that it has carefully studied and compared the drawings and pertinent provisions of the project manual and that any errors, omissions, ambiguities, discrepancies or conflicts found in said documents have been brought to the attention of the Architect for clarification prior to the Contractor's submission of its bid. If, in the interpretation of Contract Documents, requirements within the Drawings and Specifications conflict, or it appears that the Drawings and Specifications are not in agreement, the requirement to be followed shall be decided by the Architect. Where there is a discrepancy in quantity, the Contractor shall provide the greater quantity; where there is a discrepancy in quality, the Contractor shall provide the superior quality. Addenda supersede the provisions that they amend.

3. Each 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 and/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, Architect or the Construction Manager.

B. The Contractor warrants to the Owner that (1) the materials and equipment furnished under its contract will be of good quality and new, and of recent manufacture, unless otherwise required or permitted by the Contract Documents, (2) that its work will be free from defects not inherent in the quality required or permitted, and (3) that its work will conform with the terms and conditions of its agreement with the Owner. Work not conforming to these requirements,

including substitutions not properly approved and authorized, shall be considered defective and shall be removed and replaced at the Contractor's cost and expense. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

C. Except as to any reported errors, inconsistencies or omissions, and to concealed or unknown conditions, by executing the Agreement, the Contractor represents the following:

1. The drawings and accompanying specifications found in the project manual issued simultaneously with said drawings are sufficiently complete and detailed for the Contractor to (a) perform the work required to produce the results intended by the Owner and (b) comply with all the requirements of its contract with the Owner.

2. The work required to be performed by the Contractor including, without limitation, all construction details, construction means, methods, procedures and techniques necessary to perform its work, use of materials, selection of equipment and requirements of product manufacturers are consistent with: (a) good and prevailing and accepted industry standards applicable to its work; (b) requirements of any warranties applicable to its work; and (c) all laws, ordinances, regulations, rules and orders which bear upon the Contractor's performance of its work.

3. The Drawings and Specifications for the Contract have been prepared with care and are intended to show as clearly as is practicable the work required to be done. Work under all items in the Contract must be carried out to meet field conditions to the satisfaction of the Architect and Owner and in accordance with his instructions and the Contract Drawings and Specifications.

4. All dimensions shown on the Drawings are for bidding purposes only. It is the responsibility of the Contractor to verify all dimensions in the field to insure proper and accurate fit of materials and items to be installed.

D. The representations set forth herein shall survive expiration and/or termination of the Contractor's agreement with the Owner.

ARTICLE 3 CONTRACTOR'S CONSTRUCTION PROCEDURES

A. 1. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures required for the proper execution of its work on the project. Where the drawings and/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.

2. Neither the Architect, the Construction Manager or the Owner will have control over or charge of and will not be responsible for construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, since these are solely the Contractor's responsibility as provided herein.

3. The Contractor shall provide and pay for all labor, materials, equipment, tools, construction equipment and machinery, rigging, water, heat, utilities, light, transportation, and other facilities and services necessary for proper execution and completion of its work, whether temporary or permanent and whether or not incorporated or to be incorporated in its work.

B. 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. The Contractor shall review any specified or installation procedure with its employees and/or subcontractors, including those recommended by any product manufacturer, prior to the commencement of the relevant portion of the work to be performed. The Contractor shall be responsible to the Owner for the acts and/or omissions of the Contractor's employees, the Contractor's Subcontractors, the Contractor's material suppliers, and/or their respective agents and employees, and any other persons performing portions of the work on behalf of the Contractor.

C. The Contractor shall be responsible for the inspection of portions of the project performed by its own work force and/or subcontractors engaged by it for the purpose of determining that said work is in proper condition to receive subsequent work.

D. The Contractor shall perform its work in accordance with the standards of the construction industry applicable to work in the locale in which work is to be performed.

E. The Contractor shall only employ labor on the project or in connection with its work capable of working harmoniously with all trades, crafts and any other individuals associated with the capital improvement work to be performed. 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. Should it become necessary to create a separate entrance for a contractor involved in a labor dispute, all costs associated with creating that entrance shall be borne by the contractor involved in the dispute. Such costs shall include, but not be limited to, signage, fencing, temporary roads and security personnel as deemed necessary by the Owner for the safety of the occupants of the site.

F. 1. If the Contractor has engaged the services of workers and/or subcontractors who are members of trade unions, the Contractor shall 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. In case the progress of the capital improvement work to be performed by the Contractor is effected by any undue delay in furnishing or installing any items or materials or equipment required pursuant to its agreement with the Owner 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 capital improvement work pursuant to its contract.

3. The Contractor shall ensure that its work continues uninterrupted during the pendency of a labor dispute.

4. 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.

G. The Contractor shall enforce strict discipline and good order among the Contractor's employees and its Subcontractors' work forces and other persons carrying out the performance of its work. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them. The Owner reserves the right to object to any person to be hired or who is employed by the Contractor. Upon the request of the Owner, said person shall be removed from the Project and not again be assigned to perform the Contractor's work without the written permission of the Owner.

H. Within one (1) week after a Notice to Proceed is received, the Contractor shall employ a competent, full-time Project Manager and On Site Superintendent to be approved by the Owner or its representative, and such necessary assistants who shall be in attendance at each project site whenever and wherever work is in progress to provide for the expeditious completion of the work. Said Project Manager and On Site Superintendent shall be employed until punchlist and closeout of the Project. To the extent work is being performed contemporaneously at different facilities within the School District, the Contractor shall assign different superintendents for each facility at which work is being performed. The Project Manager and On Site Superintendent assigned by the Contractor shall not be changed except with the consent of Owner, unless the Project Manager or On Site superintendent or such assistant proves to be unsatisfactory to the Contractor and/or ceases to be in its employ. The Project Manager and On Site Superintendent shall represent the Contractor, and communications given to the Project Manager or On Site Superintendent, whether verbal or written, shall be as binding as if given to the Contractor. Oral communications to the superintendent(s) or his/her assistant(s) and/or project manager shall be confirmed in writing by the Owner or Architect. The Contractor shall forward to the Owner a copy of the resumes for each of its superintendents, project managers and their assistants. The

Owner, the Construction Manager or the Architect shall have the right to have any supervisory or management staff removed from the project with or without cause.

I. Each Contractor shall provide, or otherwise see that, the project manager, or on site superintendent site managers, and/or responsible workers of each Contractor and major subcontractor are equipped with cellular phones and radios. Each Contractor shall provide the Owner, the Construction Manager and the Architect with the number for each phone and worker.

J. 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/or 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, superintendents and/or assistants.

K. Prior to the commencement of work, the Contractor shall provide the Construction Manager and the Architect with:

1. a written list of the names, addresses and telephone numbers of the members of its organization who can be contacted in the event of an off-hours emergency at the building site, including cellular telephone numbers and personal/home telephone numbers.
2. 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.
3. The name, address and telephone number of the bonding company, banking and insurance company for the Prime Contractor employed by the Prime Contractor including the name, address and telephone number of each bonding company's primary contact representative for this project.
4. Detailed subcontractor schedules indicating the approximate quantity of shop drawings, sequence, timing and man loading.
5. 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 Manager.

L. 1. Tests, inspections and approvals of portions of the Contractor's work required by the drawings and/or specifications shall be made at an appropriate time. Unless otherwise provided, the Contractor shall consult with the Architect and the Construction Manager concerning the need for testing and/or inspection of its work pursuant to the Contract Documents and, after consulting with the Architect and Construction Manager, the Construction

Manager shall advise the Owner to make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority. The Owner shall bear all costs associated with the tests, inspections or approvals required by the drawings and/or specifications except as set forth in subparagraph 3 hereof.

2. Tests, inspections and approval of portions of the Contractor's work required by laws, ordinances, rules, regulations or orders of public authorities or governmental agency having jurisdiction shall be made at an appropriate time. The Contractor shall consult with the Architect and the Construction Manager concerning the need for testing and/or inspection of its work pursuant to law, ordinance, regulation or orders of public authorities or governmental agencies and shall advise the Owner in writing that it has made arrangements for such tests, inspections and approvals with the appropriate public authority or governmental agency. The Contractor shall be solely responsible for making timely notice of the need for a test, inspection and/or approval with the relevant public authority or governmental agencies and shall bear all costs associated with such testing, inspection or approval required by such public authority or governmental agency.

3. If the Architect, the Construction Manager, the Owner, or public authorities or governmental agencies having jurisdiction determine that portions of the Contractor's work require additional testing, inspection or approval due to the Contractor's failure to perform its work in accordance with the requirements of the Contract Documents and/or laws, ordinances, rules, regulations or orders of public authorities or governmental agencies having jurisdiction, the Architect and the Construction Manager will advise the Owner of the need for such additional inspections or tests and the Owner shall make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner. The Contractor shall bear the costs of such additional testing as provided in Article 14.

M. The Contractor shall, if required by ordinances, laws, codes, rules and/or regulations of the governing agencies having jurisdiction over this project, retain a licensed professional engineer to supervise the construction of this project including, but not limited to, foundations, structural work, soils, welding, reinforced masonry and the like.

N. The Contractor recognizes and acknowledges that the within project is governed by and subject to the provisions of New York State General Municipal Law, section 101, governing the award of contracts on public improvement projects. As such, the Contractor recognizes and acknowledges that other contractors will be performing work on the project in conjunction with it. As such the Contractor agrees to cooperate with such other contractors performing work on the project and shall perform its work as follows:

1. The Contractor shall not interfere with the erection, installation or storage upon the premises of any work, materials, supplies or equipment which is to be performed and furnished by other contractors, and the Contractor shall properly connect and coordinate its work therewith.

2. The Contractor shall not commit or permit any act which will interfere with the performance of the work of any other contractor performing work on the project. If the Contractor sustains any damage through any act or omission of 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 contractor, the Contractor shall promptly notify the Owner and the Construction Manager of such damage.

3. The Contractor agrees to defend and indemnify Owner, Architect, Construction Manager, its Consultants and Sub-consultants, from all claims made against any of them arising out of 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 or other contractor(s) 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 an offending contractor's contract sum an amount sufficient to cover such damage and all expenses and costs associated with the damage sustained.

4. 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.

5. In case of interference between the operations of different 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. 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 own work.

7. Delays or oversights on the part of any contractor or subcontractor in getting any or all of their 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.

8. If part of the Contractor's work depends for proper execution or results upon construction or operations by the Owner or another contractor, the Contractor shall, prior to proceeding with that portion of its work, promptly report to the Architect and Construction Manager apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall

constitute an acknowledgment that the Owner's or other contractor's completed or partially completed construction is fit and proper to receive the Contractor's work.

9. The Contractor shall promptly correct discrepancies or defects in its work which have been identified by other contractors as affecting proper execution and results of the work of such other Contractor.

O. 1. The Contractor shall comply with and give notices required by laws, ordinances, rules, regulations and lawful orders of public authorities or governmental agencies bearing on 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, (b) the Architect and its consultants, employees, officers and agents, and/or (c) the Construction Manager and its 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.

2. The Contractor shall pay any costs or fees incurred in such compliance and any fines or penalties imposed for violation thereof and any costs or fees incurred by the Owner due to such violation. If the Contractor observes that portions of the Contract Documents are at variance therewith, the Contractor shall promptly notify the Architect and Owner in writing, and necessary changes shall be accomplished by appropriate modification to the drawings and/or specifications.

3. If the Contractor performs Work knowing it to be contrary to laws, statutes, ordinances, building codes, and rules and regulations without such notice to the Architect, the Construction Manager and Owner, the Contractor shall assume full responsibility for such Work and shall bear the attributable costs and shall bear the total cost for correction of same.

4. If the Contractor fails to give such notices, it shall be liable for and shall indemnify and hold harmless (1) the Owner, its consultants, employees, officers and agents, (2) the Architect and its consultants, employees, officers and agents, and (3) the Construction Manager, its 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. The Contractor shall pay any costs or fees incurred in such compliance and any fines or penalties imposed for violation thereof and any costs or fees incurred by the Owner due to such violation.

P. The Contractor recognizes and acknowledges that job meetings will be held at the job site weekly unless otherwise designated by the Owner or the Architect. The Contractor shall have responsible representation at the MANDATORY weekly job meetings held at the Construction Manager's job office. These meetings will be held to arrange for satisfactory coordination of all trades on the project so as not to impede job progress. Contractors or subcontractors failing to attend job meetings shall be responsible for delays and/or expenses incurred due to coordination difficulty.

Q. The Contractor shall provide copies of its daily construction reports to the Construction Manager's Field Superintendent. These reports shall be submitted no later than 10:00 am the following workday. The daily reports shall provide detailed information concerning the Contractor's activities and operations, including work activities on site and manpower. A "Daily Construction" form is included in these specifications and shall be used for reporting these activities. In addition, the Contractors are to submit a Two Week Look Ahead schedule for up coming work. A "Two Week Look Ahead" form is included in these specifications for the Contractor's use.

ARTICLE 4 CONTRACTOR'S USE OF SITE

A. The Contractor shall confine operations at the site to the areas at which construction is to be performed and to such areas permitted by law, ordinances, permits and as set forth in detail in the project manual and drawings forming a part of its contract with the Owner.

B. Five (5) days after receipt of the Notice to Proceed, the Contractor shall provide two (2) copies of a video taped recording of all existing conditions to the Construction Manager. This taping shall provide a record of all existing buildings, grounds, exterior conditions and interior 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.

C. The occupied portion of any school building shall always comply with the minimum requirements necessary to maintain a certificate of occupancy.

D. General Safety and Security Standards for Construction Projects:

1. All construction materials shall be stored in a safe and secure manner.
2. Fences around construction supplies or debris shall be maintained.
3. Gates shall always be locked unless a worker is in attendance to prevent unauthorized entry.
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.
5. The Contractor shall exert utmost care and diligence when working in or near any existing buildings or sitework. 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 shall be repaired and charged to the Contractor responsible for the damage.

6. 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.

7. All disconnect and/or tie-in work involving any utilities that would interfere with the ongoing operations of the Owner shall be completed after hours when the facility is not in use. The performance of this work shall be projected on all schedules required to be prepared by the Contractor. Additionally, the Contractor shall give the Construction Manager and the Owner at least forty-eight (48) hours advance notice of its intention to perform this type of work. All overtime and standby personnel necessary to complete these tie-ins shall be the responsibility of the Contractor performing the work.

E. 1. 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. Methods of dust and fume control shall include, but not be limited to:

- a. Adequate ventilation;
- b. Wetting down;
- c. Keeping bags of insulating materials, cement, etc., closed.
- d. Controlled mixing of materials under field conditions;
- e. Special attention should be utilized in sawing of insulation and certain acoustical materials and storage of materials.
- f. Job housekeeping must be maintained;
- g. Advising all personnel of hazardous conditions, including supervisors and workers;

Each contractor is responsible for instituting the above policies to insure minimal impact to surrounding occupied areas.

2. 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.

3. 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.

4. 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.

F. 1. Storage space will be allotted to the Contractor by the Owner to the extent such space, in the sole discretion of the Owner, is available. The Contractor shall be responsible for securing appropriate space for its material with the Construction Manager prior to delivery. 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.

2. The Contractor shall schedule delivery of materials and equipment to minimize long term storage at the Project, to prevent overcrowding of construction spaces, and to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other losses.

3. The Contractor shall deliver materials and equipment to the Project in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting and installation. The Contractor shall inspect materials and equipment upon delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected. The Contractor shall store products to allow for inspection and measurement of quantity or counting of units. The Contractor shall store materials in a manner that will not endanger the Project structure. The Contractor shall store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation. The Contractor shall comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.

4. The Contractor shall not unreasonably encumber the site with materials or equipment during the performance of its work. Only materials and equipment which are to be used directly in the performance of the Contractor's work shall be brought to and stored on the premises of the School District. After equipment is no longer required for its work, the Contractor shall promptly remove such equipment from the premises of the School District. The Contractor

shall be solely responsible for the protection of construction materials and equipment stored on the premises from weather, theft, damage and all other adversity. The Contractor shall at all times provide the proper housekeeping to minimize potential fire hazards, and shall provide approved spark arresters on all steam engines, internal combustion engines and flues.

5. A construction entrance will be designated for deliveries. A separate entrance will be established for entering and exiting the site only. 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 any 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.

6. The Contractor for General Construction shall provide necessary and required security measures to adequately safeguard the construction site from vandalism and intrusion of unauthorized persons. The Contractor for General Construction shall submit its means and methods of security to the Construction Manager for review and comment. The project site(s) 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 Contractor for General Construction 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 Contractor for General Construction. 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.

G. The Contractor's right to entry and use of the School District premises arises solely from the permission granted by the Owner pursuant to the agreement between the Contractor and the Owner. This permission shall be deemed to be withdrawn upon the termination of the Contractor's agreement with the Owner.

H. 1. The Contractor shall be required to perform its work with no interruption to the School District's operations, including its administrative and business operations. Any work which will interfere with the School District's operations and/or which is to be performed when the School District's facilities are in operation shall be performed on evenings and weekends. Additionally, the Contractor shall conduct its work in compliance with federal, state, county or local ordinances. All costs incurred by the Owner to make the facilities available during evening and weekends shall be borne by the Contractor. The Owner reserves the right to determine what work will "interfere" with its operations and said determination shall be final.

2. The Contractor may request access to the site during times beyond the work hours permitted. Approval is solely at the discretion of the Owner. If approval is given, the Contractor is responsible for paying all additional costs incurred by the Owner, Architect and the Construction Manager for providing the site to the Contractor during the additional time periods.

3. 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. 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.

4. The Owner shall not be responsible for any overtime charges incurred by the Contractor during the course of this project. Any and all costs associated with work which is performed at hours requiring the payment of such overtime by the Contractor to its workers shall be the Contractor's responsibility.

I. 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.

J. The Contractor shall provide all required temporary access walkways, both interior and exterior, and the like necessary to complete its work. The Contractor shall maintain an unobstructed condition at all entrances and/or exits from present buildings. No equipment, other than equipment with rubber tires, will be allowed on any existing or new pavement, UNLESS THE CONTRACTOR HAS OBTAINED THE PRIOR APPROVAL OF THE CONSTRUCTION MANAGER AND THE PAVEMENT HAS BEEN FIRST PROTECTED WITH PLANKING OR BY OTHER MEANS APPROVED BY THE CONSTRUCTION MANAGER.

K. The Contractor and any entity for whom the Contractor is responsible shall not erect any sign on the premises of the School District without the prior written consent of the Owner, which consent may be withheld at the sole discretion of the Owner.

L. 1. Without the prior approval of the Owner, the Contractor shall not permit any workers to use any existing School District facilities, including, without limitation, lavatories, toilets, entrances and parking areas other than those designated by the Owner. Employees, vehicles, and equipment of the Contractor and of all others engaged by the Contractor for the performance of its work shall enter onto the premises of the School District for which construction work is to be performed only at those locations designated or approved by the Construction Manager. The parking for construction personnel shall be limited to the designated trailer park area only. Failure to abide by this rule will result in towing of cars at the expense of the contractor who employs the individual.

2. The Contractor shall ensure that its work, at all times, is performed in a manner that affords reasonable access to both vehicles and individuals, to the premises of the School District and all adjacent areas. The Contractors' work shall be performed, to the fullest extent possible, in such a manner that areas in and around the construction area shall be free from all debris, building materials and equipment likely to cause hazardous conditions, and do not close

or obstruct walkways, roadways or other occupied facilities or facilities to be used by the Owner. Without limitation to any other provision of the agreement between the Contractor and the Owner, the Contractor shall use its best efforts to minimize any interference with the occupancy of areas, buildings, entrances, and parking areas in and around the premises at which work is being performed. Free access to fire hydrants and standpipe connections shall be maintained at all times during construction operations, and portable fire extinguishers shall be provided by the Contractor and made conveniently available throughout the construction site.

3. The Construction Manager, in conjunction with the Owner and the Architect, shall designate locations at the site at which the Contractor, its subcontractors and employees may utilize in connection with its work. The Contractor's employees and the employees of the Contractor's Subcontractors and others engaged by the Contractor to perform its work are prohibited from trespassing or leaving any vehicle on any property not assigned by the Owner as set aside for the use of the Contractor. The Contractor's employees and the employees of the Contractor's Subcontractors and other engaged by the Contractor to perform its work are restricted to the immediate area at which work is to be performed. Only persons having official business will be admitted to the construction site. NO COMMUNICATION BETWEEN THE CONTRACTOR, ITS EMPLOYEES, SUBCONTRACTORS' EMPLOYEES, OR OTHERS ENGAGED BY THE CONTRACTOR FOR THE PERFORMANCE OF ITS WORK AND STUDENTS OR STAFF WILL BE PERMITTED.

4. The Contractor, its employees, its Subcontractors and their employees or agents, and all others engaged by the Contractor in connection with the performance of its work are required to wear photographic identification badges at all times. The Contractor shall provide such individuals with said photographic identification badges. These badges shall be worn so as to be readily and easily visible. All workers and representatives of the Contractor, its subcontractors or suppliers shall wear these badges while on school property. The information on these badges shall be as prescribed by the Owner and the Construction Manager. Each person seen without a photo identification badge (or otherwise failing to comply with this requirement in the opinion of the Owner or the Construction Manager) shall be ordered to leave school property. No warnings shall be necessary. The Contractor(s) and their subcontractor(s) employing the offending person(s) shall be solely responsible for making-up and paying for any loss of production or required progress in the Work resulting from this action (including any claims by other Contractors dependent on the work of this Contractor). All parties agree that any action taken to enforce this requirement shall not be construed by any Contractor or its subcontractors or suppliers as the basis for a claim (for either time or money) for delay to the Work or to the Contractor, its Subcontractors, or Suppliers.

5. Without limitation of any other provision of the agreement between the Owner and Contractor, the Contractor shall use its best efforts to comply with all rules and regulations promulgated by the Owner in connection with the use and occupancy of the premises of the School District. The Contractor shall immediately notify the Owner in writing if during the performance of its work, the Contractor finds compliance with any portion of such rules and regulations to be impracticable, setting forth the problems of such compliance and suggesting alternative through which the same results intended by such portion of the rules and regulations

can be achieved. The Owner may, in the Owner's sole discretion, adopt such suggestions, develop new alternatives or require compliance with the existing requirements of the rules and regulations.

M. No drinking of alcoholic beverages, smoking or use of controlled substances is permitted on the grounds. The Contractor shall insure that none of its or its Subcontractors, its employees, agents, and/or consultants report to the site impaired by alcohol or controlled substances. The Contractor bears the responsibility of determining if its, or its subcontractors, employees are in any way impaired and whether the safety of the public, the employees of other Contractors and their Subcontractors, the Owner, Architect, or Construction Manager are jeopardized. Each contractor shall provide drinking water for its own employees.

N. The Contractor's employees, representatives, agents and consultants, and all of its Subcontractors' employees, representatives, agents and consultants at the site are to refrain from using indecent language. All doing so will be removed from the site. Artwork or decoration found on vehicles belonging to Contractor or Subcontractor employees parked on or near the school property which contain indecent language or pictures shall either be covered or removed from the location.

O. The Contractor's employees, representative, agents and consultants, and all of its Subcontractors' employees, representatives, agents and consultants at the site are to wear shirts, long pants and proper footwear.

P. Each contractor shall keep the premises and surrounding area in which it is working free from accumulation of waste materials or rubbish caused by the performance of all of the work being performed on-site and in the buildings. On a daily basis at the conclusion of work on the project, each 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. Each Contractor shall broom sweep all construction areas in which it has performed worked every day. The Construction Manager shall perform an inspection each afternoon to determine that the work areas of the contractors have been properly cleaned. In the event the work areas are not cleaned, the Construction Manager shall advise the offending contractor to provide cleaning as required herein. If any contractor fails to keep the site safe and clean within four (4) hours of being notified by the Construction Manager, either verbally or in writing, the Construction Manager will have the clean up work performed and back charged to the offending contractor without further notification to the Contractor. The cost of such cleaning company, together with the cost of any custodial costs of the School District, at prevailing overtime rates plus 15% will be charged to the offending contractor. Notice to field personnel shall be deemed notice to the Contractor.

Q. The Contractor shall provide ventilation of enclosed areas during construction as may be required to permit proper curing and drying out and to prevent excessive humidity, moisture and condensation. Ventilation shall be by natural or artificial means as required by conditions involved.

R. The Contractor shall be responsible for the control of chemical fumes, gases and other contaminants produced by welding, gasoline or diesel engines, roofing, paving, painting, etc. to ensure that they do not enter occupied portions of the building or air intakes.

S. The Contractor shall be responsible for ensuring 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.

T. From the commencement to the completion of the Project, the Contractor shall keep the parts of the work and the buildings free from accumulation of water no matter what the source or cause of water.

U. 1. The General Contractor shall construct temporary partitions where shown on drawings or where otherwise required for safety of the public or to prevent dust from entering occupied areas. Partitions shall be dust-proof from floor to slab or structure above (if existing condition is a drop in tile ceiling, Contractor shall remove tile and install partition to structure above). In addition to framing and sheetrock, the Contractor shall install fire resistant plastic partitions on the work area side of its work. If an access door is required, an alternating 3 layer plastic system shall be used. The door shall be a standard hollow metal door with lockset and closer. Keys shall be distributed to the Owner's other contractors, the Owner and the Architect.

2. All cutting and welding performed within an occupied building or adjacent to a window or intake vent shall be performed during off hours.

V. 1. The Contractor shall control the safe handling and storage of all welding materials, acetylene and oxygen tanks, and other equipment required for welding and cutting work at the job site. Such storage shall be in compliance with OSHA regulations.

2. Welding materials and equipment shall be removed promptly from the premises upon completion of the welding and cutting work.

W. The Contractor shall be responsible for all costs incurred by the Owner caused by false security/fire alarms set off by the Contractor. Costs shall include custodial response charges etc.

X. The Contractor shall be responsible for broken glass, and at the completion of the Work shall replace such damaged or broken glass. After damaged or broken glass has been replaced, the Contractor shall remove all labels, wash and polish both sides of all glass. In addition to general broom cleaning, the General Contractor shall perform the following final cleaning for all trades at completion of the Work:

1. Remove temporary protections;
2. Remove marks, stains, fingerprints and other soil or dirt from painted, decorated and natural finished woodwork and other Work;

3. Remove spots, plaster, soil and paint from ceramic tile, marble and other finished materials, and wash or wipe clean;
4. Clean fixtures, cabinet work and equipment, removing stains, paint, dirt and dust, and leave same in undamaged, new condition;
5. Clean aluminum in accordance with recommendations of the manufacturer; and
6. Clean all floors thoroughly in accordance with recommendations of the manufacturer.

Y. Where a contractor other than the General Contractor is the only contractor engaged to perform work, the responsibilities allocated to the General Contractor in these General Conditions shall be performed by such other contractor.

ARTICLE 5 SUBCONTRACTORS

A. 1. As soon as practicable after receipt of Letter of Intent to Award, Notice to Proceed or other form of official notice of award of the Contract, but not more than ten (10) days after receipt of official notice of award of the Contract, the Contractor shall furnish the Owner and the Architect, in writing, with (1) the name, trade and subcontract amount for each Subcontractor and (2) the names of all persons or entities proposed as manufacturers of the products identified in the Specifications (including those who are to furnish materials or equipment fabricated to a special design) and, where applicable, the name of the installing Subcontractor. Copies of all Subcontractor contracts, fully executed, are to be provided to the Construction Manager, including but not limited to all addenda, appendices, and/or exhibits including scope of work sheets. All such subcontracts shall be submitted to the Construction Manager within ten (10) days of the Owner's award of the contract to the Contractor.

2. Upon review of the Contractor's list of Subcontractors, the Architect will advise the Contractor in writing stating whether or not the Owner, the Construction Manager or the Architect, after due investigation, accepts or rejects, any proposed Subcontractor. Subcontractors will not be acceptable unless, when requested by the Architect, evidence is furnished that the proposed subcontractor has satisfactorily completed similar subcontracts as contemplated under this prime contract, and has the necessary experience, personnel, equipment, plant, and financial ability to complete the subcontract in accordance with the intent to the Documents. As verification of financial ability, the Owner reserves the right to request and receive up to five (5) years worth of financial statements, bank references, bond/insurance company references and all other information required to assess financial ability.

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. No increase in the Contract Sum shall be allowed where a sub-contractor is rejected by the Architect, Construction Manager or Owner who is (1) deemed unqualified to perform the particular work subcontracted by the Contractor, (2) does not have the necessary experience, personnel, equipment, plant and financial ability to complete the subcontract, or (3) has a history of poor performance in work of similar

nature. Upon receipt of a rejection of a subcontractor by the Architect, the Contractor shall have the right to request a meeting with the Architect, Construction Manager and the Owner to discuss the reasons it believes the subcontractor is qualified to perform the work. Upon review of such reasons, the Architect shall re-consider its determination and shall advise the Contractor of its determination upon such review. If the Architect still finds that such subcontractor does not meet the requirements above-stated, it shall advise the Contractor. The Architect's determination upon such review shall be final and binding on the Contractor and its Subcontractor and the Contractor hereby waives any and all claims it or its subcontractor might have against the Owner, the Construction Manager and/or the Architect concerning the rejection of such Contractor and shall require its subcontractors to execute such similar waiver in its agreement with the Contractor.

4. The Contractor shall not change a Subcontractor, person or entity previously selected if the Owner, Construction Manager or Architect makes reasonable objection to such change.

B. By appropriate agreement, the Contractor shall require each Subcontractor to be bound to the Contractor by terms of the Contractor's agreement with the Owner, and to assume toward the Contractor all the obligations and responsibilities which the Contractor, by said agreement, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner, Construction Manager and Architect under the Contractor's agreement with the Owner so that subcontracting thereof will not prejudice such rights, and shall allow 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 its agreement with the Owner, has against the Owner. However, the Subcontract agreement between the Contractor and Subcontractor shall not provide, nor shall this Agreement be deemed to provide any rights, remedies or redress by the Subcontractor(s) against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors.

C. The Contractor shall promptly notify the Owner, Construction Manager and Architect of any material defaults by any Subcontractors and/or whether it has terminated its agreement with any of its subcontractors for any reason.

D. The Contractor hereby assigns all of its rights in its agreements with its Subcontractor(s) and hereby does assign, transfer and set over to the Owner all of its rights and/or interests in its agreements with its Subcontractor(s), but only in the event of termination of the Contractor's agreement with the Owner pursuant to Article 17, paragraph A of these General Conditions of the Contract for Construction and only to the extent the Owner implements its rights to take such assignment of contract by notifying the Subcontractor in writing of its intention to do so. Such an assignment is subject to the prior rights of the surety, if any, obligated to the Owner pursuant to a performance bond submitted in connection with the Contractor's work.

E. If the Work in connection with a subcontract has been suspended for more than ninety (90) days after termination of the Contract by the Owner and the Owner accepts assignment of

such subcontract, the Subcontractor's compensation shall not be adjusted for any increase in direct costs incurred by such Subcontractor as a result of the suspension.

F. It shall be the Contractor's responsibility, when sub-contracting any portion of his work, to arrange or group items of work under particular trades to conform with then prevailing customs of the trade, regardless of the particular Divisions and Sections of the Specifications in which the work is described.

G. All subcontracts must be in writing.

ARTICLE 6

CONTRACTOR'S USE OF DRAWINGS/SPECIFICATIONS

A. The Agreement between the Owner and Contractor, and all documents incorporated therein by reference, including but not limited to, the drawings and project manual shall be signed by the Contractor and the Owner.

B. The intent of the agreement between the Owner and the Contractor is to include all items necessary for the proper execution and completion of the work to be performed by the Contractor. The documents comprising the agreement between the Contractor and the Owner are complementary, and what is required by one shall be as binding as if required by all.

C. 1. In the event of inconsistencies within or between parts of the agreement between the Contractor and the Owner or between the agreement between the Contractor and the Owner and applicable standards, codes and ordinances, the Contractor shall (a) provide the better quality or greater quantity of Work or (b) comply with the more stringent requirement; either or both in accordance with the Architect's interpretation.

2. On the Drawings, given dimensions shall take precedence over scaled measurements and large scale drawings over small scale drawings.

3. Before ordering any materials or performing any of its work, the Contractor and each Subcontractor shall verify measurements at the Project site and shall be responsible for the correctness of such measurements. No extra charge or compensation will be allowed on account of differences between actual dimensions and the dimensions indicated on the Drawings. Any difference which may be found shall be submitted to the Architect for resolution before proceeding with the performance of the work.

4. 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.

5. Drawings, in general, are made to scale, but all working dimensions shall be taken from the figured dimensions or by actual measurements at the job and in no case by scaling. The Contractor shall study and compare all Drawings and verify all figures before laying out or

constructing the work and shall be responsible for any and all errors in his work which might have been avoided thereby. Whether or not an error is believed to exist, deviation from the Drawings and the dimensions given thereon shall be made only after approval in writing is obtained from the Architect.

6. In the event addendum (a) are issued and contain changes to the Drawings and/or Specifications, the provisions in the addendum (a) supersede previously issued Drawings and/or Specifications.

D. Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control Contractor in dividing the work among Subcontractor or in establishing the extent of Work to be performed by any trade.

E. Unless otherwise stated in the agreement, words and abbreviations which have well-known technical or construction industry meanings are used in the agreements in accordance with such recognized meanings.

F. The Contractor, and all Subcontractors, shall refer to all of the Drawings, including those showing the work of others performing work in connection with the project, including but not limited to the General Contractor (if any), the Plumbing Contractor, the Heating, Ventilation, Air Conditioning Contractor, Electrical Contractor and other specialized trades, and to all of the Divisions of the Project Manual, and shall perform all work reasonably inferable therefrom as being necessary to produce the indicated results.

G. All indications or notations on the drawings which apply to one of a number of similar situations, materials or processes shall be deemed to apply to all such situations, materials or processes wherever they appear in the Work, except where a contrary result is clearly indicated by the drawings or project manual. All work mentioned or indicated in the drawings or project manual shall be performed by the Contractor unless it is specifically indicated therein that the work is to be performed by others.

H. The Drawings, Specifications and other documents prepared by the Architect are instruments of the Architect's service through which the Contractor's work is to be performed. The Contractor may retain one contract record set during the course of the project. Neither the Contractor nor any Subcontractor, Sub-subcontractor or material or equipment supplier shall own or claim a copyright in the Drawings, Specifications and other documents prepared by the Architect, and unless otherwise indicated the Architect shall be deemed the author of them and will retain all common law, statutory and other reserved rights, in addition to the copyright. All copies of them, except the Contractor's record set, shall be returned or suitably accounted for to the Architect, on request, upon completion of the Work.

I. The Drawings, Specifications and other documents prepared by the Architect, and copies thereof furnished to the Contractor, are for use solely with respect to this Project. They are not to be used by the Contractor or any Subcontractor, Sub-subcontractor or material or equipment supplier on other projects without the specific written consent of the Owner and Architect. The

Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are granted a limited license to use and reproduce applicable portions of the Drawings, Specifications and other documents prepared by the Architect appropriate to and for use in the performance of its work pursuant to its agreement with the Owner. All copies made under this license shall bear the statutory copyright notice, if any, shown on the Drawings, Specifications and other documents prepared by the Architect. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect's copyright or other reserved rights.

J. The Owner shall furnish surveys describing physical characteristics of the site, upon written request of the Contractor and to the extent such survey is in existence at the time of said request, legal limitations and utility locations for the project sites. Nothing herein shall be construed as requiring the Owner to generate any document which it does not possess at the time of the request by the Contractor. In the event that the survey provided does not clearly delineate the metes and bounds of the Owner's property, the Contractor shall stop work and immediately notify the Architect, Construction Manager and the Owner. The Contractor shall NOT proceed with its work until it receives written permission from the Construction Manager and/or the Architect. The Contractor shall be fully responsible for all costs arising from non-compliance with this provision. Any delays associated with this provision shall not serve as a basis for a claim by the Contractor.

K. From the basic data established by the Owner, the General Contractor shall establish reference control points and complete the layout of the work. Each Contractor is responsible for utility markouts as it pertains to the scope of their work and maintain markout during work. Sketch of layout with reference points to be given to Construction Manager and Architect at the time of markout.

L. The Contractor shall be responsible for all measurements that may be required for execution of the work to the exact position and elevation as prescribed in the specifications, shown on the drawings, or as the same may be modified at the direction of the Architect to meet changed conditions.

M. The General Contractor shall be responsible for the establishment of points, wall and partition lines required by the various Prime Contractors and subcontractors in laying out their work.

N. Each Contractor shall furnish such stakes and other required equipment, tools and materials, and all labor as may be required in laying out any part of the work from the base lines and benchmarks established by the Owner.

O. 1. The General Construction Contractor shall establish a baseline and benchmark system for each building addition, area of renovation or component using the services of a licensed professional surveyor. The surveyor(s) employed to establish this system or to extend and maintain an existing benchmark system for the work of other trades shall have not less than five years of experience in performing construction surveys similar to the work they will perform

for this project. The remaining Contractors and their respective subcontractors shall be responsible for extending these lines, levels and grades, and for performing all layout for their own work. The Contractor is solely responsible for any damage or loss due to incorrect extension of lines, level or grades in their layout. The Contractor and its subcontractors shall be responsible for the accuracy with respect to the layout of their work. Any discrepancies or errors in the drawings, perceived by another contractor or subcontractor shall be immediately reported to the Construction Manager. If any corrections are necessary, they shall be executed in accordance with the terms and provisions of these General Conditions.

2. The Contractor and its subcontractors shall be responsible to offset or to protect their markings from anything that may disturb them.

3. Every contractor shall work off the lines and elevations established and maintained as the baseline and benchmark system.

4. Each Contractor is responsible for the accuracy of his own work.

P. The Architect may require that construction work be suspended at any time when location and limit marks established by the Contractor are not reasonably adequate to permit checking completed work or the work in progress.

Q. Except for the basic building permit, the Contractor shall be responsible for securing and maintaining for the life of the project: all permits, P.E. Licenses, connection fees, inspections, etc. applicable to, or customarily secured for the work. This provision includes any permits to be issued in the name of the Contractor required for the work. Originals of all permits are to be issued in the name of the Contractor as required for the work. The Contractor shall furnish the Construction Manager with original copies of all permits prior to the commencement of the work, and shall prominently display a copy of all permits at a location approved by the Construction Manager.

R. 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 Architect at once.

S. The exactness of grades, elevations, dimensions, or locations given on any Drawings issued by the Architect, or the work installed by other contracts, is not guaranteed by the Architect or the Owner. The Contractor shall, therefore, satisfy itself as to the accuracy of all grades, elevations, dimensions, utilities and locations. In all cases of interconnection of its Work with existing or other work, it 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, locations or dimensions shall be promptly rectified by the Contractor without any additional cost to the Owner.

T. 1. The Contractor shall give the Architect timely notice of any additional design drawings, specifications, or instructions required to define its work in greater detail, or to permit the proper progress of its work. To the extent the Architect advises the Contractor that the existing design drawings, specifications and/or instructions given are sufficiently detailed for the Contractor to perform its work, the Architect shall be under no obligation to further clarify or define the work to be performed. In all other circumstances, the Architect shall issue a field order which responds to the request for information.

2. Requests for Information (RFIs) are for requests on clarifications or questions on contract drawings and specifications, not contract terms, scheduling items, or general correspondence, nor, as a means to describe or request approval of alternate construction means, methods or concepts or substitution of materials, systems means and methods. The Contractor shall fill all RFIs out in accordance with the provisions of the Project Manual. Neither the Architect nor the Construction Manager shall fill said forms out on the Contractor's behalf.

U. The Contractor shall, prior to the start of any portion of the Work:

1. review any specified construction or installation procedures, including those as may be recommended by the proposed manufacturer.
2. advise the Architect if the specified procedure(s) deviates from good construction practice.
3. advise the Architect if following said procedure(s) will affect any warranty, including the contractor's general warranty.
4. advise the Architect of any objections the Contractor may have to the specified procedure(s).
5. propose any alternative procedure(s) which the Contractor will warrant.

V. 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 Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

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 contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

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

4. All products submitted for use and incorporated into this project shall be asbestos free.

W. 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, they shall indicate in writing, and prior to award of 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 substitutions as set forth in Article 6.X below.

X. 1. Substitutions. If the Contractor desires to substitute any kind, type, brand, or manufacturer of material other than those named in the Specifications, the Contractor shall indicate the desired substitution in its bid, including the following:

a. For which specified material or equipment the request for substitution is being made;

b. What kind, type, brand, or manufacturer is sought to be substituted for the specified items;

c. Written documentation evidencing that the substituted material or equipment meets or exceeds the specifications for materials and/or equipment set forth in the project manual. Such documentation shall include, but not limited to, a full explanation of the proposed substitution, together with a submittal of all supporting data including technical information, catalog cuts, warranties, test results, installation instructions, operating procedures, significant qualities of proposed substitution (e.g. performance, weight, size, durability and visual effects), and other like information necessary for a complete evaluation of the substitution. Additionally, the Contractor shall provide material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated. All such data shall be provided to the Architect and Owner at the Contractor's sole expense. The Contractor's written explanation shall also include a list of reasons the substitution is advantageous and necessary, including the benefits to the Owner and the project in the event the substitution is acceptable. Additionally, the Contractor shall submit to the Architect information

describing in specific detail how the proposed substituted product differs from the quality and performance required by the base specifications, and such other information as may be required by the Owner or the Architect.

d. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.

e. Samples, where applicable or requested.

f. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.

g. Detailed comparison of the difference in cost between the specified product and the proposed substitution including any and all costs associated with changes or modifications needed to other parts of the work and to construction performed by the Owner and/or separate Contractors that will be necessary to accommodate proposed substitution. In the event the substitution is accepted, the Contractor proposing the use of the substitution shall bear all costs associated with said changes or modifications.

2. By making said requests in conformance with procedures established herein and elsewhere in the Project Manual, the Contractor:

a. Represents that a representative of it has personally investigated the proposed substitute product and has determined that it is equal to or superior in all respects to that specified.

b. Represents that the warranty for the substitution will be the same, or greater than, that applicable to the specified product.

c. Certifies that the cost data is complete and includes all related costs under this contract, including professional services necessary and/or required for the architect and engineers to implement said substitution and waives any and all claims for additional costs related to the substitution which subsequently become apparent.

d. 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.

e. An affidavit stating that (1) the proposed substitution conforms and meets all the requirements of the pertinent Specifications and the requirements shown on the Drawings and (2) the Contractor accepts the warranty and correction obligations in connection with the proposed substitution as if originally specified by the Architect; and the proposed substitution will have no effect on the construction schedule.

3. Proposals for substitutions shall be submitted with the Contractor's bid.

4. No substitutions will be considered or allowed without the Contractor's submittal of complete substantiating data and information as stated hereinbefore.

Y. 1. Submittal of shop drawings, product data, material safety data sheets, samples or similar submittals shall be in accordance with the provisions of the project manual.

2. The Contractor represents and warrants that all shop drawings have been prepared by persons and entities possessing expertise and experience in the trade for which the shop drawing is prepared and, if required by the Architect or applicable law, by a licensed engineer, job specific, reviewed by Contractor and stamped by the Contractor.

3. If the Contractor elects to perform its work without approvals, such work shall be at the Contractor's own risk and expense.

4. By approving and submitting shop drawings, product data, samples and similar submittals, the Contractor represents that the Contractor has determined and verified materials, field measurements and field construction criteria related thereto and has checked and coordinated the information contained within such submittals with the requirements of its work.

5. The Contractor shall not be relieved of responsibility for deviations from requirements of its work by the Architect's approval of shop drawings, product data, samples or similar submittals unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submittal and the Architect has given written approval to the specific deviation. The Contractor shall not be relieved of responsibility for errors and/or omissions in the shop drawings, product data, samples or other of its submittals to the Architect, by the Architect's approval thereof.

6. The Architect shall review, approve, reject or take other appropriate action respecting submittals made by the Contractor as set forth in the Project Manual. The Architect shall check for conformance with information given in the drawings and project manual and the design concept expressed in the agreement between the Owner and the Contractor. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities or for substantiating instructions for installation or performance of equipment or systems designed by the Contractor, all of which remain the responsibility of the Contractor. Further, the Architect's review shall not constitute

approval of safety precautions or, unless otherwise specifically stated by the Architect, of 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. When professional certification of performance characteristics of materials, systems or equipment is required by the Contract Documents, the Architect shall be entitled to rely upon such certification to establish that the materials, systems or equipment will meet the performance criteria required by the Contract Documents.

7. Upon the Architect's rejection of the Contractor's shop drawings, product data, samples and/or other documentation submitted by the Contractor to the Architect, the Contractor shall review the rejection and re-submit such shop drawing, product data, sample and or other document in accordance with the Architect's instruction. The Contractor shall direct the Architect's specific attention in writing or on re-submitted shop drawings, product data, samples, or similar submittals, to revision which have been made, including revisions not specifically requested by the Architect. Resubmission of rejected documents shall be performed within two (2) calendar days. No claim for delay or cost shall be accepted as a result of rejected documents.

8. When professional certification of performance criteria of materials, systems or equipment is required of the Contractor, the Architect shall be entitled to rely in a reasonable and professional fashion upon the accuracy and completeness of such calculations and certifications provided, however, if the Architect, in its reasonable and professional judgment considers it advisable, the Architect shall verify the accuracy and completeness of any and all such calculations and/or certifications. In the event any and all such calculations and/or certifications are found to be inaccurate and/or incomplete by the Architect, the Contractor shall assume full responsibility and bear all costs attributable or related thereto, including, without limitation, the expense of the Architect's additional services associated with the verification of such calculations and/or certifications and the expense of the Architect's additional service made necessary by the failure of such calculations and/or certifications to be accurate or complete.

9. 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.

Z. The Architect will interpret and decide matters concerning performance under and requirements of the drawings and/or technical specifications on written request of the Contractor. Such interpretations may, at the Architect's option, be issued in the form of additional drawings or instructions indicating in greater detail the construction or design of the various parts of the Contractor's work. Such drawings or instructions may be forwarded by the Architect to the Contractor by field order, construction change directive or other notice to the Contractor. The Contractor shall execute the work for which it requested an interpretation in accordance with such additional drawings or instructions without additional cost or extension of its contract time. After a decision has been rendered by the Architect on a matter for which the Contractor sought the Architect's interpretation of the drawings and/or technical specifications, the Contractor shall proceed with the work as directed by the Architect. Failure to proceed with the work in

accordance with the Architect's interpretation may be used as a basis for termination of the Contractor's contract pursuant to Article 17 of these General Conditions.

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

BB. 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/or structural changes in the design; and (vi) such other information as either Owner or Architect may reasonably request. At the completion of the work, 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 right hand 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/or As Built drawings receive the approval from the Architect and the Owner (and all other closeout requirements are met).

CC. The Contractor shall maintain all approved permit drawings in a manner so as to make them accessible to government inspectors and other authorized agencies. All approved drawings shall be wrapped, marked and delivered to the Owner within sixty (60) days of final completion of the Contractor's work.

DD. Each Prime Contractor shall be furnished, free of charge, 3 copies of the Contract Documents and Project Manuals, including all Addenda. Any and all additional copies will be furnished to the Contractor at the cost of reproduction, postage and handling.

ARTICLE 7 CONTRACTOR'S SAFETY/SECURITY PROGRAM

A. 1. The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of its work.

Prior to beginning any work, the contractor shall submit a copy of its corporate safety plan to the Owner and the Architect. Two (2) weeks after receipt of the Notice to Proceed, the Contractor shall provide a Site Safety/Logistics Plan to the Owner and the Architect. The site logistics plan should minimally include locations of the eight-foot high temporary fence and gates, traffic plans for deliveries and removals, refuse container locations, crane locations, pick locations, boom radius, and lift locations, stockpiles, toilet locations, site water and power locations, and safety. This plan shall also show the location of all staging and storage areas, clearly separating construction and school areas. The logistical information represented by the construction documents shall serve as a minimal guide. Each contractor is required to submit their corporate safety policy within ten (10) days of receipt of the Notice to Proceed. Said policy must minimally meet OSHA standards and define details concerning the maintenance of a safe work environment and shall also define practices for the maintenance of hygiene and minimizing the spread of infectious/contagious diseases. The Contractor shall make the participation of its subcontractors in its safety program mandatory. A list of key personnel, with addresses and telephone numbers for emergency purposes shall be forwarded to the Owner and the Architect. The Owner and the Architect shall establish a fire coordination procedure and shall forward same to the Contractor for its use during the performance of its work.

2. The Contractor shall provide its COVID-19 Safety Plan to the Owner prior to the start of any work. The Contractor shall designate a person on its staff to be responsible for monitoring the wearing of Personal Protective Equipment (PPE) by each person on site working with or for the Contractor. Contractor shall strictly follow and ensure that its subcontractors follow Contractor's COVID-19 Safety Plan as well as all applicable Center for Disease Control guidelines and Local, State & Federal Orders.

3. 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 ten (10) hours in duration.

4. The Contractor and its subcontractors shall conduct their operation in accordance with the Safety Guides for Construction as issued by the SED, and the Contractors' Safety Program.

5. All safety equipment including hard hats and weather protective gear required for the Contractor to perform its work are to be supplied by the Contractor and/or its subcontractors. Within the designated construction areas, the Contractor's employees, superintendents, and/or other agents, and its subcontractors, employees, superintendents, and/or other agents are required to wear hard hats and other required and/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 or Construction Manager and 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.

6. The Contractor and its subcontractors shall provide blankets and auxiliary fire protection as part of its construction safety program to prevent damage to adjacent work or materials as a result of its welding or burning operations. Additionally, as part of its construction safety program, the Contractor and its subcontractors shall provide a fire watch, with a fire extinguisher, which is acceptable to the Owner and the Construction Manager.

7. The Construction Manager and/or Owner reserve the right to have all operating equipment periodically inspected by an independent inspector whose finding will be binding. The Prime Contractor, at its own expense, must make corrections within two (2) working days of receiving a written report.

8. All flagmen required for deliveries to the site are to be furnished by the Contractor or its Subcontractors responsible for the delivery. Any and all deliveries crossing the site or student traffic areas shall be escorted by flagmen. All flagmen shall wear orange vests.

B. 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. The Contractor shall notify the Construction Manager in writing its "OSHA Competent Person Regarding Safety". Said person must be an individual capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Construction Manager and Architect. The Contractor shall take all necessary steps to prevent its employees from disturbing and/or damaging the facility and shall be responsible for preventing the escape of fires set in connection with the construction. The Contractor shall notify its employees and subcontractors of the location of the nearest fire alarm box at all locations where the work is in progress. On a weekly basis, the Contractor shall submit to the Construction Manager and Architect minutes of its safety meetings, which minutes shall include a list of the individuals present at such meetings.

C. The Contractor and each of its subcontractors shall conduct its/their operation in accordance with all applicable laws, regulations and order of local, state and federal governments. The Contractor agrees, in order that the work will be completed with the greatest degree of safety to conform to the requirements of the Occupational Safety and Health Act of 1970 (OSHA) and the Construction Safety Act of 1969, including all standards and regulations that have been since or shall be promulgated by the governmental authorities which administer such acts.

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

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

F. The Contractor shall take reasonable precautions for the safety and protection of employees at the project site and other person who may be affected by its work, including but not limited to students, staff, employees and agents of the Owner, the Construction Manager and the Architect.

G. The Contractor shall protect and secure its work and the materials and/or equipment to be utilized in connection with its work, whether stored on or off the site and whether in its care, custody and control or that of its Subcontractors, subcontractors to its subcontractors, or material suppliers.

H. The Contractor shall take all steps necessary to protect all property at or adjacent to the site, including but not limited to trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

I. All delivery vehicles/trucks/machinery/etc. permitted on the site must be equipped with back-up alarms and enter through the designated access points. The Contractor's failure to demonstrate this ability will result in cancellation of delivery or stoppage of work. All delays associated with this cancellation will be the responsibility of the contractor responsible for the work involved.

J. All crane picks, materials delivery, etc. must be coordinated so as not to lift over any occupied area of the building. If absolutely necessary, this work shall be done on off hours to insure the safety of the building occupants. Crane location must approved by the Construction Manager to insure the safety of building occupants.

K. The Owner or Construction Manager reserves the right to have all hoisting equipment periodically inspected by an independent inspector whose findings will be binding. The Contractor, at its own expense, must make corrections cited by the inspector before continuing work. The Owner or Construction Manager will not assume any responsibility for the safe operation of any hoisting equipment by exercising this right. The Contractor and/or its subcontractor(s) shall cooperate with the inspector by allowing time for the inspection. The Contractor shall be notified twenty four (24) hours prior to the time of the inspection. These inspections do not release the Contractor if its responsibility to provide all engineering, permits and inspections as required by OSHA or the New York State Education Department prior to use of any hoisting equipment.

L. The Contractor shall use the entrances designated on the site logistic plans and drawings for personal vehicles, trucks, equipment, deliveries and the like.

M. All interior temporary partitions and emergency egress barriers (if required) are to be

installed on an after hours basis (weekends/school holidays).

N. 1. When use or storage of hazardous materials or equipment or unusual construction methods are necessary to perform its Work, the Contractor shall obtain the Owner and the Construction Manager's consent for the use of such materials, equipment or unusual construction methods. In the event the Owner determines that the use of such hazardous material or equipment or unusual construction methods can be performed by the Contractor with alternative means, methods and/or techniques, the Contractor shall employ such alternate means of prosecuting its work at no additional cost to the Owner.

2. In the event the Owner approves the use or storage of such hazardous materials, equipment or unusual construction methods, the Contractor shall provide for the Owner's and the Construction Manager's use a full set of safety instructions relating to all such materials. Additionally, when the Owner and/or the Construction Manager reviews the use of storage of such hazardous materials, equipment and or unusual construction methods, the Contractor shall exercise the highest degree of care and carry on such activities under supervision of properly qualified personnel.

3. Transportation, storage, and use of explosives shall be in strict accordance with all local, state and federal regulations, statutes, and requirements. All safety precautions as set forth in the "Manual of Accident Prevention in Construction" published by the Associated General Contractors of America, Inc. shall be observed.

4. The Contractor is responsible for its own storage and personnel trailers at the site. The Contractor will be required to supply man trailers and storage box trailers as required. All costs related to delivery, construction, protection, power, etc. for said trailers are the responsibility of the contractor utilizing the space. The Owner WILL NOT PROVIDE STORAGE SPACE. The placement of personnel and/or storage trailer will be strictly limited to pre-determined locations. The Contractor shall obtain the written approval of the placement of any trailer or storage box from the Construction Manager.

O. During construction, the General Contractor shall be responsible for maintaining a watertight structure. This shall include additions and 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, contractor shall be responsible for all costs associated with clean up and repairs. Inasmuch as flooding and damage have safety implications to the general public, clean up and repairs may be made by the Owner without warning to the Contractor. Administration costs incurred by the Owner and Architect will also be back charged to the Contractor. The Contractor, by entering into contract with the Owner agrees to be liable for these costs.

P. When all or a portion of the Contractor's work is suspended for any reason, the Contractor shall securely fasten down all coverings and protect the work, as necessary, from injury by any cause.

Q. 1. The Contractor shall promptly remedy damage and loss to all property of the Owner, or adjacent to the Owner's property (other than damage or loss covered by insurance) 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, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor.

2. Title to all completed or partially completed work at the job site, and to all materials delivered to and stored at said job site which are intended to become a part of the completed work covered by the agreement between the Contractor and the Owner, shall be in the name of the Owner. Notwithstanding the foregoing, and prior to acceptance of the completed work by the Owner, the Contractor shall be liable for all loss of or damage to said completed work, partially completed work, materials furnished by the Contractor, and/or materials or equipment furnished by others, the custody of which has been given to the Contractor, arising from any cause other than those against which the Owner herein undertakes to carry insurance. In the event of loss or damage from cause other than those against which the Owner undertakes to carry insurance, the Contractor shall replace or repair the said work or materials at his own cost and expense, to the complete satisfaction of the Owner, the Construction Manager and the Architect.

R. The Contractor shall promptly report in writing to the Owner, the Architect and the Construction Manager all accidents arising out of or in connection with the Work which cause death, person injury, or property damage, giving full details and statements or 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 the Architect.

S. 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.

T. Any and all fines or citations levied against the Owner, Architect, or Construction Manager due to the failure of the Contractor to comply with regulations of any governing authority, shall be paid for by the Contractor. This shall include any interest or late charges which accrue due to the Contractor's failure to remit payment upon receipt of such levies.

U. The Contractor shall indemnify and hold harmless the Owner, Construction Manager and Architect from any and all claims, damages, losses, suits, obligations, fines, penalties, costs, charges and expenses which may be imposed upon or incurred by or asserted against any of them by reason of any act or omission of such Contractor or any subcontractor or any person or firm directly or indirectly or indirectly employed by such Contractor, with respect to violations of OSHA requirements, rules and/or regulations.

V. The Contractor acknowledges that the Labor Law of the State of New York, and regulations adopted thereunder, place upon both the Owner and Contractor certain duties and

that liability for failure to comply therewith is imposed on both the Owner and Contractor regardless of their respective fault. The Contractor hereby agrees that, as between the Owner and the Contractor, and to the extent permitted by law, the Contractor is solely responsible for compliance with all such laws and regulations imposed for the protection of persons performing the Contract.

W. The Contractor shall indemnify and hold harmless the Owner, Architect, and Construction Manager, 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 to refuse to defend any such action, the Contractor shall be liable to the Owner for all costs of the Owner, Architect or Construction Manager in defending such claim or action and all costs of the Owner, including attorney's fees, in recovering such defense costs from the Contractor.

X. The Contractor and its subcontractors shall indemnify and hold harmless the Owner, Construction Manager and Architect from any and all claims, damages, losses, suits, obligations, fines, penalties, costs, charges and expenses which may be imposed upon or incurred by or asserted against any of them by reason of any act or omission of such Contractor or any subcontractor or any person or firm directly or indirectly employed by such Contractor, for the act and/or omissions of any Contractor or Subcontractor that resulted in an incident and/or accident causing personal injury and/or property damage.

Y. The Construction Manager, the Owner, and/or the Architect will not assume any responsibility for the safe operation of any cranes or equipment by exercising this right. The Contractor and its subcontractors shall cooperate with the inspector by allowing time for inspection. The Contractor will be notified 24 hours prior to the time of the actual inspection. The Contractor is obligated to perform all engineering, obtain permits, and to have all hoisting equipment inspected as required by OSHA, Village, Town, County, State, and Federal regulations as well as any other agency having jurisdiction. Copies of all inspection reports and certificates must be transmitted to Construction Manager as soon as possible.

ARTICLE 8 CHANGES IN THE WORK

A. Without invalidating the agreement between the Owner and the Contractor, and without notice to the Contractor's surety, the Owner may, at any time or from time to time, order additions, deletions or revisions in the Contractor's work. Such additions, deletions or revisions will be authorized by field order, change order, or construction change directive.

B. Field Orders are an interpretation of the contract drawings and/or specifications which order minor changes in the Contractor's work which will not result in an increase or decrease in the Contractor's total 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 time of the Contractor's time to complete its work. 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 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.

C. 1. 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/Construction Manager shall issue a PCO Number and 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 subcontractor(s) of subcontractor(s) perform in connection with additional work shall be submitted using the following format and in no event shall the total for overhead and profit on any change order exceed fifteen percent (15%) of the cost of the work.

1.	Materials (Itemized Breakdown) including quantities and cost	
2.	Labor (Itemized Breakdown)	
3.	Subtotal (Add lines 1 and 2)	
4.	Credit for work not required due to additional or changes to the work reflected in the within change order (if any)	
5.	Overhead (10% x line 3)	
6.	Subtotal (Add lines 3 through 5)	
7.	Sub-Contract Work (Include itemized breakdown. Sub-Contractor(s) overhead and profit allowed is 10%)	
8.	Subtotal (Add lines 6 and 7)	
9.	Profit (5% x line 8)	
10.	Subtotal (Add lines 8 and 9)	
11.	Rental Value of Equipment (Itemized Breakdown)	
12.	Actual additional charges for bonds	
13.	TOTAL CHANGE ORDER (Add lines 10, 11 and 12)	

2. All proposals submitted by the Contractor without the itemization indicated herein will be returned to the Contractor for re-submission by the Contractor. For any work performed by the Contractor's own forces, fifteen percent (15%) for overhead and profit will be allowed for labor and material related costs. Costs to which overhead is to be applied shall be limited to cost of labor and materials including the cost of delivery. Under no circumstances shall any change order proposal exceed fifteen percent (15%) of the cost of overhead and profit.

The Contractor shall not be entitled to recover overhead and profit on the rental value of equipment and machinery. "Equipment and machinery" shall not include (1) tools customarily used by the contractor's trade, including but not limited to hand tools, and/or (2) equipment and machinery already on site and being utilized by the Contractor for the original scope of work.

The Contractor shall submit with its change order proposals actual invoices from its insurance broker reflecting actual additional costs associated with the procurement of bonds.

3. The Contractor's subcontractor's proposal for any work it is to perform in connection with the additional work shall only include ten percent (10%) for the subcontractor's overhead and profit including sub-subcontracted work. The Contractor is entitled to five percent (5%) on work performed by its subcontractor in accordance with paragraph C (1) of this Article 8. Costs to which overhead is to be applied shall be limited to cost of labor and materials including the cost of delivery. Under no circumstances shall the Contractor or the Contractor's subcontractor(s) be entitled to be reimbursed for overtime, except when specifically approved by the Owner in writing and not as an Extraordinary Measure as set forth in Article 13, and in such event the Contractor shall be paid for by the Owner on the basis of premium payment.

4. Notwithstanding the foregoing, work which is performed pursuant to an allowance included in the Contractor's base contract, the provisions of Article 9, paragraph B, concerning itemization of such work shall be controlling.

5. a. A change in the Contract Sum shall be accomplished only by a written Change Order. Accordingly, no course of conduct or dealings between the parties, nor express or implied acceptance of alterations or additions to the Work, whether or not there is, in fact, any unjust enrichment to the Work, shall be the basis of any claim as defined in Article 18 of these General Conditions 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.**

b. 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.
2. Copies of invoices from subcontractors supplying work in connection with the change order work.

D. 1. When the Owner or Architect request that portions of the Contractor's work originally included in the contract drawings or specifications be deleted and which will result in a reduction of the Contractor's original contract sum, the Architect shall request that the Contractor submit its proposal for deleting the scope of such work from its contract. The Contractor's proposal shall include a complete itemization of the costs associated with deducting such work including labor and materials and shall be submitted using the format set forth in Article 8, paragraph C(1) of these General Conditions of the Contract for Construction or the schedule of values, whichever is greater. The Contractor shall not be entitled to retain its

overhead and/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/decrease with respect to that change.

2. The Owner may in its sole discretion deduct and/or reduce the scope of the Contractor's contract with or without any specific reasons therefor.

E. 1. In the event the Contractor and the Owner cannot agree on the sum by which its contract with the Owner is to be increased or reduced based upon changes to the scope of the work as described in Article 8, the Architect shall issue a construction change directive reflecting the deduction and/or reduction of the scope of the Contractor's contract and the Contractor will (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 this or other contractors working at the site, and (b) in the case of work to be deducted from the scope of the Contractor's work, refrain from taking any steps in connection with the work associated with the deduction and/or reduction of the scope of the Contractor's work. The construction change directive shall include (a) a description of the work being added or deducted from the Contractor's scope of work; (b) the amount the Owner has determined to be the cost associated with the additional work or deduction and/or reduction 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; (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 18 of these General Conditions. Failure to timely file any claim in accordance with requirements set forth therein shall constitute a waiver of such claim.

2. In the event the Contractor and the Owner reach agreement on the amount by which the Contractor's contract sum is to be increased or decreased based upon changes to the scope of the Contractor's work as described in Article 8, the Architect, Owner, Construction Manager and Contractor shall sign a change order reflecting such agreement. The change order shall include (a) the description of the change in the scope of the Contractor's work; (b) the amount of the adjustment to the Contractor's contract sum, if any; and (c) the length of time by which the time to complete the contract will be adjusted, if any. Agreement between the Owner and the Contractor in connection with any change order shall constitute a final settlement of all matters relating to the change in the Contractor's work as reflected in said change order, including but not limited to, all direct and indirect costs associated with such change and any and all adjustments to the Contractor's contract sum and the construction schedule. All such change orders for which the Owner and the Contractor have reached agreement shall be included as a separate line item in the Contractor's applications for payment as if originally part of the Contractor's agreement with the Owner.

F. Neither the Owner, the Construction Manager nor Architect may issue instructions to the

Contractor to change the amount of the Contract, except by properly executed Change Orders. Instructions are issued by the Owner or the Construction Manager through the Architect, to the Contractor. The instructions shall not be carried out by the Contractor prior to a written order in the form of a Change Order, signed by the Owner, Architect and Contractor, authorizing a change in the Contract amount or an adjustment to the Contract Sum. No amount shall be payable by the Owner to the Contractor for performance of work without an executed Change Order.

ARTICLE 9 PAYMENTS

A. 1. Prior to commencing its work on the project and within one (1) week of receipt of a Notice to Proceed, the Contractor shall submit to the Construction Manager and the Architect, a schedule of values which includes the amount of money it has allocated in its bid price for the following items of work which are applicable to the Contractor's work. Said schedule of values shall include each of the CSI division sections reflected in the specifications and applicable to the contract for which the Contractor has been awarded the contract, together with the requirements for bonds/insurance (based upon actual invoice amount), general conditions, meeting attendance and meeting documentation (at least two (2) percent of the contract sum), shop drawing/product data/sample submissions (at least one (1) percent of contract sum), labor and materials on line items as applicable, temporary utilities and services, HVAC balance reports, coordination drawings, punchlist (at least one (1) percent of the contract sum), warranties/guarantees and close out of the project (at least three (3) percent of the contract sum), and allowance, where applicable.

2. Any schedule of values which 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 Contractors' future applications for payment to ensure an adequate reserve (exclusive of normal retainage) to complete the Contractor's work.

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.

4. The Schedule of Values prepared by the Contractor must be approved by the Construction Manager and the Architect prior to the payment of any sums due the Contractor.

B. The Contractor shall include in its contract sum all allowances stated in the specifications. However, the Contractor's costs for unloading and handling at the site, overhead, profit and other expenses contemplated for the stated allowance amounts shall be included in its contract sum and not in the allowances.

C. The Contractor shall submit its applications for payment to the Construction Manager and the Architect on a periodic basis. The form to be used by the Contractor shall be AIA G732 and 703/CMA approved by the Construction Manager, the Architect and the Owner for use in connection with the Contractor's work. The form shall be divided in sufficiently in the same form as the Contractor's schedule of values and shall reflect in separate line items for the work:

1. Total value of the work listing labor and material separately
2. Percentage of work completed at the time of submission of the application for payment
3. Value of the work completed at the time of submission of the application for payment
4. Percent of previous amount billed
5. Previous amount billed
6. Current percent completed;
7. Value of work completed to date
8. Percent remaining to be completed by the Contractor; and
9. Value of work remaining to be completed by the Contractor

D. 1. Payments to the Contractor shall be based upon materials and equipment delivered and suitably stored at the site and/or incorporated into the Contractor's work, together with the labor utilized by the Contractor in connection with its work. The Contractor may be paid for materials and/or equipment which has been delivered to the Owner's facilities but which, at the time of submission of its application for payment, has not yet been incorporated into the Contractor's work upon such conditions and requirements as the Owner, the Construction Manager and/or the Architect may advise the Contractor it must satisfy.

2. 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 following circumstances:

- a. the Contractor's failure to remedy defective work;
- b. the filing of third party claims or reasonable evidence that there is a probability that such claims will be filed;
- c. 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;
- d. the Contractor's failure to make proper payments to its subcontractors or material suppliers for labor, materials and/or equipment;
- e. reasonable evidence that the Contractor will not complete its work for the unpaid balance of the remaining monies on its contract;

- f. damages caused to the Owner, Construction Manager, the Architect or another contractor as a result of the Contractor's performance of its work;
- g. reasonable evidence that the Contractor will not complete its work in accordance with its agreement with the Owner, and/or that the remaining monies available on the Contractor's contract will not be sufficient to cover actual or liquidated damages for the anticipated delay;
- h. the Contractor's failure to carry out its work in accordance with the contract drawings and/or specifications;
- i. the Contractor's failure to notify the Architect of errors or inconsistencies between and among the contract drawings and specifications;
- j. the Contractor's and/or its subcontractors' failure to comply with the requirements for maintaining record drawings;
- k. 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;
- l. such other acts and/or omissions by the Contractor in connection with the performance of its work.
- m. The amount requested exceeds the percent completion of work on the site.

3. After any such adjustments are made to the Contractor's application for payment, the Contractor shall submit four (4) copies of the final draft of its application for payment to the Construction Manager and Architect, which shall be accompanied by the following documentation:

- a. A current Contractor's lien waiver and duly executed and acknowledged sworn statement showing all Subcontractors and material suppliers with whom the Contractor has entered into subcontracts, the amount of each such subcontract, the amount requested for any Subcontractor and material suppliers in the requested progress payment and the amount to be paid to the Contractor from such progress payment, together with similar sworn statements from all such Subcontractors and material suppliers;
- b. Duly executed waivers of public improvement liens from all Subcontractors and material suppliers and lower tiered Subcontractors or material suppliers establishing payment or satisfaction of payment of all amounts requested by the Contractor on behalf of such entities or persons in any previous Application for Payment; and AIA Form G706 or G706A.

- c. Certified payroll for employees of the Contractor and employees of subcontractors performing work on the Project.
 - d. Copies of invoices submitted to the Contractor by its subcontractors and/or material suppliers.
 - e. Such other information which the Owner, Construction Manager and/or the Architect request the Contractor furnish in connection with its application for payment, including but not limited to, contractor change order log, contractor submittal log and as built drawings to date.
4. Upon submission of its application for payment, the Contractor represents that it is entitled to payment in the amount for which it seeks payment.
5. In addition to the right to make adjustments to the amount the Contractor claims is due (as set forth in subparagraph 2 of this Paragraph D), the Owner may withhold payment from the Contractor and the Architect and/or Construction Manager may withhold certification for payment, if any of the reasons set forth in subparagraph 2 exist.
6. The Owner shall make payment to the Contractor within forty-five days of receipt of the Contractor's requisition of payment unless such requisition of payment is not in accordance with the terms of the Construction Documents.
7. Upon receipt of payment by the Owner, the Contractor shall promptly make payment to each of its subcontractors and/or material suppliers for which it has received payment from the Owner. This provision does not obligate the Architect, the Construction Manager and/or the Owner to ensure payment to the Contractor's subcontractors and/or material suppliers.
8. a. In the event a subcontractor and/or material supplier files with the Owner a public improvement lien, the Owner shall withhold payment on previously certified applications for payment which have not yet been paid or subsequent applications for payment submitted by the Contractor an amount equal to 150% of the amount set forth in such public improvement lien. This provision is in addition to and does not supersede the indemnity provisions set forth in Article 12 of these General Conditions.
- b. The Owner may release any payment withheld due to the filing of a public improvement 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 the 150% of such lien claim. The cost of the premiums for any such bond posted shall be borne solely by the Contractor. By posting

a lien bond or other acceptable security, however, the Contractor shall not be relieved of its obligations pursuant to these General Conditions, including but not limited to the indemnity provisions set forth in Article 12 of these General Conditions.

E. 1. The Contractor shall not be entitled to payment for materials and/or equipment stored off the site unless previously approved in writing by the Owner, Architect, and/or the Construction Manager and upon the Contractor meeting any and all conditions which the Owner, the Architect and/or Construction Manager may impose in connection with such materials and/or equipment, including but not limited to insurance for such materials and cost of storage and transportation associated with such materials and/or equipment. No payment will be made for "commodity type" stored materials such as block, studs, sheetrock, roofing, insulation, piping, fittings, conduit work, etc.

2. In connection with materials and/or equipment stored off the project site, the Contractor must submit with its application for payment the following information:

- a. Type of material must be specifically identified by the Contractor;
- b. The Contractor must furnish an invoice from its supplier showing the total value of material and/or equipment being stored off site and must provide the bill of lading for such material and/or equipment;
- c. The Contractor must provide a Certificate of Insurance in a form approved by the Owner for the full value of the item plus 10%.
- d. The Contractor must execute a security agreement, together with an executed UCC-1 form;
- e. The materials must be stored in a bonded warehouse;
- f. The Contractor must furnish a bill of sale for stored material and/or equipment;

Contractor still has liability for all materials whether paid or not until installed.

3. Any and all materials and/or equipment for which the Contractor has been paid shall be titled in the Owner upon installation by the Contractor and shall be stored in a bonded facility. For payment to be made to the Contractor, the Contractor must provide the Owner with a waiver of lien and general release from its supplier in connection with its provisions of such materials and/or equipment. Notwithstanding payment by the Owner, any and all warranties and/or guarantees required by this agreement shall not begin to run until the Contractor has completed all of its work.

4. Prior to payment by the Owner, the Contractor may be required to provide the Architect and the Construction Manager with an opportunity to visually inspect the materials and/or equipment for the purpose of determining that such materials are in fact in storage, are the materials specified for the Contractor's work and for any other purpose which the Owner, Construction Manager and/or Architect deem necessary for payment to be made to the Contractor.

F. If the Owner is entitled to reimbursement or payment from the Contractor under or pursuant to its agreement with the Owner, including but not limited to these General Conditions of the Contract for Construction, 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 Contractor's contract sum by an amount equal to that which the Owner is entitled.

G. The Contractor may not assign any monies due or to become due to it pursuant to its agreement with the Owner without the Owner's written consent. Any such assignment shall be in a form acceptable to the Owner. If the Contractor attempts to make such an assignment without such consent from the Owner, the Contractor shall nevertheless remain legally responsible for all obligations under its agreement with the Owner.

H. Progress payments and all other payments shall be made in accordance with Section 106 (b) of the General Municipal Law.

I. At the same time the Contractor submits its insurance certificate to the Owner and the Construction Manager, it shall also submit to the Construction Manager the labor rates of each category of labor for which it and/or its subcontractors shall employ (either directly or indirectly).

This information shall be itemized in the format shown below:

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Contractor's Name					
Contractor's Address					
Contractor's Office Phone					
Contractor's Fax Number					
Contractor's Email Address					
Labor Rate Breakdown					
Worker's Title		Journeyman	1.5 Rate	Foreman	1.5 Rate
Base Hourly Rate					
Payroll Tax & Insurance:	\$ Per Hr.				
FICA					
Federal Unemployment					
State					
Workers Compensation					
Disability					
Other (Explanation Required)					
Subtotal					
Benefits:	\$ Per Hr				
Vacation					
Health & Welfare					
Pension					
Annuity					
401K Fund					
Other (Explanation Required)					
Other Explanation Required)					
Subtotal					
Hourly Labor Rate					

ARTICLE 10 INSURANCE REQUIREMENTS

A. Within ten (10) days of the award of the bid, the Contractor, at its sole cost and expense, shall provide the Owner with the following insurance coverage whether the operations to be

covered thereby are through the Contractor or by a Subcontractor, or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

1. Workers' Compensation and Disability:

Coverage	Statutory
Extensions	Voluntary compensation All states coverage employers Employer's liability - unlimited

2. Commercial General and Umbrella Liability

Coverage	Occurrence using ISO occurrence Form CG 00 01 07 98 or later form
Limits per project	\$1,000,000.00 per occurrence, \$2,000,000.00 general aggregate - on a per project basis Products/Completed Operations - \$2,000,000.00 Personal & Advertising Injury - \$1,000,000.00 Fire Damage (any one fire) - \$100,000.00 Medical Expenses (any one person) - \$10,000.00

3. Owners and Contractors Protective Liability Insurance:

- a. \$2,000,000 per occurrence, \$4,000,000 general aggregate for contracts greater than \$1,000,000, or any contracts involving scaffolds or work above a height of one story.
 - b. \$1,000,000 per occurrence, \$2,000,000 general aggregate for contracts less than or equal to \$1,000,000 that do not involve scaffolds or work above a height of one story.
- Excess Liability (excess coverage shall be on a follow-form basis):
- a. \$10,000,000 for contracts greater than \$1,000,000, or any contracts involving scaffolds or work above a height of one story

- b. \$5,000,000 for contracts less than or equal to \$1,000,000 that do not involve scaffolds or work above a height of one story.
- 4. Automobile Liability
(all vehicles hired
or non hired) \$1,000,000.00 per accident
- 5. If this project requires the removal of asbestos and/or hazardous materials, Contractors shall provide hazardous material liability insurance as follows:

\$2,000,000 per occurrence/\$2,000,000 aggregate, including products and completed operations. Such insurance shall include coverage for the Contractor's operations including, but not limited to, removal, replacement enclosure, encapsulation and/or disposal of asbestos, or any other hazardous material, along with any related pollution events, including coverage for third-party liability claims for bodily injury, property damage and clean-up costs. If a retroactive date is used, it shall pre-date the inception of the Contract. If motor vehicles are used for transporting hazardous materials, the Contractor shall provide pollution liability broadened coverage (ISO endorsement CA 9948), as well as proof of MCS 90. Coverage shall fulfill all requirements of this Article 10 and shall extend for a period of three (3) years following acceptance by the District of the Certificate of Completion.
- 6. Testing Company Errors and Omission Insurance

\$1,000,000 per occurrence/\$2,000,000 aggregate for the testing and other professional acts of the Contractor performed under the Contract with the Owner.

Notwithstanding any terms, conditions or provisions, in any other writing between the parties, Contractor hereby agrees to effectuate the naming of the Owner, Architect and Construction Manager as an additional insured on the Contractor's commercial general liability and excess liability insurance policies. If the policy is written on a claims-made basis, the retroactive date must precede the date of the contract.

- a. The policy naming the Owner, Architect and Construction Manager as an additional insured shall:
 - i. Be an insurance policy from an A.M. Best rated "Secure" insurer, licensed and admitted to do business in New York State.
 - ii. State that the coverage shall be primary and non-contributory coverage for the District, its Board, employees and volunteers.

- b. The Owner, Architect, and Construction Manager shall be listed as an additional insured by using endorsement CG 2038 or equivalent. The decision to accept an alternative endorsement rests solely with the Owner. A completed copy of the endorsement must be attached to the certificate of insurance.
- c. The certificate of insurance must describe the work that is covered by the liability policies.
- d. At the Owner's request, the Contractor shall provide a copy of the declaration page of the liability and excess policies with a list of endorsements and forms. If so requested, the Contractor will provide a copy of the policy endorsements and forms.
- e. The Contractor agrees to indemnify the Owner, Architect and Construction Manager for any applicable deductibles and self-insured retentions.

If written on a "claims-made" basis, the retroactive date must pre-date the inception of the Contract or agreement. Coverage shall remain in effect for two years following the completion of work. The testing company shall also provide proof of Workers' Compensation and NY State Disability Benefits Insurance, Commercial General Liability and Excess Liability with limits of \$2,000,000 each occurrence and in the aggregate.

Coverages shall 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.

B. Article 10 of the General Conditions shall remain in effect and the Contractor will be required to provide the insurance set forth therein. The Contractor will be permitted to commence work on the Project with the insurance certificates currently on file with the Owner. On or before July 15 of each year, the Contractor will substitute said insurance certificates with insurance in strict compliance with Article 10. In addition to any other rights or remedies that the Owner may have in law, equity or pursuant to the General Conditions of Construction set forth in the Agreement between the Owner and the Contractor, in the event the Contractor fails to provide evidence of the insurance required by Article 10 by July 15, the Owner shall assess liquidated damages of \$1,000 for every day the Contractor fails to meet the requirements for insurance as set forth in Article 10 through final completion of the Project or the date the required insurance is submitted, whichever is earlier.

C. The insurance required to be procured by the Contractor, pursuant to paragraph A of this Article 10, shall be purchased from and maintained by an insurance carrier licensed to do business in the State of New York, with an A.M. Best Rating of "secured" or better. The Contractor must submit the Certificate of Insurance to the Architect for the Owner's approval prior to the commencement of any work. **EXCESS OR SURPLUS LINE INSURANCE CARRIERS WILL NOT BE ACCEPTED.**

D. All insurance coverage to be provided by the Contractor, pursuant to paragraph A of this Article 10, shall include a cancellation notice to the Owner pursuant to the policy terms and conditions. All insurance coverage to be provided by the Contractor shall name the Owner, Architect, and Construction Manager as additional insureds on the policy, with the exception of Owners Contractors Policies. Additionally, the insurance coverage to be provided by the Contractor, pursuant to paragraph A of this Article 10, shall state that the Contractor's coverage shall be the primary and non-contributory coverage for the Contractor's work. Contractors shall include a completed copy of the ACORD 855 – NY Construction Certificate of Liability, with explanations of "yes" responses to Items G through L.

E. In the event that any of the insurance coverage to be provided by the Contractor to the Owner contains a deductible, or a self-insured retention, or the insurance provided by the Owner contains a deductible, the Contractor shall indemnify and hold the Owner, Construction Manager, and the Architect harmless from the payment of such deductible or self-insured retention, which deductible shall in all circumstances remain the sole obligation and expense of the Contractor.

F. The Contractor acknowledges that its failure to obtain or keep current the insurance coverage required by paragraph A of this Article 10 shall constitute a material breach of Contract and subjects the Contractor to liability for damages, including but not limited to direct, indirect, consequential, special and such other damages the Owner sustains as a result of such breach. In addition, the Contractor shall be responsible for the indemnification to the Owner, Architect, and Construction Manager, of any and all costs associated with such lapse in coverage, including but not limited to reasonable attorney's fees.

G. The Contractor shall require all Subcontractors to carry insurance coverages and limits of liability, as set forth in paragraph A of this Article 10 and submit same to the Owner for approval prior to start of any work. In the event the Subcontractor is unable to provide insurance by a carrier that is licensed and admitted to do business in New York, the Owner reserves the right to accept Excess or Surplus lines insurance coverage for said Subcontractor, in the Owner's sole discretion. Notwithstanding the foregoing, the Owner is under no obligation to waive the requirement that the insurance be supplied by an insurer licensed and admitted in New York. In the event the Contractor fails to obtain the required certificates of insurance from the Subcontractor and a claim is made or suffered, the Contractor shall indemnify, defend, and hold harmless the Owner, Construction Manager, the Architect, Engineers, Consultants, and Sub-consultants and their agents or employees from any and all claims for which the required insurance would have provided coverage. This indemnity obligation is in addition to any other indemnity obligation provided in the Contract.

H. The Contractor assumes responsibility for all injury or destruction of the Contractor's materials, tools, machinery, equipment, appliances, shoring, scaffolding, false and form work, and personal property of the Contractor's employees from whatever cause arises. Any policy of insurance secured covering the Contractor or Subcontractors leased or hired by them and any policy of insurance covering the Contractor or Subcontractors against physical loss or damage to

such property shall include an endorsement waiving the right of subrogation against the Owner for any loss or damage to such property.

I. The Owner in good faith may adjust and settle a loss with the Contractor's insurance carrier.

J. The Owner and the Contractor waive all rights against each other and any of their Subcontractors, Sub-subcontractors, agents and employees for damages caused by fire or other perils to the extent of actual recovery of any insurance proceeds under any property insurance policy procured, pursuant to paragraph A of this Article 10, or other property insurance applicable to the Contractor's work.

K. Before commencement of its work, the Contractor shall obtain and pay for such insurance as may be required to comply with the indemnification and hold harmless provisions outlined under Article 12 of these General Conditions of the Contract for Construction.

L. Review and acknowledgment of the Certificate of Insurance by the Owner or the Architect shall not relieve or decrease the liability of the Contractor hereunder.

M. If the terms of policies expire, or the lives of the insurance companies terminate, before the Contract is completed or during the period of completed operations coverage, and the Contractor fails to maintain continuance of such insurance, the Owner is entitled to provide protection for itself, to pay premiums, and to charge the cost to the Contractor.

ARTICLE 11 REQUIRED BONDS FOR THE PROJECT

A. Within ten (10) days of the award of the bid, the Contractor shall furnish a Performance Bond and Labor and Material Payment Bond meeting all statutory requirements of the State of New York.

B. All Surety companies are subject to the approval of the Owner and may be rejected by the Owner without cause.

C. Except as otherwise required by statute, the form and substance of such bonds shall be satisfactory to the Owner in the Owner's sole judgment.

D. Bonds shall be executed by a responsible surety licensed to do business in New York with an A.M. Best Rating of "A-" or better as to Policy Holder Ratings, and "VII" or better as to "Financial Size Category." Such bonds shall remain in effect for a period not less than two (2) years following final completion of the work by the Contractor.

E. Bonds shall further be executed by a surety that is currently listed on the U.S. Treasury Department Circular 570 entitled "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies," as amended.

F. The Performance Bond and the Labor and Material Payment Bond shall each be in an amount equal to 100% of the Contract Sum. The value of each bond shall be adjusted during the Project construction period to reflect changes in the Contract Sum.

G. Every Bond must display the Surety's Bond Number.

H. Each bond must be accompanied by an original Power of Attorney, giving the names of Attorneys-in-fact, and the extent of their bonding capacity.

I. A rider including the following provisions shall be attached to each Bond:

1. Surety hereby 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 release the Surety of its obligations hereunder and notice to the Surety of such matters is hereby waived.
2. Surety further agrees that in event of any default by the Owner in the performance of the Owner's obligations to the Contractor under the Contract, the Contractor or Surety shall cause written notice of such default (specifying said default in detail) to be given to the Owner, and the Owner shall have thirty (30) days from time after receipt of such notice within which to cure such default, or such additional reasonable period of time as may be required if the nature of such default is such that it cannot be cured within thirty (30) days. Such Notice of Default shall be sent by certified or registered U.S. Mail, return receipt requested, first class postage prepaid, to Lender and the Owner.
3. 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 three years after termination by the Owner of the Contractor's contract or within three years after final completion by the Contractor. In the event the Contractor files for bankruptcy, the commencement of the three year period shall not start to run until the bankruptcy proceeding is finalized or the Owner obtains relief from an automatic stay, whichever is later.

J. The Contractor shall deliver the required bonds to the Owner prior to beginning construction activity at the site, but no later than 10 days of issue date of Notice of Award of Contract. Said bonds shall be in the form set forth in the Project Manual. No work shall be performed by the Contractor until such bonds have been reviewed and approved.

K. The Owner may, in the Owner's sole discretion and without prior notice to the Contractor, inform surety of the progress of the Contractor's work and obtain consents as necessary to protect

the Owner's rights, interest, privileges and benefits under and pursuant to any bond issued in connection with the Contractor's work.

L. If the surety on any Bond furnished by Contractor is declared a bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of this Article, the Contractor shall within ten (10) days thereafter substitute another Performance and Payment Bond and surety, both of which must be acceptable to the Owner.

ARTICLE 12 INDEMNIFICATION

A. The Contractor and its subcontractors shall indemnify and hold harmless (1) the Owner, its consultants, employees, officers and agents, (2) the Architect and its consultants, employees, officers and agents, and (3) the Construction Manager, its consultants, employees, officers and agents, and any of their respective employees, or agents from and against any and all claims, damages, losses, suits, obligations, fines, penalties, costs, charges and expenses, including but not limited to attorneys' fees, which may be imposed upon or incurred by or asserted against any of them by reason of any act or omission of such Contractor or any of its subcontractors or any person or firm directly or indirectly employed by such Contractor, for the act(s) and/or omission(s) of any Contractor or Subcontractor in connection with the work of the Project.

B. To the fullest extent permitted by law, the Contractor and its subcontractors shall indemnify and hold harmless (1) the Owner, its consultants, employees, officers and agents, (2) the Architect and its consultants, employees, officers and agents, and (3) the Construction Manager, its consultants, employees, officers and agents, and any of their respective employees, or agents from and against claims, damages, losses and expenses including but not limited to attorneys' fees, arising out of or resulting from performance of its work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction, of tangible property including loss of use resulting therefrom, but only to the extent caused in whole or in part by negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Paragraph B. The Contractor's indemnity obligations under this Paragraph B shall, but not by way of limitation, specifically include all claims and judgments which may be made against the Owner, the Architect, the Architect's consultants and agents and employees of any of them under any applicable statute, rule or regulation including the New York Statute, Occupational Safety and Hazardous Act, and the Federal Occupational Safety and Hazardous Act. In claims against any person or entity indemnified under this Paragraph B 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 this Paragraph B 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' or workmen's compensation acts, disability benefit acts or other employee benefit acts.

C. The Contractor and its subcontractors shall indemnify and hold harmless (1) the Owner, its consultants, employees, officers and agents, (2) the Architect and its consultants, employees, officers and agents, and (3) the Construction Manager, its consultants, employees, officers and agents, and any of their respective employees or agents against any fines, penalties, judgments, or damages, including reasonable attorney's fees, imposed on or incurred by the parties indemnified hereunder which are incurred as a result of the Contractor's failure to give the notices required by Article 6(T) of these General Conditions of the Contract for Construction.

D. The Contractor and its subcontractors shall indemnify and hold harmless (1) the Owner, its consultants, employees, officers and agents, (2) the Architect and its consultants, employees, officers and agents, and (3) the Construction Manager, its consultants, employees, officers and agents, and any of their respective employees or agents against any actions, lawsuits or proceedings or claims of liens brought against each or any of them as a result of liens filed against the Contractor's project funds, including all the cost and expense of said liens, and including but not limited to attorneys' fees incurred by each or any of them.

E. The Contractor and its subcontractors shall indemnify and hold harmless (1) the Owner, its consultants, employees, officers and agents, (2) the Architect and its consultants, employees, officers and agents, and (3) the Construction Manager, its consultants, employees, officers and agents, and any of their respective employees or agents of and from any and all liability for violation of any laws and regulations applicable to the Contractor's work 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 to 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 fees, in recovering such defense costs from the Contractor.

F. The Contractor and its subcontractors shall indemnify and hold harmless (1) the Owner, its consultants, employees, officers and agents, (2) the Architect and its consultants, employees, officers and agents, and (3) the Construction Manager, its consultants, employees, officers and agents, and any of their respective employees or agents of and from any and all liability for claims made by third parties, including subcontractors, in connection with this Agreement 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 to 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 fees, in recovering such defense costs from the Contractor.

G. The indemnification obligations set forth herein shall become effective upon the Owner, Architect or Construction Manager's receipt of a claim for which the Contractor is required to provide indemnification to the Owner, Architect or Construction Manager. In the event the Owner, Architect or Construction Manager is required to bring an action to enforce the indemnification obligation, the Contractor shall be liable to the Owner, Architect, and/or Construction Manager for all costs associated with said action including attorneys' fees.

ARTICLE 13 TIME FOR COMPLETION OF WORK

A. The date of commencement of the Contractor's work shall be as indicated in the agreement between the Contractor and the Owner. The date shall not be postponed or extended by the failure to act of the Contractor or of persons or entities for whom the Contractor is responsible to act. Time limits stated in the agreement between the Owner and the Contractor 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.

B. The Contractor shall not commence work on the site until two certified copies of all insurance policies and bonds required by Article 10 and Article 11 of these General Conditions of the Contract for Construction are provided to the Owner and accepted by the Owner. The date of commencement and/or completion of the Contractor's work shall not be changed by the effective date of such insurance. The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the acceptance of the insurance and bonds required by Article 10 and Article 11 of these General Conditions.

C. The Contractor shall proceed expeditiously with adequate forces and shall achieve substantial completion of its contract in accordance with the schedule set forth in its agreement. The Contractor shall cooperate with the Owner, Architect, Construction Manager, and other Contractors on the Project, making every reasonable effort to reduce the contract time.

D. 1. In the event the Owner determines that the performance of the Contractor's work, as of a milestone date, has not progressed or reached the level of completion required by its contract, the Owner shall have the right to order the Contractor to take corrective measures necessary to expedite the progress of construction, including, without limitation, (1) working additional shifts or overtime, (2) supplying additional manpower, equipment, and facilities and (3) other similar measures (hereinafter referred to collectively as "Extraordinary Measures"). Such Extraordinary Measures shall continue until the Contractor progresses its work in compliance with the stage of completion required by its agreement with the Owner. The Owner's right to require Extraordinary Measures is solely for the purpose of ensuring the Contractor's compliance with the construction schedule.

2. The Contractor shall not be entitled to an adjustment in its contract sum in connection with Extraordinary Measures ordered by the Owner under or pursuant to this Paragraph D.

3. The Owner may exercise the rights furnished the Owner under or pursuant to this Paragraph D as frequently as the Owner deems necessary to ensure that the Contractor's performance of its work will comply with any Milestone Date or completion date set forth in the Contractor's agreement with it.

4. The Owner reserves the right to withhold payment from the Contractor until such time as the Contractor submits a daily schedule showing work to be again on schedule with the Construction Schedule and/or until its work is being installed according to the project construction schedule, without additional cost to the Owner.

E. The Contractor shall achieve substantial completion of its work in accordance with the schedule for the work set forth in the project manual included as part of its agreement with the Owner. Milestone Dates are dates critical to the Owner's operations that establish when a part of the work is to commence or be complete. All Milestone Dates are of the essence and shall have the same meaning as Substantial Completion for the purpose of Liquidated Damages in this Article 13.

F. Substantial completion shall be achieved by the Contractor when the Contractor has completed ninety-eight (98%) percent of its work. Work remaining to be completed after substantial completion shall be limited to items which can ordinarily be completed within the period between the payment at the time of substantial completion and final payment.

G. 1. This project is to be physically completed in accordance with the time limits set forth in the agreement between the Owner and Contractor and as further set forth in the project manual and/or bidding documents. Liquidated damages will be assessed in the amount of One Thousand (\$1,000.00) Dollars for each and every calendar day after such time allowed for completion.

2. Contractor realizes that time is of the essence on this Contract and the completion date and milestone date for each work item in its agreement, a Milestone Date reflected on the project schedule, or the date of substantial completion of the Contractor's work shall be no later than the date indicated therein. In the event the Contractor fails to complete any work or substantially complete the work under this contract by said schedule date, the sum per calendar day for each date not met, as delineated above, will be subtracted from the payment due the Contractor (or, if the amount due Contractor as payment is insufficient, any deficiency shall be paid by the Contractor to the Owner), except in cases where the Contractor has applied for and been granted an extension of time in accordance with the provisions of this Article 13.

3. The said sum per calendar day shall constitute the Liquidated Damages incurred by the Owner for each day of delay beyond the agreed upon dates of Substantial Completion. 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 that substantial completion of its work is not achieved in accordance with the project schedule, inspections will be performed once each week unless the Owner or the Architect determines, at their sole discretion, that additional inspections are not needed. All costs incurred by the Owner, Owner's Representative and the cost of additional inspections, at the rate of One Thousand Dollars (\$1,000) per inspection, 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.

H. 1. Within five (5) calendar days from the occurrence of same, the Contractor must apply in writing to the Owner, its Architect or Construction Manager for an extension of time to complete its work where it has been delayed as a result of: unforeseeable causes beyond the control and without the fault or negligence of the contractor, including acts of God, acts of the public enemy, acts of the federal or state government in either their sovereign or contractual capacities, fires, floods, epidemics, quarantine restrictions, priority or allocation orders duly issued by the federal government; freight embargoes; changes in the work to be performed by the Contractor. The Contractor may not apply for an extension of time for delays in acquisitions of materials other than by reason of freight embargoes. All other delays of the project, including but not limited to, Architect review and/or approval of shop drawings and/or 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 amongst Contractors; unavailability of materials and/or equipment; surveying/testing; closeout, etc. are deemed to be foreseeable and, therefore shall not form the basis for a claim for an extension of time by the Contractor.

2. All claims for additional time shall be 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 schedule cannot be maintained by re-ordering other activities within the project at no cost. 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. Where 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; only the actual period of delay as determined by the Owner or its Architect may be allowed.

3. The Owner reserves the right to delay the commencement of Work or to otherwise modify the construction schedule set forth in the bid documents in order to comply with applicable State, Federal and/or local laws, regulations, or orders related to the COVID-19 pandemic. Contractor's remedies for any schedule modifications or delays caused directly or indirectly by the COVID-19 pandemic shall be an extension of time only, as further delineated in Article 13 (H)(4), below.

4. Notwithstanding anything to the contrary in the Contract Documents, an extension in the contract time, to the extent permitted under this Article 13(H), shall be the sole remedy of the Contractor for 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 similar claims (collective referred to herein as "delay(s)"), unless a delay is caused by the Owner's active interference with the Contractor's performance of the Work, and only to the extent such acts continue after the Contractor furnishes the Owner with three (3) days' written notice of such interference. 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, 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 active interference with the Contractor's performance of the Work.

ARTICLE 14 DEFICIENT AND INCOMPLETE WORK

A. The Owner, through its Architect or Construction Manager, will have the authority to reject work performed by the Contractor which does not conform to the requirements of the drawings and/or specifications.

B. The Owner, through its Architect or Construction Manager, shall have the authority to require additional inspection or testing of the Contractor's work whether or not such work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons performing portions of the work to have performed additional inspection or testing of the work.

C. 1. If a portion of the Contractor's work is covered contrary to the Architect's request or to requirements specifically expressed in the drawings and/or specifications, upon request by the Architect or the Construction Manager, the Contractor shall uncover such work for the Architect's or any governmental authority's observation and be replaced at the Contractor's sole expense without change in the Contract Time or Contract Sum.

2. If a portion of the Contractor's work has been covered which the Architect or any governmental authority has not specifically requested to observe prior to its being covered, the Architect or any governmental authority may request to see such work and it shall be uncovered by the Contractor. If such work is in accordance with the drawings and/or specifications, costs of uncovering and replacement shall, by appropriate Change Order, be charged to the Owner. If such Work is not in accordance with the Contract Documents, the Contractor, at its sole cost and expense, shall uncover and replace such work.

D. The Contractor shall promptly correct work rejected by the Owner, through its Architect or Construction Manager, or failing to conform to the requirements of its contract with the Owner, whether observed before or after Substantial Completion and whether or not fabricated, installed or completed. The Contractor shall bear the all costs of correcting such rejected work, including but not limited to the cost of said additional testing and/or inspection, the cost of the Architect's services incurred in conjunction with such additional testing, and any cost, loss or damages to the Owner resulting from such actions. If prior to the date of Substantial Completion, the Contractor, a Sub-contractor or anyone for whom either is responsible uses or damages any portion of the Work or premises, including, without limitation, mechanical, electrical, plumbing and other building systems, machinery, equipment or other mechanical device, the Contractor shall cause such item to be restored to "like new" condition at no expense to the Owner.

E. If the Contractor (1) fails to correct work which is not in accordance with the requirements of its agreement with the Owner, or (2) fails to carry out its work in accordance with the requirements of its agreement with the Owner, 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 ten (10) days) any lien filed upon Owner's property by anyone claiming by, through, or under the Contractor, or (5) disregards the instructions of the Architect, Owner or Construction Manager, the Construction Manager, on behalf of the Owner may order the Contractor to stop its 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. This right shall be in addition to, and not in restriction of, other rights the Owner may have pursuant to these General Conditions or at law.

F. 1. If the Contractor defaults or neglects to carry out its work in accordance with its agreement with the Owner and fails within a three (3) day period after receipt of written notice from the Construction Manager to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case, an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the cost of correcting such deficiencies, including compensation for the Architect, the Construction Manager and the Owner and such other consultants whose participation is deemed necessary by the Architect, for additional services and expenses made necessary by such default, neglect or failure. Such action by the Construction Manager, including the amounts to be charged to the Contractor as a result of such action are subject to the prior approval of the Architect. 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. Where the Contractor's default and/or neglect to carry out its work in accordance with its agreement with the Owner threatens the health, safety and/or welfare of the occupants of the school district's facilities and/or threatens the structural integrity and/or preservation of the school district's facilities, the Owner may proceed to carry out the Contractor's work upon twenty-four (24) hours notice of its intention to do so to the Contractor.

G. If the Owner prefers to accept work which is not in accordance with the terms and conditions of the agreement between the Owner and the Contractor, the Owner may, in its discretion, accept such work and reduce the Contractor's contract sum accordingly.

ARTICLE 15

FINAL COMPLETION AND CLOSEOUT OF THE PROJECT

A. 1. When advised by the Construction Manager that the Contractor's work is near substantial completion, the Architect shall visit the site to determine whether the Contractor's work is substantially complete. If the Architect's observations of the Contractor's work discloses any item which has not been performed in accordance with the requirements of the drawings and/or specifications and/or which has not been completed to the point indicated in Article 13 paragraph F of these General Conditions, the Contractor shall complete or correct such items upon receipt of notification from the Architect that a deficiency exists. The Architect shall not issue a certificate of substantial completion for the work of the Contractor until the work has been completed in accordance with Article 13(F). Upon completion of the work outlined by the Architect to it in accordance with this paragraph A, the Contractor shall advise the Architect of the need for an inspection of the work. If the Architect is required to inspect the Contractor's work more than twice, the Contractor shall be liable to the Owner for the services performed by the Architect as a result of additional inspections.

2. Upon determining that the Contractor's work has progressed to the point of Substantial Completion, the Architect shall prepare a punch list of the Contractor's work which shall include only minor items of work remaining to be performed by the Contractor to bring its work into compliance with the requirements of the drawings and/or specifications. The Contractor shall proceed promptly to complete and correct items on the punch list issued by the Architect and shall complete said items within thirty (30) days of its receipt of the punch list from the Architect. At the time of substantial completion, the Owner shall retain 200 percent of the value of the punch list items from the Contractor's remaining contract sum. The value of said remaining work shall be determined by the Architect. Upon completion of the work reflected in the final punch list, the Owner shall release the monies withheld pursuant to this paragraph to the Contractor.

3. The Architect's failure to include an item of deficiency on the punch list issued to the Contractor shall not relieve the contractor of its responsibility to perform its work in accordance with the drawings and/or specifications.

B. 1. If within three (3) years after the date of Substantial Completion of the Contractor's work or designated portion thereof, or after the date for commencement of warranties established pursuant to these General Conditions, or by terms of in applicable special warranty required by the agreement between the Owner and the Contractor, any of the Work is found to be not in

accordance with the requirements of said agreement, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. This period of three (3) years shall be extended with respect to portions of the Contractor's work first performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of such work. The obligation set forth hereunder shall survive acceptance by the Owner of the Contractor's and/or termination of the Contractor's agreement with the Owner. The Owner shall give such notice within a reasonable period of time after discovery of the condition.

2. The Contractor shall, within a reasonable time after receipt of written notice thereof, but in no event no later than seventy-two (72) hours after receipt of such notice, commence to correct, repair, and make good any defects in its work.

3. The obligations of the Contractor pursuant to this paragraph shall cover any repairs to or replacement of work affected by the defective work.

4. In the case of any work performed in correcting defects pursuant to this paragraph, the guarantee periods specified herein shall begin anew from the date of acceptance by the Owner of such work.

C. Upon receipt of written notice from the Construction Manager that the Contractor's work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection. When the Architect finds the Contractor's work acceptable pursuant to the terms and conditions of its agreement with the Owner and the Contract fully performed and upon receipt of the closeout documentation required by the Contract Documents and elsewhere in the agreement between the Owner and the Contractor, the Architect will certify to the Owner that the Contractor is entitled to final payment on the project.

D. 1. Prior to receipt of final payment from the Owner, the Contractor shall provide to the Architect the close out documentation required by the Contract Documents.

2. The Contractor shall schedule a close out meeting with the Architect and the Construction Manager for the purpose of delivering the close out documents required pursuant to the Contract Documents and elsewhere in the agreement between the Owner and the Contractor.

E. If the Contractor's 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 warranty periods described in the Contract Documents shall be set by the Architect at his discretion.

F. If the Architect is required to perform more than one final inspection because the Contractor's work fails to comply with the requirements of the contract, the amount of compensation paid to the Architect by the Owner for additional services shall be deducted from the final payment to the Contractor.

G. Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those claims previously made in writing in accordance with the terms of Article 18 hereof and identified by that payee as unsettled at the time of final Application for Payment.

H. Contractor shall submit all documentation identified in this section within ninety (90) days from the date of Substantial Completion. If the documentation has not been submitted, the Owner will obtain same through whatever means necessary. The Contractor shall solely be responsible for all expenses incurred by the Owner in securing such documentation.

ARTICLE 16

RELEVANT STATUTORY PROVISIONS

A. The Contractor shall at all times observe and comply with all Federal and State 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 indemnify and save harmless the Owner and all his 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.

B. The Contractor and each of its subcontractors 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 and shall comply with all requirements governing its payments to its employees as set forth in Labor Law, section 220 et seq of the New York State Labor Law, as amended.

C. The Contractor and each of its subcontractors shall post a notice at the beginning of the performance of every public work contract on each job site that includes the telephone number and addresses for the Department of Labor and a statement informing laborers, workers or mechanics of their right to contact the Department of Labor if he/she is not receiving the proper prevailing rate of wages and/or supplements for his/her particular job classification.

D. The Contractor specifically agrees, as required by Labor Law, Sections 220 and 220-d, as amended, that:

1. No laborer, workman 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 contemplated by the Contract, shall be permitted or required to work more than eight hours in any one calendar day or more than five days in any one week, except in the emergencies set forth in the Labor Law.
2. The wages paid for a legal day's work shall not be less than the prevailing rate of wages as defined by law.

3. The minimum hourly rate of wages to be paid shall not be less than that stated in the Project Manual, and any re-determination of the prevailing rate of wages after the Contract is approved shall be deemed to be incorporated herein by reference as of the effective date of re-determination and shall form a part of this Contract. The Labor Law provides that the Contract may be forfeited and no sum paid for any work done thereunder on a second conviction for willfully paying less than:

- a. The stipulated wage scale as provided in Labor Law, Section 220, Sub division 3, as amended; or
- b. The stipulated minimum hourly wage scale as provided in Labor Law, Section 220-d, as amended.

E. The Contractor acknowledges that its work is governed by the provisions of Section 101 of the General Municipal Law of the State of New York.

F. The Contractor specifically agrees, as required by the provisions of the Labor Law of New York, Section 220-E, as amended that:

- 1. In the hiring of employees for the performance of this contract or any sub-contractor hereunder, no contractor, sub-contractor, nor any person acting on behalf of such contractor or sub-contractor shall by reason of race, creed, color 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, sub-contractor, nor any person on his behalf shall, in any manner, discriminate against or intimidate any employee hired for the performance of work under this contract on account of race, color, creed, sex or national origin.
- 3. There may be deducted from the amount payable to the Contractor a penalty of 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.
- 4. This Contract may be canceled or terminated by the Owner and all monies due or to become due hereunder may be forfeited for a second or any subsequent violation of the terms or conditions of this section of the Contract.

The aforesaid provisions of this section covering every Contract for or on behalf of the Owner, the State or a municipality for the manufacture, sale or distribution of materials, equipment or supplies shall be limited to operations performed within the territorial limits of the State of New York.

G. The successful Contractor shall conform to the guidelines spelled out in the County's Affirmative Action Program, if any.

H. The Contractor shall comply with all of the provisions of the Immigration Reform and Control Act of 1986 and regulations promulgated pursuant thereto and shall require its subcontractors to comply with same. The Contractor shall and does hereby agree to fully indemnify, protect, defend, and hold harmless the Owner, Owner's agents and employees from and against any penalties, fees, costs, liabilities, suits, claims, or expenses of any kind or nature, including reasonable attorney's fees, arising out of or resulting from any violation or alleged violation of the provisions of said laws in connection with the work performed hereunder.

I. This Contract shall be void if the Contractor fails to install, maintain, and effectively operate appliances and methods for the elimination of harmful dust when a harmful dust shall have been identified in accordance with Section 222-a of the Labor Law of the State of New York.

J. The Contractor shall insure that absolutely no asbestos containing material is used in conjunction with the performance of its work. The Contractor bears the sole responsibility to provide assurances that no asbestos containing material is built into the construction, or that any equipment used in the construction contains any asbestos containing material. If asbestos containing material is found, at any time during or after the construction is completed, it shall be the responsibility of the Contractor who installed said material to remove it and replace it with new non-asbestos containing material, as per federal, state and local mandates.

K. Large and small asbestos abatement projects as defined by 12 N.Y.C.R.R. 56 shall not be performed while the building is occupied. As referenced in this section, the term "building" shall mean 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. 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 windows is provided. Work must be scheduled so that classes are not disrupted by noise or visual distraction.

L. Surfaces that will be disturbed by reconstruction must have a determination made as to the presence of lead. Projects which disturb surfaces that contain lead shall have in the specifications a plan prepared by a certified Lead Risk Assessor or Supervisor which details provisions for occupant protection, worksite preparation, work methods, cleaning and clearance testing which are in general accordance with the HUD Guidelines.

M. No smoking is allowed anywhere on school property per New York State and County law. Violators are subject to a \$1,000 fine and/or banishment from the property.

N. Applicable codes and standards for material furnished and work installed shall include all state laws, local ordinances, requirements of governmental agencies having jurisdiction, and applicable requirements of following codes and standards, including but not limited to:

1. New York State Uniform Fire Prevention and Building Code, and amendments thereto.
2. New York State Energy Conservation Construction Code.
3. State Education Department Manual of Planning Standards.
4. New York State Department of Transportation, Office of Engineering, Standard Specification, Construction and Materials, latest edition.
5. Life Safety Code - NFPA.

O. Wherever in the specifications reference is made to ANSI or ASTM Standards, Federal Specifications, Consumer Product Standards, or similar recognized standards, the latest edition of the respective publishing agency in effect at the date of "Bid Issuance" shall be accepted as establishing the technical requirements for which compliance is required.

P. The 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 its agreement in the event (1) an order for relief is entered on behalf of the Contractor pursuant to Title 11 of the United States Code, (2) any other similar order is entered under any other debtor relief laws, (3) the Contractor makes a general assignment for the benefit of its creditors, (4) a receiver is appointed for the benefit of its creditors, or (5) a receiver is appointed on account of its insolvency. Failure to comply with such request within ten (10) days of delivery of the request shall entitle the Owner to terminate the Contract in accordance with Article 17 hereof. In all events, pending receipt of adequate assurance of performance and actual performance in accordance therewith, the Owner shall be entitled to proceed with the Contractor's 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 Contractor.

Q. The Contractor shall maintain policies of employment as follows:

1. The Contractor and the Contractor's Subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex or national origin. The Contractor shall take affirmative action to insure that applicants are employed, and that employees are treated during employment without regard to their race, religion, color, sex 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. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the policies of non-discrimination.
2. The Contractor and the Contractor's Subcontractors shall, in all solicitations or advertisements for employees placed by them or on their behalf, state that all qualified applicants will receive consideration for employment without regard to race, religion, color, sex or national origin.

ARTICLE 17

TERMINATION OR SUSPENSION

- A. 1. The Owner may terminate the Contractor's agreement in the event the Contractor:
- a. refuses or fails to supply sufficient skilled workers or suitable materials or equipment to complete the Work in a diligent, efficient, timely, workmanlike, skillful, and careful manner;
 - b. refuses or fails to correct deficient work performed by it;
 - c. fails to make prompt payments to subcontractors for labor, materials, and/or equipment in accordance with the respective agreements between the Contractor and the Subcontractors;
 - d. disregards laws, ordinances, rules, regulations, or orders of a public authority having jurisdiction;
 - e. disregards the instructions of the Architect, Construction Manager or the Owner (when such instructions are based on the requirements of the Contract Documents);
 - f. is adjudged a bankrupt or insolvent, or makes a general assignment for the benefit of Contractor's creditors, or a trustee or receiver is appointed for Contractor or for any of its property, or files a petition to take advantage of any debtor's act or to reorganize under bankruptcy or similar laws; or
 - g. breaches any warranty made by the Contractor under or pursuant to the Contract Documents.
 - h. fails to furnish the Owner with assurances satisfactory to the Owner evidencing the Contractor's ability to complete the Work in compliance with all the requirements of the Contract Documents; or
 - i. fails after commencement of the Work to proceed continuously with the construction and completion of the Work for more than ten (10) days, except as permitted under the Contract Documents.
 - j. fails to keep the Project free from strikes, work stoppages, slowdowns, lockouts or other disruptive activity;
 - k. or otherwise does not fully comply with the Contract Documents.
2. When any of the above reasons exists, may without prejudice to any other rights or remedies of the Owner, terminate employment of the Contractor upon three (3) days written notice and may, subject to any prior rights of the surety:

- a. take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- b. take possession of materials stored off site by the Contractor;
- c. take assignments of the Contractor's subcontractors in accordance with these General Conditions;
- d. finish the Work by whatever reasonable method the Owner may deem expedient.

3. When the Owner terminates the Contract for one of the reasons stated in Subparagraph 1 hereof, the Contractor shall not be entitled to receive further payment until the completion of the Contractor's work. If the Owner's costs to complete the Contractor's work, including the expenses incurred by the Owner in connection with the services of the Architect, the Construction Manager and/or other consultants, exceed the contract balance remaining on the Contractor's contract, the Contractor shall be liable to the Owner for such excess costs. This provision shall survive termination of the Contractor's agreement with the Owner.

B. 1. In addition to the Owner's right to carry out the work of the Contractor pursuant to its agreement with the Contractor, the Owner may at any time, at will and without cause, terminate any part of the Contractor's work or all of the Contractor's remaining work for any reason whatsoever by giving three (3) days' written notice to Contractor, specifying the portion of the Contractor's work to be terminated and the effective date of termination.

2. Upon receipt of a notice of termination for convenience, the Contractor shall immediately, in accordance with instructions from the Owner, proceed with performance of the following duties regardless of delay in determining or adjusting amounts due under this Paragraph:

- a. cease operation as specified in the notice;
- b. place no further orders and enter into no further subcontracts for materials, labor, services or facilities except as necessary to complete continued portions of the Contract;
- c. terminate all subcontracts and orders to the extent they relate to the Work terminated;
- d. proceed to complete the performance of the remaining work on its contract which has not been so terminated; and
- e. take actions that may be necessary, or that the Owner may direct, for the protection and preservation of the terminated Work.

3. The Contractor shall continue to prosecute that portion of its work which has not been terminated by the Owner pursuant to this paragraph. If the Contractor's work is so terminated, the Owner shall not be liable to the Contractor by reason of such termination except that the Contractor shall be entitled to payment for the work it has properly executed in accordance with its agreement and prior to the effective date of termination (the basis for such payment shall be as provided in the Contract) and for costs directly related to work thereafter performed by Contractor in terminating such Work, provided such work is authorized in advance by the Architect and the Owner. No payment shall be made by Owner, however, to the extent that such work is, was, or could have been terminated under the Contractor's agreement with the Owner.

4. In case of a termination pursuant to this paragraph B, the Owner will issue a Construction Change Directive or authorize a Change Order, making any required adjustment to the Date of Substantial Completion and/or the sum of contract monies remaining to be paid to the Contractor. The Owner shall be credited for (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 and (3) the value of the materials, supplies, equipment or other items that are to be disposed of by the Contractor that are part of the Contract Sum; multiplied by 15% representing the Contractor's overhead and profit.

5. For the remaining portions of the Contractor's work which have not been terminated pursuant to this paragraph B, the terms and conditions of the Contractor's agreement with the Owner shall remain in full force and effect.

6. Upon termination of the Contractor's work or a portion of the Contractor's work pursuant to this paragraph B, the Contractor shall recover as its sole remedy, payment for work which it has properly performed in connection with the terminated portion of the Work prior to the effective date of termination and for items properly and timely fabricated off the Project site, delivered and stored in accordance with the Owner's instructions. The Contractor hereby waives and forfeits all other claims for payment and damages, including, without limitation, overhead and profit related to work terminated by the Owner pursuant to this paragraph B.

C. 1. In addition to Owner's right to suspend, delay, or interrupt Contractor from proceeding with any portion of its work pursuant to the terms and conditions of its agreement with the Owner, the Owner may at any time, at will and without cause suspend, delay, or interrupt any part of the Contractor's work or all work for any reason whatsoever for such period of time as the Owner may determine by giving three (3) days' prior written notice to Contractor, specifying that portion of the Contractor's work which is to be suspended, delayed, or interrupted, and the effective date of such suspension, delay, or interruption, as the case may be.

2. The Contractor shall continue to prosecute that portion of its work which has not been suspended, delayed, or interrupted, and shall properly protect and secure the portion of its work so suspended, delayed or interrupted.

3. The Owner shall incur no liability to Contractor by reason of such suspension, delay, or interruption except that Contractor may request an extension of its time to complete its work in accordance with Article 13 hereof.

D. The Contractor agrees and acknowledges that payments for the work have been obtained through obligations or bonds which have been sold after public referendum. In the event the work is suspended or canceled as a result of the order of any court, agency, department entity or individual having jurisdiction, or in the event the work is suspended or canceled due to the fact that a court, agency, department, entity or individual having jurisdiction has issued an order, the result of which is that the aforesaid obligations or bonds are no longer available for payment for the work, the Contractor expressly agrees that it shall be solely entitled to payment for work accomplished until a notice of suspension or cancellation is served upon it. The Contractor expressly waives any and all rights to institute an action, claim, cause of action or similar for any damages it may suffer as a result of the suspension or cancellation of the Work and/or its contract pursuant to this section.

ARTICLE 18 CLAIMS AND DISPUTES

A. Definition. A "Claim" is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, extension of 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.

B. Time Limits on Claims. Claims by the Contractor must be made within thirty (30) days after occurrence of the event giving rise to such Claim, or within thirty (30) days after the claimant first recognizes the condition giving rise to the Claim, whichever is earlier. Claims must be made by written notice. An additional Claim made after the initial Claim has been decided by the Owner will not be considered unless submitted in a timely manner. Failure of the Contractor to give timely notice of claim shall constitute waiver of the claim. Claims must be made by written notice to the Construction Manager, Architect and Owner. The responsibility to substantiate Claims shall rest with the Contractor.

C. Pending final resolution of a Claim, unless otherwise agreed in writing, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

D. Claims for Concealed or Unknown Conditions. If conditions are encountered at the site which are (1) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, which 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, then notice by the Contractor shall be given to the Owner and Architect promptly before conditions are disturbed and in no event later than five (5) days after first observance of the conditions; and,

(3) in the case of a condition at the site which involves a hazardous or toxic substance, as those terms are defined by OSHA or AHERA, notice to the Owner, the Construction Manager and the Architect shall be given immediately upon discovery of such hazardous or toxic substance. The Architect, and/or Construction Manager will promptly investigate such conditions and, if 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 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 so notify the Contractor in writing, stating the reasons.

E. Claims for Additional Cost. If the Contractor wishes to make Claim for an increase in the Contract Sum as a result of a Change in the Work pursuant to Article 8 of these General Conditions, written notice as provided in this Article 18 shall be given before proceeding to execute the Work.

F. Claims for Additional Time. If the Contractor wishes to make Claim for an increase in the Contract Time, the Contractor shall comply with the requirements set forth in Article 13.

G. Nothing contained in the Contract Documents shall relieve a Contractor from compliance with any statutory requirement, including, but not limited to those contained in Education Law Section 3813.

ARTICLE 19 MISCELLANEOUS PROVISIONS

A. The agreement between the Owner and the Contractor shall be governed by the law of the place where the project is located; venue to be in the County in which the project is located.

B. 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 its agreement with the Owner 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.

C. All notices to be given hereunder shall be in writing and may be given, served, or made (1) by depositing the same for first class mail delivery in the United States mail addressed to the authorized representative of the party to be notified; (2) by depositing the same in the United States mail addressed to the authorized representative of the party to be notified, postpaid and registered or certified with return receipt requested; (3) by depositing the same for overnight delivery (prepaid by or billed to the party giving notice) with the United States Postal Service or other nationally recognized overnight delivery service addressed to the authorized representative of the party to be notified; or (4) by delivering the same in person to the said authorized representative of such party. Notice deposited in the mail by certified mail or overnight delivery in accordance with the provisions hereof shall be effective from and after the

fourth (4th) day next following the date postmarked on the envelope containing such notice, or when actually received, whichever is earlier. All notices to be given to the parties hereto shall be sent to or made at the addresses set forth hereinbelow. By giving the other parties at least seven (7) days' written notice thereof, the parties hereto shall have the right to change their respective addresses and specify as their respective addresses for the purposes hereof any other address in the United States of America.

D. Except as expressly provided in the agreement between the Owner and the Contractor, duties and obligations imposed by such agreement 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, or in equity or by other agreement, and such rights and remedies shall survive acceptance of the Contractor's work and/or any other termination of the Contractor's agreement with the Owner.

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

F. The headings denoting the separately numbered Articles of these General Conditions are specifically set forth for reference purposes only and are not in any way to be deemed explanatory of or limiting of the contents of any paragraph or subparagraph. Furthermore, said headings are not to be deemed part of this Agreement for purposes of interpretation, litigation or as defining or limiting the rights or obligations of the parties.

G. In case any provision of this Agreement should be held to be contrary to, or invalid, under the law of any country, state or other jurisdiction, such illegality or invalidity, shall not affect in any way, any other provisions hereof, all of which shall continue, nevertheless, in full force and effect in any country, state or jurisdiction in which such provision is legal and valid.

H. The rights stated in these General Conditions and the documents which form the agreement between the Owner and the Contractor are cumulative and not in limitation of any rights of the Owner at law or in equity.

I. 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 pursuant to its agreement with the Contractor.

J. The Owner shall not be liable to the Contractor for punitive damages on account of any its termination of the Contractor or any other alleged breach of the agreement between it and the Contractor and the Contractor hereby expressly waives its right to claim such damages against the Owner.

K. 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.

L. Upon determination by legal means (e.g. court action, etc.) that termination of Contractor pursuant to Article 17.A.1 was wrongful, such termination will be deemed converted to a termination for convenience pursuant to Article 17.B.1 and Contractor's remedy for such termination shall be limited to the recovery of the payments permitted for termination for convenience as set forth in Article 17.B.1.

M. As between the Owner and Contractor:

1. Before Substantial Completion. As to acts or failures to act occurring prior to the relevant date of Substantial Completion, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than such date of Substantial Completion;
2. Between Substantial Completion and Final Certificate for Payment. As to acts or failures to act occurring subsequent to the relevant date of Substantial Completion and prior to issuance of the final Certificate for Payment, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of issuance of the final Certificate for Payment; and
3. After Final Certificate for Payment. As to acts or failures to act occurring after the relevant date of issuance of the final Certificate for Payment, any applicable statute of limitations shall commence to run and any alleged 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 warranties provided in accordance with its agreement with the Owner, the date of any correction of work performed by the Contractor or failure to correct its work, or the date of actual commission of any other act or failure to perform any duty or obligation by the Contractor or Owner, whichever occurs last.

N. 1. The Owner may occupy or use any completed or partially completed portion of the Contractor's work at any stage when such occupancy is authorized by public authorities having jurisdiction over the project.

2. Partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of the Contractor's work, nor does it waive the Owner's right to liquidated damages. Further such occupancy alone shall not determine when substantial completion and performance has been reached.

3. Immediately prior to such partial occupancy or use, the Owner, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order

to determine and record the condition of the Contractor's work, and in order to prepare a complete punchlist of omissions of materials, faulty workmanship, or any items to be repaired, torn out or replaced.

O. The Contractor agrees not to assign, transfer, convey or sublet or otherwise dispose of this Contract or his right, title and interest therein or his power to execute such Contract, to any other person, firm or corporation without the previous consent in writing of the Owner.

P. The Owner is a tax exempt organization and will take title to materials used in the Project in order to permit tax exemption.

Q. The Owner will furnish a certificate with the Owner's Tax Exemption Number to the Contractor for use in purchasing tangible personal property required for the Project.

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

S. The Contractor shall, upon request by the Owner, furnish a bill of sale or other instrument indicating the quantities and types of materials purchased directly by the Contractor or subcontractor for incorporation into the Work. Upon delivery of the materials to the site, the Contractor shall mark or otherwise identify the materials to be incorporated into the Work. This exemption shall apply only to materials so identified and accepted.

END OF GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

NYSED 155.5 REGULATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies requirements of 8NYCRR155.5, Uniform Safety Standards for School Construction and Maintenance Projects, that are required in construction documents. The Contractor shall comply with these requirements in addition to any and all similar requirements in the Contract Documents.

1.3 REQUIREMENTS

- A. The occupied portion of any school building shall always comply with the minimum requirements necessary to maintain a certificate of occupancy. In addition, the following shall be strictly enforced and cooperated with:
 - 1. No smoking is allowed on public school property, including construction areas.
 - 2. During construction daily inspections of district occupied areas shall be conducted by school district personnel to assure that construction materials, equipment or debris do not block fore exits or emergency egress windows.
 - 3. Proper operation of fire extinguishers, fire alarm, and smoke/fire detection systems shall be maintained throughout the project.
- B. Verify that all school areas to be disturbed during renovation or demolition have been or will be tested for lead and for asbestos. For any project work that disturbs surfaces that contain lead or asbestos, follow the plans and specifications prepared by a certified Lead Risk Assessor or Supervisor which details provisions for occupant protection, worksite preparation, work methods, cleaning, and clearance testing; which are in general accordance with HUD Guidelines.
 - 1. All asbestos abatement projects shall comply will all applicable federal and State laws including but not limited to the New York

State Department of Labor industrial code rule 56(12NYCRR56), and the federal Asbestos Hazard Emergency Response Act (AHERA), 40 CFR Part 763 (Code of Federal Regulations, 1998 Edition); available at the Office of Facilities Planning, Education Building Annex, Room 1060, State Education Department, Albany, NY 12234.

2. 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 (HUD), Washington, D.C. 20410; available at the Office of Facilities Planning, Education Building Annex, Room 1060, State Education Department, Albany, NY 12234.

C. General Safety and Security Standards for Construction Projects:

1. All construction materials shall be stored in a safe and secure manner.
2. Fences around construction supplies or debris shall be maintained.
3. Gates shall always be locked unless a worker is in attendance to prevent unauthorized entry.
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 warnings signs to prevent entry.
5. Workers shall be required to wear photo-identification badges at all times for identification and security purposes while working at occupied sites.

D. 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.

1. A specific stairwell and/or elevator may be assigned for construction worker use during the work hours. In general,

workers may not use the corridors, stairs or elevators designated for students or school staff.

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.
3. All occupied parts of the buildings 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.

E. The Architect will prepare phasing plans indicating exiting, required by the applicable building code, which shall be maintained during construction.

1. The Contractor shall submit plans, to be approved by the Architect, indicating temporary construction required to isolate construction equipment, materials, people, dust, fumes, odors, and noise during the construction period and meeting the requirements of the phasing plans.
2. Temporary construction details shall meet code-required fire ratings for separation and corridor enclosure.
3. At a minimum, required exits, temporary stairs, ramps, exit signs, and door hardware shall be provided at all times.

F. Prepare a plan detailing how adequate ventilation will be maintained during construction.

1. 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.
2. The plan shall also indicate how required ventilation to occupied spaces affected by construction will be maintained during the project.

G. 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.

- H. The contractor shall be responsible for the control of chemical fumes, gases, and other contaminants 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.
- I. 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.
- J. Large and small asbestos abatement projects as defined by 12NYCRR56 shall not be performed while the building is occupied. The term "building", as used in this paragraph, 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.
- K. 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.

IN ACCORDANCE WITH ARTICLE 8, SECTION 220 (3-a) OF THE NEW YORK STATE LABOR LAW, THE FOLLOWING LINK REPRESENTS THE MOST CURRENT PREVAILING WAGE RATE SCHEDULES AT THE TIME OF BIDDING, ISSUED BY THE NEW YORK STATE DEPARTMENT OF LABOR SPECIFICALLY REQUESTED FOR THIS PROJECT:

PRC# 2020003343

<http://apps.labor.ny.gov/wpp/publicViewProject.do?method=showIt&id=1495766>

PRC# 2020010963

<http://apps.labor.ny.gov/wpp/publicViewProject.do?method=showIt&id=1505203>

CONTRACTOR IS TO OBTAIN THE PREVAILING WAGE RATES GENERATED FOR THIS PROJECT AT THE NEW YORK STATE DEPARTMENT OF LABOR WEBSITE.

- ASSEMBLY BILL NUMBER 1839
- NOTICES REGARDING WAGE RATE UPDATES
- WAGE RATE SCHEDULE
- LIST OF EMPLOYERS INELIGIBLE TO BID ON OR BE AWARDED PUBLIC WORK

**Irvington Union Free School District
Board of Education
6 Dows Lane
Irvington, NY 10533**

PAYROLL NO.

FOR WEEK ENDING

PROJECT AND LOCATION

PROJECT OR CONTRACT NO.

(1) NAME AND INDIVIDUAL IDENTIFYING NUMBER (e.g., LAST FOUR DIGITS OF SOCIAL SECURITY NUMBER) OF WORKER	(2) NO. OF WITHHOLDING EXEMPTIONS	(3) WORK CLASSIFICATION	OT OR ST	(4) DAY AND DATE							(5) TOTAL HOURS	(6) RATE OF PAY	(7) GROSS AMOUNT EARNED	(8) DEDUCTIONS						(9) NET WAGES PAID FOR WEEK
				HOURS WORKED EACH DAY										FICA	WITH- HOLDING TAX			OTHER	TOTAL DEDUCTIONS	
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While completion of Form WH-347 is optional, it is mandatory for covered contractors and subcontractors performing work on Federally financed or assisted construction contracts to respond to the information collection contained in 29 C.F.R. §§ 3.3, 5.5(a). The Copeland Act (40 U.S.C. § 3145) contractors and subcontractors performing work on Federally financed or assisted construction contracts to "furnish weekly a statement with respect to the wages paid each employee during the preceding week." U.S. Department of Labor (DOL) regulations at 29 C.F.R. § 5.5(a)(3)(ii) require contractors to submit weekly a copy of all payrolls to the Federal agency contracting for or financing the construction project, accompanied by a signed "Statement of Compliance" indicating that the payrolls are correct and complete and that each laborer or mechanic has been paid not less than the proper Davis-Bacon prevailing wage rate for the work performed. DOL and federal contracting agencies receiving this information review the information to determine that employees have received legally required wages and fringe benefits.

Public Burden Statement

We estimate that it will take an average of 55 minutes to complete this collection, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. If you have any comments regarding these estimates or any other aspect of this collection, including suggestions for reducing this burden, send them to the Administrator, Wage and Hour Division, U.S. Department of Labor, Room S3502, 200 Constitution Avenue, N.W. Washington, D.C. 20210

(over)

Date _____

I, _____
(Name of Signatory Party) (Title)

do hereby state:

(1) That I pay or supervise the payment of the persons employed by _____ on the _____
(Contractor or Subcontractor)
_____ ; that during the payroll period commencing on the _____
(Building or Work)
_____ day of _____, _____, and ending the _____ day of _____, _____,
all persons employed on said project have been paid the full weekly wages earned, that no rebates have
been or will be made either directly or indirectly to or on behalf of said
_____ from the full
(Contractor or Subcontractor)

weekly wages earned by any person and that no deductions have been made either directly or indirectly
from the full wages earned by any person, other than permissible deductions as defined in Regulations, Part
3 (29 C.F.R. Subtitle A), issued by the Secretary of Labor under the Copeland Act, as amended (48 Stat. 948,
63 Stat. 108, 72 Stat. 967; 76 Stat. 357; 40 U.S.C. § 3145), and described below:

(2) That any payrolls otherwise under this contract required to be submitted for the above period are
correct and complete; that the wage rates for laborers or mechanics contained therein are not less than the
applicable wage rates contained in any wage determination incorporated into the contract; that the classifications
set forth therein for each laborer or mechanic conform with the work he performed.

(3) That any apprentices employed in the above period are duly registered in a bona fide apprenticeship
program registered with a State apprenticeship agency recognized by the Bureau of Apprenticeship and
Training, United States Department of Labor, or if no such recognized agency exists in a State, are registered
with the Bureau of Apprenticeship and Training, United States Department of Labor.

(4) That:
(a) WHERE FRINGE BENEFITS ARE PAID TO APPROVED PLANS, FUNDS, OR PROGRAMS

- in addition to the basic hourly wage rates paid to each laborer or mechanic listed in
the above referenced payroll, payments of fringe benefits as listed in the contract
have been or will be made to appropriate programs for the benefit of such employees,
except as noted in section 4(c) below.

(b) WHERE FRINGE BENEFITS ARE PAID IN CASH

- Each laborer or mechanic listed in the above referenced payroll has been paid,
as indicated on the payroll, an amount not less than the sum of the applicable
basic hourly wage rate plus the amount of the required fringe benefits as listed
in the contract, except as noted in section 4(c) below.

(c) EXCEPTIONS

EXCEPTION (CRAFT)	EXPLANATION

REMARKS:

NAME AND TITLE	SIGNATURE

THE WILLFUL FALSIFICATION OF ANY OF THE ABOVE STATEMENTS MAY SUBJECT THE CONTRACTOR OR
SUBCONTRACTOR TO CIVIL OR CRIMINAL PROSECUTION. SEE SECTION 1001 OF TITLE 18 AND SECTION 231 OF TITLE
31 OF THE UNITED STATES CODE.

DRAFT 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)

« »
« »

BOND AMOUNT: \$ « »

PROJECT:

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

«PWA»
« »
« »

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

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

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

ADDITIONS AND DELETIONS:

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

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

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

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

Signed and sealed this « » day of « », « »

(Witness)

(Witness)

« »

(Contractor as Principal)

(Seal)

« »

(Title)

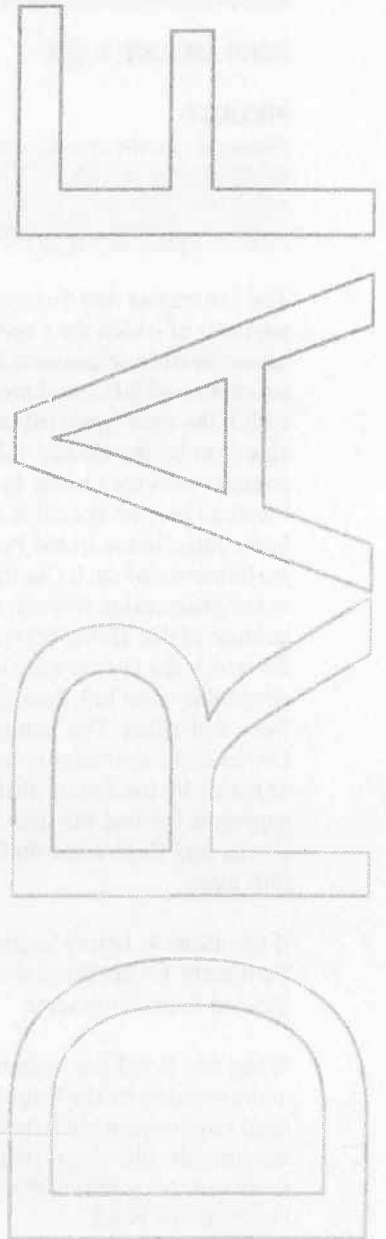
« »

(Surety)

(Seal)

« »

(Title)



DRAFT 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)

« »
« »

CONSTRUCTION CONTRACT

Date: « »

Amount: \$ « »

Description:

(Name and location)

«PWA»

« »

BOND

Date:

(Not earlier than Construction Contract Date)

« »

Amount: \$ « »

Modifications to this Bond:

« »

None

« »

See Section 16

CONTRACTOR AS PRINCIPAL

Company: (Corporate Seal)

SURETY

Company: (Corporate Seal)

Signature:

Name and « »

Title:

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

Signature:

Name and « »

Title:

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or BROKER:

« »
« »
« »

OWNER'S REPRESENTATIVE:

(Architect, Engineer or other party:)

« »
« »
« »
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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.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

§ 14 Definitions

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

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

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

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

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

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

§ 16 Modifications to this bond are as follows:

« »

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

CONTRACTOR AS PRINCIPAL

Company:

(Corporate Seal)

SURETY

Company:

(Corporate Seal)

Signature:

Name and Title:

« »« »

Address:

« »

Signature:

Name and Title:

« »« »

Address:

« »

DRAFT AIA Document A312™ - 2010

Payment Bond

CONTRACTOR:

(Name, legal status and address)

« »
« »

SURETY:

(Name, legal status and principal place of business)

« »
« »

OWNER:

(Name, legal status and address)

« »
« »

CONSTRUCTION CONTRACT

Date: « »

Amount: \$ « »

Description:

(Name and location)

«PWA»

« »

BOND

Date:

(Not earlier than Construction Contract Date)

« »

Amount: \$ « »

Modifications to this Bond:

« »

None

« »

See Section 18

CONTRACTOR AS PRINCIPAL

Company: (Corporate Seal)

SURETY

Company: (Corporate Seal)

Signature:

Name and « »

Title:

Signature:

Name and « »

Title:

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

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.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

§ 16 Definitions

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

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

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

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

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

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

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

§ 18 Modifications to this bond are as follows:

« »

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

CONTRACTOR AS PRINCIPAL

Company: _____ (Corporate Seal)

Signature: _____

Name and Title: « »« »

Address: « »

SURETY

Company: _____ (Corporate Seal)

Signature: _____

Name and Title: « »« »

Address: « »

Application and Certificate for Payment

TO OWNER: PROJECT: PWA APPLICATION NO: 001 Distribution to: OWNER: ARCHITECT: CONTRACTOR: FIELD: FROM CONTRACTOR: VIA ARCHITECT: PERIOD TO: CONTRACT FOR: General Construction CONTRACT DATE: PROJECT NOS:

CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for payment, as shown below, in connection with the Contract. Continuation Sheet, AIA Document G703, is attached.

- 1. ORIGINAL CONTRACT SUM.....\$0.00
- 2. NET CHANGE BY CHANGE ORDERS.....\$0.00
- 3. CONTRACT SUM TO DATE (Line 1 ± 2).....\$0.00
- 4. TOTAL COMPLETED & STORED TO DATE (Column G on G703).....\$0.00
- 5. RETAINAGE:

- a. 0 % of Completed Work (Column D + E on G703): \$0.00 = \$0.00
- b. 0 % of Stored Material (Column F on G703): \$0.00 = \$0.00

Total Retainage (Lines 5a + 5b or Total in Column I of G703).....\$0.00

6. TOTAL EARNED LESS RETAINAGE.....\$0.00

(Line 4 Less Line 5 Total)

7. LESS PREVIOUS CERTIFICATES FOR PAYMENT.....\$0.00

(Line 6 from prior Certificate)

8. CURRENT PAYMENT DUE.....\$0.00

9. BALANCE TO FINISH, INCLUDING RETAINAGE

(Line 3 less Line 6)

\$0.00

AMOUNT CERTIFIED.....\$0.00

(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)

CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner	\$0.00	\$0.00
Total approved this Month	\$0.00	\$0.00
TOTALS	\$0.00	\$0.00
NET CHANGES by Change Order		\$0.00

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR:

By:

Date:

State of:

County of:

Subscribed and sworn to before me this day of

Notary Public:

My Commission expires:

ARCHITECT'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on on-site observations and the data comprising this application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED.....\$0.00 (Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)

ARCHITECT:

By:

Date:

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

DRAFT AIA Document G704™ - 2000

Certificate of Substantial Completion

PROJECT:
(Name and address)
PWA

PROJECT NUMBER: /
CONTRACT FOR: General Construction
CONTRACT DATE:

TO OWNER:
(Name and address)

TO CONTRACTOR:
(Name and address)

OWNER: ☐
ARCHITECT: ☐
CONTRACTOR: ☐
FIELD: ☐
OTHER: ☐

PROJECT OR PORTION OF THE PROJECT DESIGNATED FOR PARTIAL OCCUPANCY OR USE SHALL INCLUDE:

The Work performed under this Contract has been reviewed and found, to the Architect's best knowledge, information and belief, to be substantially complete. Substantial Completion is the stage in the progress of the Work when the Work or designated portion is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use. The date of Substantial Completion of the Project or portion designated above is the date of issuance established by this Certificate, which is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below:

Warranty

Date of Commencement

ARCHITECT

BY

DATE OF ISSUANCE

A list of items to be completed or corrected is attached hereto. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. Unless otherwise agreed to in writing, the date of commencement of warranties for items on the attached list will be the date of issuance of the final Certificate of Payment or the date of final payment.

Cost estimate of Work that is incomplete or defective: \$0.00

The Contractor will complete or correct the Work on the list of items attached hereto within Zero (0) days from the above date of Substantial Completion.

CONTRACTOR

BY

DATE

The Owner accepts the Work or designated portion as substantially complete and will assume full possession at _____ (time) on _____ (date).

OWNER

BY

DATE

The responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance shall be as follows:

(Note: Owner's and Contractor's legal and insurance counsel should determine and review insurance requirements and coverage.)

DRAFT AIA Document G706™ - 1994

Contractor's Affidavit of Payment of Debts and Claims

PROJECT: (Name and address)
PWA

ARCHITECT'S PROJECT NUMBER:

TO OWNER: (Name and address)

CONTRACT FOR: General Construction

CONTRACT DATED:

OWNER: ☐

ARCHITECT: ☐

CONTRACTOR: ☐

SURETY: ☐

OTHER: ☐

STATE OF:
COUNTY OF:

The undersigned hereby certifies that, except as listed below, payment has been made in full and all obligations have otherwise been satisfied for all materials and equipment furnished, for all work, labor, and services performed, and for all known indebtedness and claims against the Contractor for damages arising in any manner in connection with the performance of the Contract referenced above for which the Owner or Owner's property might in any way be held responsible or encumbered.

EXCEPTIONS:

SUPPORTING DOCUMENTS ATTACHED HERETO:

1. Consent of Surety to Final Payment. Whenever Surety is involved, Consent of Surety is required. AIA Document G707, Consent of Surety, may be used for this purpose

Indicate Attachment ☐ Yes ☒ No

The following supporting documents should be attached hereto if required by the Owner:

1. Contractor's Release or Waiver of Liens, conditional upon receipt of final payment.
2. Separate Releases or Waivers of Liens from Subcontractors and material and equipment suppliers, to the extent required by the Owner, accompanied by a list thereof.
3. Contractor's Affidavit of Release of Liens (AIA Document G706A).

CONTRACTOR: (Name and address)

BY:

(Signature of authorized representative)

(Printed name and title)

Subscribed and sworn to before me on this date:

Notary Public:

My Commission Expires:

DRAFT AIA® Document G706A™ - 1994

Contractor's Affidavit of Release of Liens

PROJECT: *(Name and address)*

PWA

TO OWNER: *(Name and address)*

ARCHITECT'S PROJECT
NUMBER:

CONTRACT FOR: General
Construction

CONTRACT DATED:

OWNER: ☐

ARCHITECT: ☐

CONTRACTOR: ☐

SURETY: ☐

OTHER: ☐

STATE OF:
COUNTY OF:

The undersigned hereby certifies that to the best of the undersigned's knowledge, information and belief, except as listed below, the Releases or Waivers of Lien attached hereto include the Contractor, all Subcontractors, all suppliers of materials and equipment, and all performers of Work, labor or services who have or may have liens or encumbrances or the right to assert liens or encumbrances against any property of the Owner arising in any manner out of the performance of the Contract referenced above.

EXCEPTIONS:

SUPPORTING DOCUMENTS ATTACHED HERETO:

1. Contractor's Release or Waiver of Liens, conditional upon receipt of final payment.
2. Separate Releases or Waivers of Liens from Subcontractors and material and equipment suppliers, to the extent required by the Owner, accompanied by a list thereof.

CONTRACTOR: *(Name and address)*

BY:

*(Signature of authorized
representative)*

(Printed name and title)

Subscribed and sworn to before me on this date:

Notary Public:

My Commission Expires:

DRAFT AIA Document G707™ - 1994

Consent Of Surety to Final Payment

PROJECT: *(Name and address)*

PWA

ARCHITECT'S PROJECT NUMBER:

CONTRACT FOR: General Construction

TO OWNER: *(Name and address)*

CONTRACT DATED:

OWNER: ☐

ARCHITECT: ☐

CONTRACTOR: ☐

SURETY: ☐

OTHER: ☐

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above, the
(Insert name and address of Surety)

on bond of

(Insert name and address of Contractor)

, SURETY,

hereby approves of the final payment to the Contractor, and agrees that final payment to the Contractor shall not relieve the
Surety of any of its obligations to
(Insert name and address of Owner)

, CONTRACTOR,

, OWNER,

as set forth in said Surety's bond.

IN WITNESS WHEREOF, the Surety has hereunto set its hand on this date:
(Insert in writing the month followed by the numeric date and year.)

(Surety)

(Signature of authorized representative)

Attest:

(Seal):

(Printed name and title)

PART 1 - GENERAL

1.01 BRIEF PURPOSE OF PROJECT / GENERAL

- A. The purpose of the project is provide a facilities maintenance building. .
- B. This Section provides an abbreviated summary of the work for the Construction Contracts associated with the Owner's program to construct the project.
- C. In the event that any of the provisions in the technical specifications conflicts with the general conditions, the provision more favorable to the owner, as determined by the owner in its sole discretion, shall govern.

1.02 NOMENCLATURE

- A. Where the terms "Engineer/Architect", "Architect/Engineer", "Engineer", or "Architect" are used throughout these Contract Documents, they shall mean the firm of H2M architects + engineers as may be abbreviated by H2M or H2M Group.
- B. The terms "Contractor" and/or "Prime Contractor" where used shall refer to the individual or company who has entered into an agreement with the Owner to perform the work contained within these Contract Documents. The lack of word capitalization shall be incidental.
- C. The terms "Contractor" and/or "Prime Contractor" where used within the body of a specific Construction Contract, (i.e.; Contract G, Contract E, Contract H, Contract P, and Contract S), shall refer to the individual or company who has entered into an agreement with the Owner to perform the work contained within those Contract Documents. The lack of word capitalization shall be incidental.
- D. The General Construction Contractor may be referred to as the "General Contractor", "Prime General Contractor", "Contract G Contractor" or similar wording. The lack of word capitalization shall be incidental. This Construction Contract shall be known as Contract G.
- E. The Electrical Construction Contractor may be referred to as the "Electrical Contractor", "Prime Electrical Contractor", "Contract E Contractor" or similar wording. The lack of word capitalization shall be incidental. This Construction Contract shall be known as Contract E.
- F. The Heating, Ventilating & Air Conditioning Construction Contractor may be referred to as the "HVAC Contractor", "Prime HVAC Contractor", "Contract H Contractor" or similar wording. The lack of word capitalization shall be incidental. This Construction Contract shall be known as Contract H.
- G. The SITE WORK Construction Contractor may be referred to as the "Site Work Contractor", "Prime Site Work Contractor", "Contract C Contractor" or similar wording. The lack of word capitalization shall be incidental. This Construction Contract shall be known as Contract C.
- H. Where the terms "Owner" or "Owner's Construction Representative" are used, they will be defined as a person selected by the Owner, or the actual Owner, Irvington Union Free School District.

1.03 ABBREVIATED SUMMARY OF CONTRACT G WORK

- A. Furnish all labor, equipment, materials, tools, means, methods, and incidentals necessary to complete the Work as required by the Contract Documents for this Construction Contract. Each contractor shall coordinate, through the Owner/Architect, the work of their contract with the work by others.
- B. This following abbreviated summary is provided in order to briefly describe the work covered by the Contract Documents for this Construction Contract. It is not all inclusive of the work under the Contract.
- C. The work includes, but is not limited to, the following:
 - 1. Two bay facilities storage, wash and maintenance building
 - 2. Site work and foundations for future bleachers / pressbox
 - 3. Construction of New Building: Two bay facilities storage, wash and maintenance building including: all concrete footings/foundations/walls, concrete reinforcement, penetrations, structural steel, masonry, drywall, roofing, windows, doors and louvers.
 - 4. Project closeout submittals.
- D. All other work shown and specified within the Contract Documents for Contract G.

1.04 ABBREVIATED SUMMARY OF CONTRACT E WORK

- A. Furnish all labor, equipment, materials, tools, means, methods, and incidentals necessary to complete the Work as required by the Contract Documents for this Construction Contract. Each Contractor shall coordinate, through the Owner/Architect, the work of their contract with the work by others.
- B. This following abbreviated summary is provided in order to briefly describe the work covered by the Contract Documents for this Construction Contract. It is not all inclusive of the work under the Contract.
- C. The work includes, but is not limited to, the following:
 - 1. Provide, install, maintain, and repair, if necessary, temporary power and light throughout the site and to the Owner/Architect's field office. Temporary power shall be provided at location(s) selected by the Architect based on input by the General Contractor.
 - 2. Arrange for and install primary electric service.
 - 3. Main secondary feeders, power distribution, and instrumentation control wiring. Provide, mount, and install electrical conduit, wire, fittings, boxes, panels, and electrical accessories.

1.05 ABBREVIATED SUMMARY OF CONTRACT H WORK

1.06 ABBREVIATED SUMMARY OF CONTRACT P WORK

1.07 PARTIAL LISTING OF SPECIFIC CONTRACT REQUIREMENTS

- A. The Contract Documents detail the work included in the Contract. Related requirements and conditions covered by the Contract Documents include, but are not limited to, the following:
 - 1. The contractor shall adhere to all New York State Education Department requirements, including but not limited to NYCRR, Title 8, Chapter 2, Part 155.5 - Uniform Safety Standards for School Construction and Maintenance

SUMMARY OF WORK

Irvington Union Free School District
Facilities Storage Building at Irvington Campus
Facilities Storage Building
SED No.: 66-04-02-02-2-022-001

H2M

2. Guidelines and requirements of the New York State Department of Environmental Conservation (NYSDEC).
3. Guidelines and requirements of the local Health Department.
4. Local laws and ordinances of the Westchester County and the New York State.
5. Local gas utility requirements for new services, connections, alterations and related work.
6. The contractor shall adhere to all New York State Education Department requirements, including but not limited to NYCRR, Title 8, Chapter 2, Part 155.5 - Uniform Safety Standards for School Construction and Maintenance.

1.08 PARTIAL LISTING OF OVERALL CONTRACT REQUIREMENTS

- A. The Contract Documents detail the work included in the Contract. Related requirements and conditions covered by the Contract Documents include, but is not limited to, the following:
 1. Debris removal and daily and final cleaning up.
 2. Coordination with the Owner and other contractors who have been awarded work by the Owner.
 3. Coordination with utility companies necessary to schedule connection of services, and management of the installation.
 4. Site utilization and management so as not to disrupt the Owner's ability to operate the existing facilities in a safe and efficient manner.
 5. Maintain the Owner's ability to operate the facility at all times during the construction period.
 6. Facilities to be used during the contract period that are to be used by the Owner or his representatives and others involved with constructing the project.
 7. Product and equipment storage and handling requirements.
 8. Starting and adjusting of the equipment and systems required under the project.
 9. Site safety in accordance with all applicable federal, state, and local regulations.
 10. Project submittals, testing services, work plans, schedules, shop drawings, closeout procedures and documents, manuals, as-built drawings, final commissioning, of the work shall be provided as required by the Contract.
 11. Provide and maintain, at all times, temporary roadways for site access to all parties involved with the project.
 12. Sequence and schedule the construction so that new facilities come on-line before pre-existing facilities are demolished, dismantled or taken offline.
 13. Temporary facilities and controls necessary to construct the project and to maintain permit levels of sewage treatment at all time.
 14. Site utilization and management so as to allow other prime contractors to perform work in conjunction with this project and to afford them equal opportunity and space to complete their contractual obligations with the Owner as solely defined by the Architect.
 15. To not hinder the Owner's ability to deliver a safe and potable water supply.
 16. To not hinder the Owner's ability to maintain permit levels of sewage treatment at all times.
- B. The Owner has or will award other construction contracts associated with this project.
- C. Each Contractor shall coordinate the work between the various construction contracts, through the Owner/Architect, as required to complete the contract requirements in accordance with the requirements contained in Section 013100.

1.09 OWNER SUPPLIED PRODUCTS AND UTILITIES

- A. The Owner will not be supplying equipment, labor, or tools for the project.

- B. The Owner will be supplying products or materials for the project as follows:
- C. The Owner will pay for electricity usage. The restrictions on electrical usage shall be as follows:
 - 1. Power tool usage during specified working hours will only be permitted.
 - 2. Dewatering and trash pumps and portable heaters will not be permitted.
 - 3. Sump pumps, if less than 1/3 horsepower will be allowed. Only two (2) sump pumps will be permitted to operate at the same time.
 - 4. Power to help cure concrete or painting systems will not be permitted.
- D. The Owner reserves the right to stop paying for electrical usage at any time if, in the opinion of the Owner/Architect, the Contractor causes excessive electrical charges or does not conserve electricity to the maximum extent possible in the opinion of the Architect. All Contractors shall conserve electricity during the course of construction.

1.10 EXISTING CONDITIONS

- A. The Drawings show certain information that has been obtained by the Owner regarding various conditions that exist at the location of the project both below and at grade.
- B. The Owner and the Architect expressly disclaims all responsibility for the accuracy or completeness of the information given on the Drawings with regard to existing facilities.
- C. In the case where the Contractor discovers an obstruction not indicated on the Drawings or not described via specification reference, then the Contractor shall immediately notify the Architect of the obstructions' existence.
- D. The Architect will determine if the obstruction is to be relocated or removed.
- E. Compensation for this extra work will be paid for in accordance with the provisions in the Contract for "Extra Work".

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Site access and control of areas outside of site.
- B. Contractor use of the premises.
- C. Contractor storage, parking and deliveries.
- D. Work hours, employee conduct and miscellaneous employee requirements.
- E. Contract requirements related to maintaining Owner's current operations and excess inspection required.

1.02 SITE ACCESS AND CONTROL

- A. Contractors shall use the designated entrance to the site as shown on the drawings. If no site entrance is designated, Contractors shall use an entrance designated by the Owner's Construction Representative.
 - 1. The Owner may permit, solely at the Owner's discretion, the temporary use of another entrance for site access.
 - 2. The Owner will only review requests made by the Contractor for an exception to the designated site entrance if made in writing at least 72 hours in advance of each of the times desired for use.
- B. All contractors to maintain the entrance area clear of materials, vehicles and any other obstacle or debris. Failure to do so will result in a minimum back charge of \$750 per occurrence.
- C. The area around the site is a residential neighborhood. The Owner intends to be a good neighbor. Contractors shall not close any road for any period in time. The Contractors shall take whatever measures are necessary to not cause any inconvenience to the area's residents
- D. All Contractors are responsible to employ methods to prevent construction materials and/or debris from leaving the site. All Contractors are responsible to routinely monitor the areas surrounding the site during the day as well as at the end of the work-day and to immediately clean up any area to its previous condition.
- E. The Contractors shall employ methods to prevent the transmission of dirt from vehicles driving on exposed areas of the site from reaching the surrounding roadways. The Contractors will be responsible to immediately clean the roadway, should the measures being taken by the Contractors not satisfactorily control the transmission of any dirt to the roadway.
- F. Any damages to areas outside the site, spills of soil, liquid, or any other material shall immediately be repaired, cleaned and restored to its previous condition.
- G. The Contractors shall comply with all state and local requirements for allowable weight limits of vehicles on all roads.
- H. The Owner reserves the right to back charge the Contractors for all costs associated with maintaining the grounds as well as maintaining areas outside the site, which may be disturbed by the Contractors should the Contractors fail to maintain or repair the aforementioned in a condition acceptable to the Owner.

- I. The Contractor shall not close any road for any period in time unless approved ahead of time by appropriate road agency. The Contractor shall take whatever measures are necessary to not cause any inconvenience to the area's residents.
- J. The Contractor shall maintain the premises in a safe condition throughout the construction period. Compliance with OSHA regulations and site safety shall be the responsibility of the Contractor as it relates to work of the Contract. The posting of all applicable OSHA safety signs shall be the responsibility of the Contractor.
- K. Contractor shall be responsible for protecting private property. All existing buildings, structures, shrubs, trees, lawn fixtures, sculptures and misc. equipment shall be protected at all times. Any removals or relocation of said objects, if allowed shall be as directed by the Architect or District. Contractor shall protect all of the physical structures, property and improvements from damage by their Work and shall immediately repair or replace damage caused by construction operations, employees or equipment employed by the Contractor. All labor, materials and equipment and outside contractors that are employed by the Owner to repair damage caused by the Contractor shall be billed to the Contractor directly or withheld from money due the Contractor for work already completed.
- L. Keep all existing driveways, roads, and parking areas free and clear of materials and equipment. Do not unreasonably encumber the work area with materials and equipment.
- M. Immediately remove excess excavated material or relocate to areas on the site requiring placement of fill. Do not stockpile excess material.
- N. The Contractor is responsible for cleaning up the work area. Failure to maintain a clean work site daily, will result in others performing the work and the Contractor being back charged for the cleaning cost plus construction administration fees.
- O. Do not discard or dispose of any waste on-site.
- P. The Contractor shall be responsible for managing dust.

1.03 CONTRACTOR USE OF THE PREMISES

- A. Premises, for the purpose of this Contract, shall mean the site, buildings and other structures located within the property line or in any temporary or permanent construction easements identified on the plans.
- B. The Contractors shall use and manage the premises and the associated construction activities as follows:
 - 1. To not hinder the Owner's ability to operate their facilities.
 - 2. To allow other Prime Contractors to install their work and complete their contractual obligations in the time period specified.
 - 3. To allow for stockpiling of construction material and debris without any significant hardship, as defined by the Owner's Construction Representative, on the Owner or other contractors.
 - 4. To allow for the stockpiling of excavated soil and imported fill, when called for, without any significant hardship, as defined by the Owner's Construction Representative, on the Owner or other contractors.
 - 5. To allow utility companies to install their work.

WORK RESTRICTIONS

H2M

Irvington Union Free School District
Facilities Storage Building at Irvington Campus
Facilities Storage Building
SED No.: 66-04-02-02-2-022-001

6. To allow for the delivery of equipment and materials by independent trucking companies by leaving enough space for backing in and out of areas.
 7. To allow for the safe, unimpeded travel way of the Owners vehicles, Owner's Construction Representative's vehicles, Architect's vehicles, construction vehicles and heavy construction equipment about the entire site.
- C. Contractors shall maintain the premises in a safe condition throughout the construction period. Compliance with OSHA regulations and site safety shall be the responsibility of the Contractor as it relates to work of the Contract. The posting of all applicable OSHA safety signs shall be the responsibility of the Contractors.
- D. The Contractor shall provide temporary handrails, as required, for their work or for work put in place by their Contract that will require temporary handrails. Construction of temporary handrails shall be as specified in Section 015000.
- E. Contractors shall be responsible for protecting Owner's property. All existing buildings, structures, shrubs, trees, lawn fixtures, sculptures and misc. equipment shall be protected at all times. Any removals or relocation of said objects, if allowed shall be as directed by Owner's Construction Representative.
- F. Contractors shall protect all of the physical structures, property and improvements upon the site from damage by their Work and shall immediately repair or replace damage caused by construction operations, employees or equipment employed by the Contractor. All labor, materials and equipment and outside contractors that are employed by the Owner to repair damage caused by the Contractor shall be billed to the Contractor directly or withheld from money due the Contractor for work already completed.
- G. Keep all existing operations areas, driveways, roads, and parking areas free and clear of materials and equipment. Do not unreasonably encumber the site with materials and equipment. Confine stockpiling of excess excavated material, materials and equipment to areas selected under the Site Utilization Plan or as designated by the Owner's construction representative. Locate storage sheds and trailers to areas designated in the plan or by the Owner's Construction Representative.
- H. Immediately remove excess excavated material or relocate to areas on the site requiring placement of fill. Do not stockpile excess material on the site.
- I. The construction site space is limited and it shall be the General Contractor's responsibility to manage the site during the entire construction period with input from all concerned parties as to meeting their needs. Equal consideration of the needs of others with that of the Contractor's shall be provided as judged by the Owner.
- J. Due to the limited site area available for construction, staging areas shall be relocated several times during the various stages of construction. Additional compensation for relocating staging areas, equipment and material storage, and trailers are not to be considered an extra cost to the Contractor as this is an anticipated expense that shall be considered at the time of the bid.
- K. Contractors are responsible for cleaning up their own materials and debris. Failure to maintain a clean work site daily, will result in other performing the work and Contractors being back charged for the cleaning cost plus construction administration fees.

- L. Use of the existing building facilities during construction is prohibited including but not limited to: toilet rooms, telephone and water fountains. Contractors shall be fined (\$250) per occurrence if their employee (or subcontractor's employee) is observed disregarding these rules.
- M. Should it become necessary to access the existing building during construction hours for measurements or other non-disruptive work, the contractor shall be escorted by an Owner's Construction Representative.
- N. Refer to Section 015000 - Temporary Facilities and Controls for minimum rubbish removal requirements.
- O. Do not discard or dispose of any waste on-site.
- P. Open fires will not be permitted on the site.
- Q. The Sitework Contractor shall employ erosion control measures to protect wetlands located adjacent to the work where shown on the Drawings and as required by regulatory agencies.
- R. Install erosion control measures as indicated in the Contract. The Contractor shall confine stormwater runoff to the site.
- S. The General Contractor shall be responsible for managing dust as specified in Section 015719.

1.04 CONTRACTOR STORAGE, PARKING AND DELIVERIES

- A. Contractors must provide exterior storage containers when required. Final location of storage container shall be determined by the Owner.
- B. Do not unreasonably encumber the premises with materials and equipment. Do not store material in existing buildings. Store all equipment and materials to allow the Owner's employees to operate and conduct their business safely.
- C. Confine premise storage areas to locations designated by the Owner. Immediately repair or replace damaged facilities to the satisfaction of the Owner and to a condition that existed before the damage occurred as determined by preconstruction photographs, or if photographs are unavailable, to that deemed by the Owner.
- D. No materials storage will be permitted within the buildings at any time during construction.
- E. Storage of chemicals and paint materials shall be outside the existing or new structures and shall follow manufacturer's storage/handling guidelines.
- F. Compressed gas containers shall be properly stored and secured per OSHA, to the satisfaction of the Owner. Failure to do so will result in a \$250 back charge, per occurrence.
- G. Contractors shall provide minimum of 48 hours advance written notice to the Owner's Construction Representative for deliveries of materials, site visits by inspectors, manufacturer's representatives or any other occasion that impacts the use of the site. Contractors shall be responsible for any costs that are incurred by the owner, for failure to meet previously agreed upon appointments or work schedules.

- H. Deliveries sent to the Owner 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.
- I. Night deliveries of equipment (past the designated quitting time) will not be permitted. Do not schedule trucking companies to deliver equipment or wait for the job site to open. Delivery trucks shall not obstruct the site entrance, shall not sit within the neighborhood causing an obstruction or perceived nuisance, nor be left idling on or off the site for any period of time.
- J. Parking shall be in the designated areas of the site only. All automotive type vehicles are to be locked when parked or unattended to prevent unauthorized use. Do not leave vehicles or equipment unattended with the motor running or the ignition key in place. Any vehicles or trucks in non-designated areas may be towed at contractor's expense.

1.05 WORK HOURS, EMPLOYEE CONDUCT AND MISCELLANEOUS EMPLOYEE REQUIREMENTS

- A. The Contractors will be permitted to schedule working days and hours as specified in the General Terms and Conditions, if no times are specified therein then the work hours shall be Monday - Friday 8:00 am - 4:00 pm.
- B. Employees are to act in a professional manner. Any employee using inappropriate language or who is disruptive to the work environment will be banned from the site.
- C. Proper work attire is required. Shirts are to be worn at all times and no short pants are permitted.
- D. Employees shall not converse with local residents or Owner's employees.
- E. Any employee found under the influence of any drug or alcohol will be banned from the site.
- F. The Contractors shall schedule working days and hours as specified. The contractor shall pay all excess costs for working beyond the times specified. This includes the cost of the owner's employees to keep the building/site open and/or the cost of the additional services for the construction manager.

1.06 CONTRACT REQUIREMENTS RELATED TO MAINTAINING OWNER'S CURRENT OPERATIONS AND EXCESS INSPECTION REQUIRED

- A. The Contractor shall schedule working days and hours as specified. The Contractor shall pay all excess costs for inspection services provided by the Owner/Architect for working beyond the times specified.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Site Utilization Plan requirements

1.02 SITE UTILIZATION PLAN REQUIREMENTS

- A. The Contractor shall prepare a Site Utilization Plan (SUP) showing staging areas, parking areas, stockpile areas, debris container areas, unloading areas, and trailer areas for review by the Architect and Owner's Construction Representative. The length and number of meetings necessary to develop and adopt a SUP shall be as required.
- B. Meetings will be held at the site with all concerned parties to assist the Contractor in developing the criteria for the plan. During these meetings, all parties will present their needs and requirements for site utilization. Representatives from the local municipality or utility companies may be attending. The requirements of the local municipality and utility companies shall be incorporated into the SUP.
- C. The Contractor shall then prepare a draft site plan that attempts to incorporate the needs of all concerned parties. Another meeting will then be held at the site to review and present the plan. The plan shall then be revised at that meeting and adopted for use if it is acceptable to all relevant parties. If all parties cannot agree on an acceptable plan, then the Owner's Construction Representative will establish the Site Utilization Plan without any claims from any contractor.
- D. The Contractor, by submitting a bid, understands the importance of a workable Site Utilization Plan and also understands that the Owner's Construction Representative may be required to select a plan for the contractor to adopt that is not ideal to the planned construction activities anticipated before the bid was submitted. There shall be no claims for damages associated with site utilization.
- E. If the General Contractor fails to prepare the Site Utilization Plan as stipulated above, then the Owner reserves the right to back charge the Contractor for the costs associated with having a Site Utilization Plan developed.
- F. If a Prime Contractor fails to participate or attend the meetings scheduled to develop the Site Utilization Plan then the Prime Contractor will forfeit any right to comment on the plan that is developed.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Allowance pricing for the following items:
 - 1. General Contingency Account.
- B. This Section covers the requirements for use of the cash allowances listed above contained in the proposal (Bid Forms, Price Schedule) and included in the Contract Price bid by the Contractor and defines and stipulates the charges that will be paid for out of the stipulated allowances.
- C. The Contractor shall include the cash allowances stipulated in this Section in the amount bid (Base Bid).
- D. Eligible costs described in this Section, and Sections referenced herein, will be the only costs paid for out of the stipulated allowances.
- E. All other costs associated with the project as specified and/or shown, including but not limited to the delivery, installation and all Contractor overhead and/or collateral expenses are to be distributed among the other portions of the work and shall be included in the lump sum base bid.

1.02 SUBMITTALS

- A. Make all submissions under the provisions of Section 013300.
- B. For each type of product/material specified to be furnished under allowance pricing provide documentation of the unit pricing on manufacturer's letterhead certifying pricing of the product/material.
- C. Submit additional backup information to substantiate the invoiced amount(s) as the Architect may require for review and approval, prior to order or payment of item.
- D. Provide written breakdowns for extra work as the Owner may require.

1.03 CHANGES TO STIPULATED (CASH) ALLOWANCE

- A. If the actual cost of services differs from the cash allowance, then the Contract Price will be adjusted accordingly.

1.04 PAYMENTS TO BE MADE OUT OF CONTINGENCY ACCOUNT

- A. Include the cash allowance as shown in the proposal, in the amount bid for use upon the Owner's instructions.
- B. The Owner will draw funds from the contingency account only upon prior written approval by the Owner's Construction Field Representative and Architect.
- C. Funds remaining at project closeout shall be credited to the Owner.

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PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

UNIT PRICES

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PART 1 - GENERAL

1.01 DESCRIPTION

- A. This Section specifies the requirements for measurements and records made for payment purposes and describes the item(s) under which payment(s) will be made for the Work performed under this Contract.
- B. All work shown or specified in the Contract Documents shall be performed.
- C. Items not specified to be measured or paid for (for which no specific pay item exists in the Price Schedule) shall be included in an appropriate unit price item or in a lump-sum item.
- D. Comply with the requirements pertaining to the restoration of all surfaces, which may or may not be paid for under a separate unit price item, and which shall be restored to a condition equal to or better than that existed prior to work starting under this contract.

1.02 MEASUREMENT REQUIREMENTS

- A. All required measurements shall be made by the Contractor with the Architect.
- B. Any measurements not witnessed by Architect and which cannot be verified or substantiated by Architect will not be approved and payment under the item(s) requiring such measurements will not be made.
- C. Coordinate measurements monthly, for the preparation of periodic pay estimates.
- D. Where payments will be made for removing rock and existing materials, notify Architect so that he may witness the measurements.
 - 1. All materials removed without conforming to the above procedures, which Architect cannot verify or substantiate, will not be paid for.
 - 2. Maintain complete, neat, clean, and legible field notes for all measured items.
 - 3. Notes shall contain spaces for Contractor's and Architect's signatures plus additional space for comments.
 - 4. An original and a carbon copy shall be made for all notes and one copy shall be turned over to Architect daily.
 - 5. The Architect's signature shall not be constituted as an acceptance of the work, or the measurements made, but shall mean that he was present when the measurements were made.

1.03 SUBMITTALS

- A. See Section 013300.
- B. Field notes of all measurements for payment purposes delivered to Architect daily.
- C. Copies of all invoices required for payments out of cash allowance(s).
- D. Monthly Applications for Payment.
- E. Record Drawings showing the locations and quantities of all items measured for payment purposes.

1.04 SCHEDULING

- A. Notify Architect, as far in advance as possible, of the recording of measurements so that a representative of the Architect may observe existing conditions, work being performed, and measurements being made.
- B. Allow for and afford Architect ample time, space, and equipment to observe measurements and to verify measurements and elevations.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Provide all labor, materials, facilities, levels, measuring devices and all other equipment and items necessary to properly and accurately perform all measurements for payment purposes.
- B. Payment for certain items not specifically listed in the bid forms but otherwise required by the technical specifications shall be deemed included as part of the General Conditions and the individual unit price and lump sum bid items provided for in the proposal.

PART 3 - EXECUTION

3.01 GENERAL

- A. Perform all measuring required under this Section.
- B. Record all measurements and calculated quantities on the Record Drawings.
- C. No measurement shall be made for work performed within the limits of Lump Sum Items.

ITEM NO.	ITEM DESCRIPTION
1	

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. **This Section includes the requirements for substitution of specified products during construction.**
- B. *The Architect will consider requests for substitutions only within **two (2)** business days following the Bid Opening.*
- C. Only products not specifically named in the bid are eligible for substitution in accordance with the requirements contained herein these specifications.
- D. Products named by the Bidder, at the time of bid, shall be furnished and installed and substitutions will not be considered by the Owner/Architect for those products named in the bid.

1.02 CONTRACTOR'S OPTIONS

- A. For products specified only by reference standard, select any product meeting that standard.
- B. For products specified by naming several products or manufacturers, select any one of the products or manufacturers named which complies with the Specifications.
- C. Where products are not named, then submit products that meet the specifications.

PART 2 - PRODUCTS

2.01 SUBSTITUTIONS

- A. Name - The Drawings and Specifications list acceptable manufacturers, commercial names, trademarks, brands and other product, material and equipment designations. Such names are provided to establish the required type, quality and other salient requirements of procurement.
- B. Equals - An item equal to that named or described on the Drawings or in the Specifications may be provided by Contractor if accepted in writing by the Architect.
- C. A request for product substitution constitutes a representation that the Contractor:
 - 1. Has investigated proposed Product and determined that it meets or exceeds the quality level of the specified Product.
 - 2. Shall provide the same warranty for the Substitution as for the specified Product.
 - 3. Shall coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner, including extra charges by other Prime Contractors, material suppliers, and vendors.
 - 4. Waives claims for additional costs or time extension that may subsequently become apparent.
 - 5. Shall reimburse the Owner for review or redesign services associated with re-approval by authorities, if required.
 - 6. Shall reimburse the Owner for all additional A/E services needed by the Architect for extra services associated with the review of the Contractor's substituted item since it could not have been originally included in the Architect's professional engineering services agreement. Reimbursement shall be based on the man-hours expended, at current billing rates.

- D. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.
- E. Substitution Submittal Procedure:
 - 1. The Contractor shall submit three (3) copies of the REQUEST FOR SUBSTITUTION FORM for consideration including all required information.
 - 2. The Contractor shall use the form included within this Section.
 - 3. All forms shall be type written.
 - 4. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence.
- F. The burden to prove product equivalence rests on the Contractor.
- G. The Architect will notify Contractor in writing of decision to accept or reject request and at that time the Contractor can make a formal submittal in accordance with the requirements contained in Section 013300.
- H. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor or the Architect.
- I. **Refer to the general conditions for additional requirements.**

PART 3 - EXECUTION

NOT USED

This space left intentionally blank.

REQUEST FOR SUBSTITUTION FORM

Project: Facilities Storage Building at Irvington Campus Substitution Request Number: _____

Contractor: _____

Address: _____

To: _____ Date: _____

H2M Project Number: IRSD1903 Owner: Irvington Union Free School District

Contract Name: _____ Contract No.: _____

Specification Title: _____

Section: _____ Page: _____ Article/Paragraph: _____

Drawing No(s): _____

Proposed Substitution: _____

Manufacturer: _____ Address: _____

Trade Name: _____ Phone #: (____) _____

Installer: _____ Address: _____

Phone #: (____) _____

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

Differences between proposed substitution and specified product:

___ Point-by-point comparative data attached

Reason for not providing specified item (Attach separate sheet if necessary):

Typical Similar Installation:

Project: _____

Engineer / Architect: _____

Address: _____

Owner: _____

Date Installed: _____

Submit complete installation list on separate sheets.

Proposed substitution affects other parts of Work: ☐ No ☐ Yes

Explain: _____

Gross Savings to Owner for accepting substitution: \$ _____

Proposed substitution changes Contract Time: ☐ No ☐ Yes

Add / deduct (circle): _____ days

Supporting data attached for evaluation of the proposed substitution:

☐ Product Data ☐ Photos ☐ Drawings ☐ Tests ☐ Reports ☐ Samples

☐ Other (explain): _____

Attached data includes description, specifications, drawings, photographs, performance and test data adequate for evaluation of request; applicable portions of data are clearly identified.

Attached data also includes a description of changes to Contract Documents that proposed substitution will require for its proper installation.

The undersigned certifies that the following paragraphs, unless modified by attachments, are correct:

1. Proposed Substitution has been fully checked and coordinated with Contract Documents.
2. Proposed Substitution does not affect dimensions shown on Drawings.
3. Proposed Substitution does not require revisions to any other Prime Contractor's work.
4. The undersigned will pay for changes to building design, including Architectural and Engineering design, detailing, and construction costs caused by requested Substitution.
5. Proposed Substitution will have no adverse affect on other trades, construction schedule, or specified warranty requirements.
6. Maintenance and service parts will be locally available for proposed substitution.
7. The undersigned further states that the function, appearance, and quality of proposed Substitution are equivalent or superior to specified item.

This request for product substitution also constitutes a representation that I, as the Contractor:

1. Has investigated proposed Product and determined that it meets or exceeds the quality of the specified Product.
2. Shall provide the same warranty for the Substitution as for the specified Product.
3. Shall coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner, including extra charges by other Prime Contractors, material suppliers, and vendors.
4. Waives claims for additional costs or time extension that may subsequently become apparent.
5. Shall reimburse the Owner and the Architect for review or redesign services associated with re-approval by authorities.
6. Shall reimburse the Owner for all additional engineering services claimed by the Architect for extra services associated with the review of the Contractor's substituted item since it could not have been originally included in the Architect's professional engineering services agreement. Reimbursement shall be based on the man-hours expended, at current billing rates.

Contractor's Authorized Representative (Typewritten): _____

Authorized Signature: _____

Date: _____

END OF SECTION

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work under this Section specifies the procedures used to process partial payments and the Final Payment Request.

1.02 SUMMARY

- A. This Section specifies administrative and procedural requirements governing each prime contractor's Applications for Payment.
 - 1. Coordinate the Schedule of Values and 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 01 - Section 013300 - SUBMITTALS.

1.03 TIME FOR COMPLETION

- A. Inasmuch as the provisions of the Contract relating to the time for performance and completion of the Work are for the purposes of enabling the Owner to proceed with the construction of a public improvement in accordance with a predetermined program, and inasmuch as failure to complete the Work within the period herein specified may result in damage or loss to the Owner, time is of the essence of the Contract.
- B. Time for completion of the Work shall be in accordance with that stipulated in the Contract Documents.
- C. The date for completion will be calculated from the date shown on the Notice to Proceed. The Contractor shall execute the Work with diligence from day to day, and complete it within the time fixed.
- D. For the purpose of defining the date of substantial completion, the Project will be considered complete when all Work covered by the Contract has been performed and all installations and equipment have been tested and are ready for permanent use. Contractor shall provide a copy of the final Certificate of Occupancy from the AHJ prior to issuance of the final payment. Removal of the Contractor's plant and equipment and other minor adjustments which do not prevent use of the Project will not be a factor in establishing the date of substantial completion.
- E. Notwithstanding the foregoing, the Architect will establish the date of substantial completion when the project is accepted and ready for operation, and no large or major items of work are as yet outstanding. At such time, the Architect will issue a punch list, itemizing the items of work remaining. The punch list will include "minor" items only, as defined solely by the Architect. Any prior punch lists, which include "major" or significant items, as defined by the Architect, shall not be a criterion in establishing the date of substantial completion.

1.04 PARTIAL COMPENSATION

- A. At the Owner's discretion, the Contractor may receive compensation for materials and products delivered to the site yet not installed providing:
 - 1. A canceled check or paid bill from the supplier is submitted to the Architect indicating that the Contractor has paid the supplier for the material or equipment.

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2. The material or piece of equipment is properly stored and protected from the elements and/or vandalism in accordance with the manufacturer's written requirements for long term storage.
 3. A certificate of insurance is provided for the material or piece of equipment in the event of a fire, vandalism, theft, etc.
 4. A bill of material is delivered to the Architect at the time of delivery itemizing the subject material or equipment. Payment will be made for on-site material and/or equipment in the amount of 80% of the gross amount of the paid invoice. This payment will be subject to the normal retainage of the partial estimate.
 5. The Architect has agreed to the pre-purchasing of the materials.
- B. The Contractor may not receive compensation for materials and products stored in the Contractor's yard or shop unless permitted by the Owner.

1.05 SCHEDULE OF VALUES

- A. Coordination: Contractor shall coordinate preparation of its Schedule of Values for 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 (SOV) to the Owner's Construction Representative within 10 days of receipt of Letter of Intent but no later than 10 days before the date scheduled for submittal of the initial Applications for Payment. (SOV received after the 15 day of the month, will not be accepted for review until the following month to allow for computer system input time required by the Owner's Construction Representative and the Owner.
- 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 item for each Specification Section.
1. Identification: Include the following Project Identification on the Schedule of Values:
 - a. Project name and location. (Each school and additions / renovations will require separate breakdown sections and front end with subtotals.
 - b. Name of the Architect.
 - c. Architect's Project Number.
 - d. Contractor's name and address.
 - e. Date of Submittal.
 2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of 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.

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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 where requested by Owner's Construction Representative. Multiple line items will be provided for amounts in excess of five percent of the contract sum, broken out into sub components equating not greater than five percent each. Separate all line items by material & labor.
 - a. Breakdown shall be separated between additions and renovations with subtotals for each.
4. In addition to the breakdown of specification sections , separate line items will be required for the following front-end line items:
 - a. Bonds & OCP insurances shall have separate line items. (substantiation letters shall be required from bonding & insurance company for any amounts higher than industry standard). Only OCP insurance shall be allowed for the insurance line item. All other insurance costs must be distributed by contractor throughout the various sections.
 - b. Supervision: include a minimum of one percent of contract value.
 - c. Project Administration: include a minimum of one percent of contract value.
 - d. Project meetings (appropriate value for weekly attendance for entire duration of project - see Section 013119 Progress Meetings).
 - e. Punchlist - include a minimum of two (2) percent of contract sum.
 - f. Closeout: separate lines for demobilization, Operation & Maintenance manuals, closeout paperwork and Demonstration & Training. All totaling a minimum two (2) percent of the Contract value.
 - g. Continuous Clean-up and Final Clean-up values each at a minimum of one half percent (0.5 % of the Contract value).
 - h. The General Construction Contractor shall add a line item for broom sweep/ damp mopping at an agreed to value.
5. Round amounts to nearest whole dollar; the total shall equal the Contract Value.
6. Provide a separate line item in the Schedule of Values (SOV) for each part of the Work where Applications for Payment may include materials or equipment, purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. Include requirements for insurance and bonded warehousing.
7. 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.
8. 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.
9. 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 expenses, at the discretion of the Contractor.
10. 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 Value.

1.06 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 the 21st day of each month (or as designated by the Owner). The period covered by each Application for Payment is the previous month.
- D. Payment-Application Forms: Use AIA Document G732/CMA (include line for Owner's Construction Representative signature) 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(s) 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 Owner's Construction Representative 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 Allowances issued prior to the last day of the construction period covered by the application. (No Change order or Allowance requisitions can be made or listed on the requisition, unless the formal Change Order and Allowance paperwork has been fully executed by Contractor, Owner's Construction Representative, Architect and Owner).
 - 3. Provide copies of payrolls which are signed and notarized documenting compliance with prevailing wage laws. Payrolls for contractors are required from the of the previous month to the 24th day of the current month. Payrolls for subcontractors are required from the 15th day of the previous month to the 14th day of the current month.
 - 4. Provide copies of Lien Waivers for the previous payment (or anticipated payment). Include certificate of monthly payment for subcontractors for the previous month.
 - 5. Provide OSHA 10 certificates for all workers on site.
 - 6. Payment for stored materials (whether on-site but not installed, or offsite in a secured warehouse) will require a Bill of Lading showing the exact value accompanied by photographs of the actual materials. In no case shall more that 80% be approved for uninstalled stored materials. An Insurance certificate must be provided, specific to the materials stored with the appropriate dollar value (for on-site or offsite materials).
- F. Transmittal: Submit three (3) signed and notarized original copies of each Application for Payment to the Owner's Construction Representative by a method ensuring receipt within 24 hours. Each copy shall be complete and securely attached and shall include all waivers of lien, certified payrolls and similar attachments.

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1. Transmit each copy with a transmittal form listing attachments and recording appropriate information related to the application, in a manner acceptable to the Architect and Owner's Construction Representative.
- G. Waivers of Mechanics Lien: With each Application for Payment, submit waivers of mechanics liens 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 items listed below. The initial payment application will not be processed until all of these actions and submittals have been received by the Owner's Construction Representative. When preliminary submissions are received with the initial application (item 4 and item 7 listed below), the final submission for these items must be received and approved by the Owner's Construction Representative 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.

1.07 ACCEPTANCE OF FINAL PAYMENT REQUEST

- A. The Contractor shall be conclusively deemed to have accepted the Final Payment Request as a correct statement of the total liability of the Owner and of the compensation paid and to be paid to the Contractor by the Owner unless within seven (7) days after delivery of his copy of the

Final Payment Request to him, the Contractor shall return such copy to the Owner together with a statement of his objections to such request and of any claim for damages or compensation in excess of the amounts shown on the Request. The acceptance by the Contractor of the Final Payment Request approved by the Owner shall constitute a release and shall discharge the Owner from all further claims by the Contractor arising out of or relating to the Contract, including but not limited to, a release from all impact costs.

1.08 SCOPE OF PAYMENTS

- A. The Contractor shall receive and accept the compensation as herein provided, in full payment for furnishing all materials, labor, tools, and equipment and for performing all work contemplated and embraced under the Contract, also for all loss or damage arising out of the nature of the Work or from the action of the elements, or from any unforeseen difficulties or obstructions which may arise or be encountered during the prosecution of the Work, and for all risks of every description connected with the prosecution of the Work, until its final acceptance by the Owner, also for all expenses incurred by, or in consequence of, the suspension or discontinuance of the said prosecution of the Work as herein specified, and for all actual or alleged infringements of patent, trademark, or copyright, and for completing the Work and the whole hereof, in an acceptable manner, according to the Plans, Specifications, and other Contract Documents. The payment of any partial or final estimate shall in no way or in no degree prejudice or affect the obligation of the Contractor, at his own cost and expense, to renew or replace all defects and imperfections, or damages. The Architect shall be the judge, and the said Contractor shall be liable to the Owner for failure so to do.

PART 2 - PRODUCTS

NOT USED.

PART 3 - EXECUTION

NOT USED.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Schedule of Values

1.02 SCHEDULE OF VALUES

- A. Submit for approval prior to the start of the work a Schedule of Values that indicates a breakdown of the labor, materials and equipment and other costs used in the preparation of the bid. This schedule shall be in sufficient detail to indicate separate figures for such items as excavation, concrete, equipment and all other items making up the lump sum price. The cost breakdown shall be separately itemized for each lump sum bid item in the project.
- B. Where the cost breakdown includes items for bond payment, insurance payment, job set-up, or job mobilization, these items will be paid based on paid invoices and copies of cancelled checks.
- C. Submit a Schedule of Values to the Architect for review and approval within fifteen (15) calendar days from the date shown on the Notice to Proceed.

1.03 FORM OF SUBMITTAL

- A. Submit typewritten Contract Cost Breakdown on AIA Form G703 - Application and Certificate for Payment Continuation Sheet or EJCDC 1910-8-E. The Architect reserves the right to revise the form or provide a form prepared by the Architect.
- B. Use the Table of Contents of the Contract Specifications as a basis for format for listing costs of work for Sections under Divisions 01-48 as sections apply to work. Not all Sections need be assigned a breakout price as determined by the Architect.
- C. Identify each line item with number and title as listed in Table of Contents.
- D. Provide dollar values for each line item for labor, overhead, profit, material, and equipment components for each category of work if requested by the Architect.
- E. List quantities of materials specified under unit price allowances.
- F. The Schedule of Values, after approval by the Architect, shall be the basis for the Contractor's Application for Payment.
- G. The first Application for Payment will not be reviewed prior to an approved breakdown.

1.04 PREPARATION OF SCHEDULE OF VALUES

- A. In addition to the above, provide a separate line item cost for each of the following items which shall be supported by proof where requested by Architect:
 - 1. Performance and payment bonds.
 - 2. Insurance.
 - 3. Mobilization and Demobilization (Amounts shall be equal in value).
 - 4. Temporary facilities and measures as specified in Section 015000.
 - 5. Project Coordination Meetings as specified in Section 013100.

SCHEDULE OF VALUES

H2M

Irvington Union Free School District

Facilities Storage Building at Irvington Campus

Facilities Storage Building

SED No.: 66-04-02-02-2-022-001

6. Preparation of the Project Construction Schedule, and updates, as specified in Section 013300.
7. Preparation of Weekly Schedules as specified in Section 013100
8. Rubbish removal and daily cleaning up. (Provide a total dollar amount and a daily rate for each calendar day during the contract period.)
9. All Cash Allowance items as contained in Section 012100.
10. On-site, full time superintendent starting on the date of the Notice To Proceed and ending on the date that all punch list items are completed, which for the purposes of the Schedule of Values, shall be the contract completion date.
11. Final cleaning.

B. Show total costs including overhead and profit.

C. Provide additional details and data to substantiate the cost breakdown as requested by the Architect.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Work of this Section includes:
 - 1. Requests for Interpretation or for information
 - 2. Coordination between contractors, if applicable
 - 3. Administration of subcontracts
 - 4. Coordination of work with utility companies and the Owner/Architect
 - 5. Communication and coordination requirements
 - 6. Qualifications of Contractor's job site superintendent
- B. Site staffing requirements for the Contractor's superintendent are also specified herein, the costs for which shall be included in the Contract price.

1.02 REQUEST FOR INTERPRETATION OR INFORMATION

- A. The Contractor shall use the Request for Interpretation/Information Form included within this Section when the Contractor feels that additional information is needed to perform the work of the Contract.
- B. The Architect will respond to requests utilizing the form provided herein.
- C. The Architect's verbal response(s) to the Contractor's formal requests, if provided, shall not constitute an official response and if acted upon by the Contractor are done so at the Contractor's own risk and liability and shall not be subject to claims for additional compensation.
- D. A signed facsimile of the form will be accepted. The original of the form must be signed and provided to the project manager.
- E. The Architect will respond in writing to the request as soon as possible.

1.03 DAILY CONSTRUCTION REPORTS

- A. Prepare a daily construction report recording the following information concerning events at the site, and submit one copy to the Owner's Construction Representative by 10:00 a.m. the following day. Any contractor not submitting required reports will not receive approval of the subsequent application for payment until such time that all required information is submitted:
 - 1. List of subcontractors at the site.
 - 2. Count and names of personnel at the site.
 - 3. High and low temperatures, general weather conditions.
 - 4. Accidents and unusual events.
 - 5. Meetings and significant decisions.
 - 6. Stoppages, delays, shortages, and losses.
 - 7. Meter readings and similar recordings.
 - 8. Emergency procedures.
 - 9. Orders and requests of governing authorities.
 - 10. Change Orders received, implemented.
 - 11. Services connected, disconnected.
 - 12. Equipment or system tests and startups.
 - 13. Partial Completions, occupancies.
 - 14. Substantial Completions authorized.

1.04 COORDINATION BETWEEN CONTRACTORS

- A. During the progress of the Work, other Contractors may be engaged in performing other work or may be awarded other contracts for other work on this Project. Each Contractor shall coordinate all the work to be done with the work of each Contractor(s) through the Owner.
- B. Each Contractor shall fully cooperate with each other Contractor(s) and carefully fit its own work to that provided under other contracts as shown or specified in the Contract Documents and as may be coordinated by the Owner and as may be coordinated by the Owner/Architect
- C. Each Contractor shall not commit or permit any act that will interfere with the timely performance of work by any other Contractor.
- D. The Contractor shall conduct his/her own operations, and to cooperate with such other parties, so as to cause as little interference as possible with the work by others.
- E. The Contractor agrees to make no claim against the Owner/Architect for additional payment due to delays or other conditions created by the operation of others.
- F. If there is a difference of opinion as to the respective project rights of each Contractor doing the work, within the limits of or adjacent to the Project, the Owner/Architect shall decide as to the respective rights of the various parties involved in order to secure completion of the work in a satisfactory manner. The Owner/Architect's decision shall be final and binding on each Contractor.
- G. If any portion of the work of the Contractor, or any of his/her subcontractors, depends upon the proper execution of the work by others, the Contractor shall promptly give written notice to the Architect of all purported defects in the installed work as renders it unsuitable for proper execution and completion of his own work. The Contractor shall further notify the Architect of all supposed delays, in the performance of his/her work, as will affect the timely performance of his own work or the project.
- H. The Contractor's lack of notice shall constitute an acceptance by him/her that the work of others is fit and proper for the reception of the Contractor's own work, except as to defects developing in the work that could not have been reasonably foreseen.
- I. The Contractor's lack of notice shall also constitute an acceptance by him/her and an acknowledgement of the timely performance of work by other Contractors or the Owner and that no claims for additional compensation may result.
- J. If the Owner/Architect determines that the Contractor is failing to coordinate his own work with the work of others, then the Owner shall have the right to enforce the provisions of the Contract as related to non-performance.
- K. The Owner/Architect shall not be liable for any damages suffered by this Contractor by reason of any other Contractor's failure to comply with the directions so issued by the Owner/Architect, or by reason of another Contractor's default in performance; it being understood that the Owner does not guarantee the continued efficiency or work production of any Contractor and by execution of the Contract, the Contractor fully understood the potential coordination problems associated with projects involving multiple prime construction contracts.

- L. The Contractor's attention is specifically directed to the fact that he may not have exclusive occupancy of the work area within the limits of the Contract. Each Contractor shall afford the Owner, other Contractors, and utilities reasonable opportunity for the storage of their materials and equipment, and the execution of their work, and shall connect and coordinate his work with theirs as required by the Contract Documents.

1.05 SUBCONTRACTOR ADMINISTRATION AND COORDINATION

- A. Terms and conditions of the Contract shall be binding upon each subcontractor.
- B. Furnish each subcontractor and major equipment vendor at least one (1) copy of the Plans and Technical Specifications.
- C. Provide at least one (1) copy of each approved shop drawing to each subcontractor whose work may depend upon the contents of the shop drawing submittal. The Owner reserves the right to stop all work, without claims for delay, until such time as appropriate subcontractors are furnished with appropriate shop drawings.
- D. Each Contractor shall sequence and schedule the work of subcontractors. Coordinate construction and administration activities of subcontractors. The Architect and Owner will not accept telephone calls, facsimiles or office visits from any subcontractors on the project. Subcontractor and vendor questions and clarifications shall be directed to the Architect by the Contractor.
- E. The Contractor's on-site project superintendent shall inspect all the work of all of his/her subcontractors, as it is being constructed. The Contractor's subcontractor shall not be permitted to do any work on the site without the Contractor's job site superintendent also being there to inspect the work as it is being performed.

1.06 UTILITY COORDINATION

- A. Comply with the requirements of 16 NYCRR Part 753 - Protection of Underground Facilities. Submit a letter stating the case number.
- B. Comply with the utility coordination requirements contained in the General Conditions.

1.07 PUBLIC/PRIVATE UTILITIES

- A. Notify all public and private utilities in accordance with Article 20, Section 322-a of the New York State General Business Law for location and markout of existing utilities in the vicinity of the work.
- B. Repair all utilities damaged during the Work to the standards and approval of the respective utility at no cost to the Owner.

1.08 SPECIFIC COORDINATION REQUIREMENTS

- A. Sequence and schedule work so as not to interfere with the work by others. Coordinate the work of this Contract with the work by others. In case of conflicts due to improper coordination by the Contractor, the Owner/Architect's resolution will be final. No compensation will be awarded for extra work required to resolve conflicts.

- B. Coordinate space requirements, supports, and installation of mechanical, electrical and plumbing work which may be indicated diagrammatically on the Drawings. Follow routing shown for pipes, ducts, and conduit as closely as practicable. Place runs parallel with building lines. Utilize spaces efficiently to maximize accessibility for other installations, maintenance, and to facilitate repairs.
- C. In finished areas, except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of all fixtures and outlets with finish elements and work by all other trades.
- D. The Contractor shall sequence and schedule work so as not to interfere with the work by others and to afford each Contractor the time to complete their contractual obligations with the Owner. Coordinate the work of this Contract with the work by others. Coordination includes, but is not limited to, the following:
 - 1. Schedule work with all trades throughout the project to prevent interference.
 - 2. Accomplish work in coordination with the other Contractors in a manner that will allow each Contractor adequate time (at the proper stage of construction as determined by the Owner/Architect) to perform and complete the work of their contract.
 - 3. The Contractor shall annotate on each of his own shop drawings and submittals, information that is relevant to the work of others or where potential conflicts in the installed work may occur. The Contractor shall "bubble" in green ink the area of potential conflict so as to alert the reviewer.
 - 4. Each prime Contractor shall provide the Architect with a list of shop drawings that they may require to properly coordinate the work. If a list is not provided to the Engineer within fifteen (15) calendar days from the date of the Notice to Proceed, then it shall be taken that shop drawings of other prime Contractors are not required. Each prime Contractor shall be responsible for providing the list within the time specified.
 - 5. In case of conflicts due to improper coordination by any Contractor, the Owner/Architect's resolution will be final. No compensation will be awarded for extra work required to resolve conflicts or to coordinate the work of all contracts.
 - 6. Coordinate space requirements, supports, and installation of mechanical, electrical and plumbing work which may be indicated diagrammatically on the Drawings. Follow routing shown for pipes, ducts, and conduit as closely as practicable. Place runs parallel with building lines. Utilize spaces efficiently to maximize accessibility for other installations, maintenance, and to facilitate repairs.
 - 7. In finished areas, except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of all fixtures and outlets with finish elements and work by all other trades.
- E. Shop Drawings and Submittals Coordination Procedure:
 - 1. The Architect will forward copies of relevant shop drawings to all prime Contractors, whose work may be subject to that of others, as solely determined by the Architect.
 - 2. The Contractor shall then, within five (5) calendar days of receipt, review said shop drawings provided by the Architect for the purposes of resolving field and fabrication problems and as a way to coordinate the work.
 - 3. Immediately notify the Architect should a purported conflict in the work be discovered so that the Architect can investigate and take appropriate action.
 - 4. If a shop drawing was so provided by the Architect and a conflict in the work was not brought to the attention of the Architect, then the conflict shall be immediately corrected by the Contractor submitting the shop drawing.
- F. Each Contractor shall also coordinate the work by complying with the following:

1. Construction Schedule: Each Contractor shall provide a construction schedule as specified in Section 013216 - Construction Schedules.
2. Weekly Schedule: By 3:00 PM of each Friday during the construction period, each Contractor shall fax or email a typed memo addressed to the Architect/Owner's resident field engineer/inspector and designated office project manager summarizing the work for the following week. The memo shall also be faxed or emailed to the Owner. The memo shall briefly itemize the planned activities for the coming week. The memo shall also include a summary of expected material/equipment deliveries, concrete pours, utility tie-ins, excavated material removals and other heavy construction traffic that may impact the work activities for the coming week.
3. Email Account: Each Contractor shall maintain an email account that shall be used to improve communication. An email shall not constitute a formal advisement regarding the terms and conditions of the contract. Email shall only be considered an informal way of notifying relevant parties of project related activities.
4. Email List: Each Contractor, within five (5) calendar days from the Notice To Proceed, shall provide a list of email addresses for each major equipment supplier and local representative, if such exists. A contact person shall be provided for each email address.
5. Work Plan: All Contractors shall within five (5) calendar days from the date of the Notice to Proceed, submit to the Engineer a type written work plan in bullet format of the sequence of construction activities from start to finish of construction. A facsimile will not be accepted. All work plans shall include a description of the different major phases of construction as pertaining to the individual construction contract. As a minimum each work plan shall include the tasks and subtasks specified in Section 013216 for the project schedule.
 - a. Each Prime Contractor's work plan shall be complete and shall address every phase of the scope of the Contract.
 - b. Each Prime Contractor shall then prepare a construction schedule as specified below using the work plans prepared by others and his/her own.
6. Equipment and Startup Schedule: All Contractors shall also submit a preliminary equipment delivery schedule and a preliminary startup schedule for all equipment and systems being furnished under the Contract. This schedule shall be submitted within 30 calendar days from the date of the Notice To Proceed.
 - a. Include an early and late date for each item.
 - b. Indicate the time necessary to physically install and ready each item so that other work can be completed by other Prime Contractors.
 - c. The Engineer/Architect may waive this schedule if the Contractor has adequately shown the information on the construction schedule, in the opinion of the Engineer/Architect.

1.09 CONTRACTOR'S JOB SITE SUPERINTENDENT

- A. Each Contractor shall employ an on-site superintendent as specified herein below. He/She shall be a full-time employee of the Contractor.
- B. Each Contractor shall name the job site superintendent within five (5) days of the Notice To Proceed. A letter to the Architect shall be provided.
- C. He/She shall have the authority to sequence and schedule the work, and to staff the project, so as not to interfere with the work by others and to complete the work daily within the time so required.
- D. Each Superintendent shall have a minimum of five (5) years of experience as a job site superintendent for projects of equal size and complexity.

- E. Each superintendent shall be qualified to perform the duties so required to successfully complete the work in accordance with the Contract Documents.
- F. Each superintendent shall speak English. If required by the Architect, provide a resume for the proposed superintendent that shall be typed and shall list the qualifications of the superintendent. Prior to the Contractor assigning a superintendent to the project, he may wish to arrange an interview with the Architect to determine the proposed superintendent's ability to properly coordinate the work through the Owner/Architect. The Contractor shall employ a superintendent acceptable to the Owner.

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REQUEST FOR INTERPRETATION/INFORMATION (RFI)

OWNER'S NAME: Irvington Union Free School District

PROJECT NAME & CONTRACT DESIGNATION: Facilities Storage Building at Irvington Campus

CONSTRUCTION CONTRACT NO.: IRSD1903

Product, Item, or System:		
Request Date:		RFI No.:
Specification Section:		Paragraph Ref:
Contract Drawing Reference(s):		
Describe Request:		
Signed:	See Contractor's Attachments for Additional Description for Information	
Owner/Architect Response:		
Architect (Printed):	See Architect's Attachments for Additional Information	
Architect's Signature & Date		<i>Response Accepted By Contractor</i> <i>Contractor's Signature & Date</i>
The Work shall be carried out in accordance with these supplemental instructions without change in Contract amount or Contract time for completion. Prior to proceeding with these instructions, indicate your acceptance of these instructions by signing where indicated and returning this form to the Architect.		

PROJECT MANAGEMENT AND COORDINATION
Irvington Union Free School District
Facilities Storage Building at Irvington Campus
Facilities Storage Building
SED No.: 66-04-02-02-2-022-001

H2M

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Work of this Section includes the requirements for progress meetings, including but not limited to, the following:
 - 1. Preconstruction conferences.
 - 2. Preinstallation conferences.
 - 3. Progress meetings.
 - 4. Coordination meetings.

1.02 PRE-CONSTRUCTION CONFERENCE

- A. A preconstruction conference will be scheduled before starting construction, at a time convenient to the Owner, Owner's Construction Representative and the Architect, but no later than 15 days after issuance of the Letter of Intent. The conference will be held at the Project Site or another convenient location.
- B. Attendees: Authorized representatives of the Construction Manager, Owner, Architect, 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 be authorized to speak/make decisions, on behalf of the concern they represent, on matters relating to the Work.
 - 1. Agenda: Discuss items of significance that could affect progress, including the following:
 - 2. Tentative construction schedule.
 - 3. Critical work sequencing.
 - 4. Designation of responsible personnel.
 - 5. Procedures for processing field decisions and Change Orders.
 - 6. Procedures for processing Applications for Payment.
 - 7. Distribution of Contract Documents.
 - 8. Submittal of Shop Drawings, Product Data, and Samples.
 - 9. Preparation of record documents.
 - 10. Use of the premises.
 - 11. Parking availability.
 - 12. Office, work, and storage areas
 - 13. Equipment deliveries and priorities.
 - 14. Safety procedures.
 - 15. First aid.
 - 16. Security.
 - 17. Housekeeping.
 - 18. Working hours.
- C. Reporting: The Owner's Construction Representative shall set-up the meeting(s), prepare and issue meeting minutes to attendees and interested parties.
- D. Each Contractor is required to attend the pre-construction conference at a location, date, and time selected by the Owner.

1.03 PREINSTALLATION CONFERENCES

- A. Contractor shall conduct a pre-installation conference at the Project Site before each construction activity that requires coordination with other construction activities / trade work.

- 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 Owner's Construction Representative and Architect 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. Possible conflicts.
 - h. Compatibility problems.
 - i. Time schedules.
 - j. Weather limitations.
 - k. Manufacturer's recommendations.
 - l. Warranty requirements. Compatibility of materials. Acceptability of substrates. Temporary facilities.
 - m. Space and access limitations.
 - n. Governing regulations. Safety.
 - o. Inspecting and testing requirements. Required performance results.
 - p. Recording requirements Protection.
 2. Contractor shall record significant discussions, 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 possible date.
 4. Reporting: Prime Contractor or Installer shall issue meeting minutes to attendees, Owner's Construction Representative, Owner and Architect and associated field representatives.

1.04 PROGRESS MEETINGS

- A. Progress meetings will be held at the Project Site at regular intervals (typically bi-weekly) as determined by the Owner's Construction Representative and Architect.
- B. Attendees: In addition to representatives of the Owner, Owner's Construction Representative, and the Architect, each Prime Contractor shall be represented at these meetings. Attendance is mandatory at weekly meetings and contractor will include in their bid a sum of \$250.00 per meeting (figure 10 meetings) to have an authorized individual in attendance capable of making decisions and providing direction. This amount will be listed as a separate line item on the contractors Schedule of Values. If the contractor misses a meeting without prior written authorization from the Owner's Construction Representative, they will be issued a deduct change order in the amount of \$250.00 per occurrence. Subcontractors, suppliers, or other entities will be invited at the discretion of the Owner, Owner's Construction Representative, 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. Time.
 - b. Sequences.
 - c. Status of submittals. Deliveries.
 - d. Off-site fabrication problems. Access.
 - e. Site utilization.
 - f. Temporary facilities and services.
 - g. Hours of work.
 - h. Hazards and risks.
 - i. Housekeeping.
 - j. Quality and work standards. Change Orders.
 - k. Documentation of information for payment requests.
- D. Reporting: Approximately 5 days after each meeting, Owner's Construction Representative 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.
- E. Progress meetings will be held approximately once every two (2) weeks during the project. The Owner may elect to hold meetings more or less frequently.
- F. At least seven (7) calendar days advance notice will be given by the Owner's Construction Representative or the date for the upcoming meeting will be set during the progress meeting.
- G. Attendance at progress meetings shall be mandatory. An amount of \$1,000 shall be deducted from the Contract Amount for each announced meeting not attended by the Contractor.
- H. The owner, a partner, or a corporate officer representing the Contractor shall attend each announced progress meeting. The job site superintendent and office project manager for each Contractor shall also attend.
- I. Subcontractors shall attend when requested by the Owner or Owner's Construction Representative at no cost to the Owner.
- J. Meetings will be conducted by Owner's Construction Representative at a location selected by the Owner, normally at or adjacent to the project site.
- K. The minimum agenda will cover:
 - 1. Review minutes of previous meetings.
 - 2. Identify present problems and resolve them.
 - 3. Plan work progress during next work period.
 - 4. Review the status of off-site fabrication and delivery schedule.

5. Review shop drawings and submittal schedules.
6. Review change order status.
7. Review status of construction progress schedule.
8. Coordinate access requirements.
9. Other business related to the work.

1.05 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 Construction Representative Field Manager will conduct daily meetings with the prime contractors and major subcontractors foremen. The purpose of the meetings is to provide the opportunity for each 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. These meetings are generally informal. The Owner's Construction Representative Field Manager will keep minutes of these meetings when appropriate and will be available upon request.

1.06 SAFETY MEETINGS

- A. Each Contractor will be responsible to conduct their own safety meetings on a regular basis (but not less than four times during any thirty day period.)
- B. Minutes of the Safety Meeting must be maintained by each contractor on-site and must be made available upon request. Failure to conduct and submit meeting minutes will be grounds to reject the Prime Contractor's progress payment.

1.07 OTHER MEETINGS

- A. Attend special meetings which may be required or called for by Federal, State or Local authorities, utility companies, Owner, Architect or any other firm, person or organization related to the project.

1.08 CONDUCTING MEETINGS

- A. General - This paragraph covers Owner, Owner's Construction Representative, and Architect meetings with Contractor and/or his subcontractors. Neither the Owner nor the Owner's Construction Representative nor the Architect wish to meet solely with a subcontractor and requests for such meetings will be discouraged. If a meeting is deemed necessary, every effort will be made to have Contractor attend. If, for some reason, circumstances do not allow such, the meeting may be held, minutes of the meeting will be sent to contractor and decisions on any major questions will be reserved until contractor has been consulted. Subcontractors may accompany contractor to meetings provided the contractor notifies the Owner's Construction Representative in advance.

- B. Chairman - When Owner's Construction Representative/Owner attend meetings, the Owner's Construction Representative, or his duly authorized representative, will act as chairman. Should Owner-Contractor meetings be necessary, Owner will chair such meetings.
- C. Notices - Owner's Construction Representative or Owner will issue notices of meetings to all parties concerned and will note, thereof, who must attend and who may attend if they so desire. When a Contractor desires a formal meeting, make a request through Owner's Construction Representative. Except when Owner's Construction Representative determines that a prompt meeting is essential, all notices will be issued at least one week in advance of the meeting date.
- D. Agenda - All parties shall inform Owner's Construction Representative of items desired to be discussed and Owner's Construction Representative will notify all parties of all items to be considered. This is to allow each party to fully prepare for the meeting. This shall not be construed to mean that other items cannot be brought up at the meetings.
- E. Time Limits - It is the intent to hold productive and efficient meetings and to keep them as short as is reasonably possible. The Chairman will be the sole judge as to whether or not further discussion on any matter is warranted and all discussions shall cease when he so orders.
- F. Minutes - Minutes of meetings will be kept, written and distributed by the Chairman or his duly authorized representative. Minutes of all meetings will be available upon request to the Chairman.
- G. Conduct - It is the intent to conduct all meetings in an orderly manner, to reasonably discuss all items and to hear and observe the rights and opinions of all parties. The Chairman will allow each party to speak, however, he reserves the right to order any individual to leave the meeting at any time for any reason.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. This Section specifies the requirements for preparing construction schedules and for keeping them up to date.
- B. Prepare a Gantt Chart type schedule and keep it up to date as specified hereinafter.
- C. All schedules shall be submitted in accordance with the requirements contained herein in Section 013300.
- D. Refer to Section 013100 regarding the requirements for attendance at Project Coordination Meetings and additional requirements concerning the submission of other project coordination and sequencing information.

1.02 SCHEDULE PREPARATION MILESTONE DATES & REQUIREMENTS

- A. Each Contractor shall prepare Draft #1 Construction Schedule for presentation and discussion during Project Coordination Meeting No. 1.
 - 1. The Architect will provide at least seven (7) calendar days written notice regarding the date of the first meeting.
 - 2. At the Architect's discretion, Project Coordination Meeting No. 1 may immediately take place on the same date and directly following the Pre-Construction Conference. The Notice To Proceed will contain information regarding the Pre-Construction Conference and Project Coordination Meeting No. 1 should it be so decided by the Architect.
 - 3. Draft #1 Construction Schedule shall be prepared as specified hereinafter.
 - a. The schedule shall show all the major and subordinate tasks necessary to complete the project in the specified time and interim milestones.
 - b. It shall allow adequate time for other Prime Contractors to complete their related work as best estimated by the Contractor. It being understood that the Contractor's allotted time for others to perform their work is non-binding and does not relieve the Contractor from completing all the work in the specified contract completion time in accordance with the Contract Documents. It also being understood that this is the Contractor's realistic best estimate of the time needed for others to complete their related work.
 - c. The schedule shall also show the dependencies and time allocated for each task.
 - 4. The date, place, and time for Project Coordination Meeting No. 2 shall be established at the first meeting, but in no case be more than ten (10) calendar days from the date of the first meeting.
- B. As a result of the first meeting, a better understanding of each Contractor's time requirements will have been achieved. Within five (5) working days of the date of *Project Coordination Meeting No. 1*, each Contractor shall prepare Draft #2 Construction Schedule and submit it to the Architect and each other Prime Contractor for review. Each Contractor shall mail his/her schedule to all parties via Overnight Mail with a Return Receipt Requested.
 - 1. *Project Coordination Meeting No. 2* shall be attended by all Prime Contractors for the purpose of jointly developing a Combined Construction Schedule. The meeting shall focus on the time needed to complete each task and subordinate task and for establishing task dependencies.
 - 2. The date, place, and time for *Project Coordination Meeting No. 3* shall be established at the meeting.

1.03 CONSTRUCTION SCHEDULE - GENERAL

- A. The Contractor shall develop a full schedule, in sufficient detail and clarity of for and technique so that the contractor can plan and control his work properly and the Owner's Construction Representative, Owner, and Architect can each readily monitor and follow the progress for all portions of the work. The Contractor shall complete the detailed schedule within 10 days after contract award.
- B. In no case shall first application for payment be approved prior to submission of acceptable preliminary schedule, detailed submittal schedule, and schedule of values.
- C. Monthly updates, required schedules and graphics shall be submitted to the Owner's Construction Representative/Owner within five working days following the end of the preceding month. Monthly updates, schedules and graphics shall be submitted in five copies.
- D. If any of the required submissions are returned to the Contractor for corrections or revisions, they shall be resubmitted within ten (10) calendar days after the return mailing date. Re-submittals shall be in the same quantities as noted above. Review and response by the Owner's Construction Representative/Owner will be given within (10) calendar days after resubmission.
- E. The schedule shall comply with the various limits imposed by the scope of work any by any contractually intermediate milestone dates and completion dates included in the contract.
- F. The activities identified in the schedule shall be analyzed in detail to determine activity time durations in units of whole working days. All durations listed shall be the result of definitive manpower and resource planning by the Contractor. The contractor will provide specific manpower loading information / crew size to support the duration proposed. (e.g. - 4 man crew can produce 1000 sq. ft. / day, project has 11,000 sq. ft., thus duration is identified as 11 days)
- G. The activity data shall include activity codes to facilitate selection, sorting and preparation of summary reports and graphics. Activity codes shall be developed for:
 - 1. Area: Subdivision of the site into logical modules or blocks and levels.
 - 2. Responsibility: Contractor or subcontractor responsible for the work.
 - 3. Specifications: CSI format - 48 Division.
 - 4. System: Division of the work into building systems for summary purposes.
 - 5. Milestone: Work associated with completion of interim completion dates or milestones.
 - 6. Pay Item: Work identified with a pay item listed on the approved Schedule of Values.
- H. Coordinate the work and maintain the construction schedule. In the event actual progress begins to lag the schedule, promptly employ additional means and methods of construction to make up the lost time.
- I. Keep the construction schedule current and revise and resubmit as often as necessary to accurately reflect the conditions of the work, past progress and anticipated future progress.
- J. The construction schedule shall be completed, submitted, and deemed received by the Architect prior to the first payment application.
- K. The schedule, when approved by the Owner's Construction Representative, Owner, and Architect, shall establish the dates for starting and completing work for the various portions of the Contract. It shall be the duty of the Contractor to conform to his/her own schedule and to

perform the work within the time limits indicated. Failure to adhere to the approved schedule may expose the Contractor to disputes, claims and additional costs incurred by others.

- L. Coordinate letting of subcontracts, material purchases, shop drawing submissions, delivery of materials, and sequence of operations, to conform to the schedule.
- M. Coordinate the construction schedule with the proposed schedules of the equipment suppliers and subcontractors.
- N. The schedule shall show the critical sequence items where new units must come online before existing facilities go offline, if applicable to the project. The schedule shall also show, in detail, the proposed sequence of the work and the estimated date of starting and completing each stage of the work in order to complete the project within the contract time.
- O. The schedule shall be plotted out in color and shall be 11-inch by 17-inch. It shall contain as many sheets as are necessary to show all rolled down tasks. Partially printed schedules will not be accepted. Each Contractor shall arrange to have it plotted on a color plotter suitable for the intended application.
- P. Prepare the schedule in a manner so that the actual progress of the work can be recorded and compared with the expected progress.
- Q. The schedule shall use the following convention:
 - 1. Tasks for the General Contractor in blue ink.
 - 2. Task links/task dependency in blue ink.
 - 3. Work by others in green ink.
 - 4. Milestone dates (zero duration) by a red diamond.
 - 5. The end date for each task and subtask at the end of a bar.
 - 6. The description of all major tasks within the bar. The bar shall be red.
 - 7. Critical path.
- R. The construction schedule shall also show the following:
 - 1. Critical sequence items where new units must come on-line before existing facilities go off-line, if applicable to the project.
 - 2. Computer delivery, if so specified elsewhere.
 - 3. Telephone service and high speed internet cable installation.
 - 4. Lead time for control panels that are packaged as systems.

1.04 CONSTRUCTION SCHEDULE - GANTT CHART TYPE

- A. The schedule shall show, in detail, the proposed sequence of the work and the estimated date of starting and completing each stage of the work in order to complete the project within the contract time.
- B. Prepare the schedule in a manner so that the actual progress of the work can be recorded and compared with the expected progress.
- C. The schedule shall show the following:
 - 1. Task links/task dependency in blue ink.
 - 2. Work under the Contract in green ink.
 - 3. Milestone dates (zero duration) by a red diamond.
 - 4. The end date for each task and subtask at the end of a bar.
 - 5. The description of all major tasks within the bar. The bar shall be red.

6. Critical path.

1.05 REPORTS

- A. For initial submittal and each update the contractor shall prepare the following standard report:
 - 1. Tabular Schedule Report sorted by Activity code and Early Start.

1.06 GRAPHICS

- A. For initial submittal the contractor shall prepare the following graphics:
 - 1. Pure logic diagram (Precedence Format) of all data, not time scaled, grouped by Activity code.
 - 2. Detailed bar chart sorted by Activity Code with Early Start and Early Finish.
 - 3. Summary bar chart summarizing by Activity Code with Early Start and Early Finish.
- B. For each update the contractor shall prepare the following graphic:
 - 1. Bar Chart showing work activities with Early Start in the next 40 work-days sorted by Activity Code and Early Start.
 - 2. Summary Bar Chart summarizing by Activity Code showing progress with Early Start and Early Finish.
- C. For each Change Order involving adjustment in the contract time for performance, the contractor shall prepare a pure logic diagram showing the changed work with all preceding (predecessors) and succeeding (successors) activities (fragnet schedule).

1.07 SUBMITTALS

- A. In no case shall first application for payment be approved prior to submission of acceptable preliminary schedule, detailed submittal schedule, and schedule of values.
- B. Monthly updates, required schedules and graphics shall be submitted to the Owner's Construction Representative and Owner within five working days following the end of the preceding month. Monthly updates, schedules and graphics shall be submitted in five copies.
- C. If any of the required submissions are returned to the Contractor for corrections or revisions, they shall be resubmitted within ten (10) calendar days after the return mailing date. Resubmittal shall be in the same quantities as noted above. Review and response by the Owner's Construction Representative and Owner will be given within (10) calendar days after resubmission.

1.08 PAYMENT WITHHELD

- A. If the Contractor fails to submit the required schedule information as indicated in this section within the time stipulated or provide revision(s) thereof within the requested time, the Owner and Owner's Construction Representative may withhold approval of Progress Payment Estimates until such time as the Contractor submits the required information.

1.09 REVISION OF PROJECT PROGRESS SCHEDULE

- A. Each Prime Contractor shall evaluate and provide updated construction schedules monthly in accordance with job requirements. Each update shall be submitted to the Owner and Owner's Construction Representative for information purposes and be provided by the last Friday of every month

- B. Each Contractor shall modify its construction schedule to accommodate coordination of the construction contracts by the Owner/Architect without claims for additional compensation or delay.
- C. The Owner's Construction Representative will provide an electronic version of the Final Combined Construction Schedule for use in keeping the schedule up to date.
- D. From time to time, and at stages deemed appropriate by the Owner's Construction Representative, the Owner may issue updated schedules to reflect the project's status. The percent complete for each task may be shown, as determined by the Owner's Construction Representative.

1.10 UPDATES

- A. Updates of the Schedule shall be made at the end of each month reflecting actual or reasonably anticipated progress as of the last working day of the month. Monthly updates of the Detailed Schedule will be made each month until all work is substantially complete.
- B. The Contractor will meet with the Owner's Construction Representative and Owner at the end of the updated period to review information in draft form before preparation of the required schedules and graphics. The Contractor will present data, prepared in advance, for review and approval of the Owner's Construction Representative and Owner including :
 - 1. Actual Start Dates.
 - 2. Actual Completion Dates.
 - 3. Activity percent complete and/or Remaining Duration.
 - 4. Revised logic, changes in activity duration's or resource assignments.
 - 5. Narrative report discussing progress through the update period; changes, delays or other circumstances affecting progress; status of the project with respect to completion schedule; and any efforts by the Contractor to improve progress.
- C. The update meeting will establish the values to be submitted for payment and will be directly related to the schedule of values in the application for payment.
- D. The Contractor shall prepare a report of the meeting and make all changes, additions or corrections to the data resulting from the review. The contractor shall promptly prepare the monthly submittal following the update meeting.

1.11 CHANGES, DELAYS AND EXTENSIONS OF TIME

- A. When changes or delays are experienced, the Contractor shall submit to the Owner's Construction Representative and Owner, a Time Impact Analysis (TIA) illustrating the influence of each change or delay on the currently scheduled Contract completion date. Each Time Impact Analysis shall include a Fragnet (network analysis) demonstrating how the Contractor proposes to incorporate the change or delay into the Detailed Schedule. Additionally, the analysis shall demonstrate the time impact based on the date the change was given to the Contractor, the status of construction at that point in time, and the activity duration of all affected activities. The activity duration used in this Time Impact Analysis shall be those activities included in the latest update of the Detailed Schedule, closest to the time of delay or as adjusted by mutual agreement.
- B. Each TIA shall be submitted within ten (10) calendar days after a delay occurs or a notice of change order is given to the Contractor. In cases where the Contractor does not submit a TIA

for a specific change or delay with a specified period of time, it shall be mutually agreed that no time extension is required. Final evaluation of each TIA by the Owner's Construction Representative and Owner shall be made within fourteen (14) calendar days after receipt of the TIA unless subsequent meetings and negotiations are necessary. Adjustments in the Contract time for performance shall be made only by written change order approved by the Owner. Upon approval of the Owner, Fragnets illustrating the influence of changes and delays shall be incorporated into the Detailed Schedule by the contractor during the first update after agreement is reached.

- C. The time difference between the Early Finish date and the Late Finish Date is defined as "float." The "float" belongs to the Project and may be used by the Contractor or the Owner's Construction Representative and Owner to benefit the Project. Changes or delays that influence activities in the network with "float" and do not extend the Critical Path (the network of activities with zero days "float") shall not be justification for an adjustment in Contract time for performance.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

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PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Project record documents shall be prepared as specified herein.
- B. Fence locations shall be staked by the Contractor's surveyor in accordance with the requirements contained in Section 323113.16.

1.02 QUALITY ASSURANCE

- A. The Contractor shall employ a land surveyor licensed in the State where the project is located. The surveyor shall be acceptable to the Architect in terms of experience and qualifications.
 - 1. Submit evidence of the surveyor's errors and omissions (professional liability) insurance coverage in the form of an insurance certificate.
 - 2. The surveyor shall maintain a minimum coverage of \$1,000,000 for professional liability.
 - 3. The Owner, Architect, and Contractor shall be named as insurance certificate holders.
 - 4. A thirty-day cancellation notice shall be provided.
 - 5. Physical work shall not be performed until the certificate is provided and approved by the Owner.
- B. All instruments used on the project shall be of professional quality and in first class condition.
 - 1. All instruments shall have been calibrated by a manufacturer's service station within the last twelve (12) months.
 - 2. Submit certificate of calibration or paid invoice showing that the unit has been calibrated, if so required by the Architect.

1.03 SUBMITTALS FOR REVIEW

- A. Submit name, address, and telephone number of Surveyor before starting survey work.
- B. Surveyor's professional liability insurance certificate.
- C. On request, submit documentation verifying accuracy of survey work.
- D. Submit a copy of the site drawing signed by the land surveyor showing locations of other benchmarks set by the surveyor, baseline location and offset hubs. If requested, the Architect will provide a reproducible drawing or a drawing in digital format for use by the surveyor.

1.04 EXAMINATION

- A. Verify locations of survey control points prior to starting work.
- B. Promptly notify Architect of any discrepancies discovered.

1.05 SURVEY REFERENCE POINTS

- A. The Contractor's surveyor shall locate and protect survey control and reference points located throughout the project site.
- B. Control datum for survey is that indicated on the Drawings or will be provided by the Architect.

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- C. The Contractor shall protect survey control points prior to starting any site work. Preserve permanent reference points during construction.
- D. Promptly report to the Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
 - 1. The surveyor shall replace dislocated survey control points based on original survey control when directed by the Architect.
 - 2. Make no changes without prior written notice to Architect.
- E. The surveyor shall set control lath for rough and final grading purposes. Lath shall be placed at sufficient intervals to control grade or as directed by the Architect.
- F. All new structures, pits, chambers, drainage pools, curbs, roads, swales, and other physical elements shall be located by survey control.
- G. Underground pipelines need not be located using survey control but shall be located using standard survey equipment operated by persons experienced in their operation.

1.06 SURVEY REQUIREMENTS

- A. The Architect will provide one (1) benchmark.
- B. The Contractor shall, with his own forces, obtain working or construction lines or grades as needed subject to the check of the surveyor. The surveyor shall set offsets.
- C. Establish elevations, lines, offsets and levels. Locate and lay out by instrumentation and similar appropriate means:
 - 1. Site improvements including pavements, stakes for grading, curbs, fill and topsoil placement, utility locations, slopes and invert elevations.
 - 2. Grid or axis for structures.
 - 3. Building foundation, column locations, ground floor elevations, and equipment foundations.
- D. Provide tie distances on record drawings to all underground structures, valves, pipes, and utilities installed as work of this Contract.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

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PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. This Section specifies the requirements for making submissions for the project. Electronic submissions will be required unless expressly noted otherwise.
- B. Refer to Section 013216 - Construction Schedule for the requirements concerning the submission of construction schedules and for making updates thereto.
- C. This Section includes administrative and procedural requirements for submittals required for performance of the Work, including the following:
 - 1. Contractor's construction schedule.
 - 2. Submittal schedule.
 - 3. Daily construction reports.
 - 4. Shop Drawings.
 - 5. Product Data.
 - 6. Samples.
 - 7. Quality assurance submittals.
- D. Administrative Submittals: Refer to other Division 1 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to, the following:
 - 1. Permits.
 - 2. Applications for Payment.
 - 3. Performance and payment bonds.
 - 4. Insurance certificates.
 - 5. List of subcontractors.
- E. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section "Payment Procedures" specifies requirements for submittal of the Schedule of Values.
 - 2. Division 1 Section "Project Management and Coordination" specifies requirements governing preparation and submittal of required Coordination Drawings.
 - 3. Division 1 Section "Project Meetings" specifies requirements for submittal and distribution of meeting and conference minutes.
 - 4. Division 1 Section "Quality Requirements" specifies requirements for submittal of inspection and test reports.
 - 5. Division 1 Section "Execution and Closeout Requirements " specifies requirements for submittal of Project Record Documents and warranties at project closeout.

1.02 DEFINITIONS

- A. Coordination Drawings show the relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in the space provided or to function as intended.
 - 1. Preparation of Coordination Drawings is specified in Division 1 Section "Project Management and Coordination" and may include components previously shown in detail on Shop Drawings or Product Data.

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- B. Field samples are full-size physical examples erected on-site to illustrate finishes, coatings, or finish materials. Field samples are used to establish the standard by which the Work will be judged.
- C. Mockups are full-size assemblies for review of construction, coordination, testing, or operation; they are not Samples.

1.03 IDENTIFICATION OF SUBMITTALS

- A. Each and every submission shall be provided by the Contractor and shall be accompanied by a SUBMISSION TRANSMITTAL FORM. The Contractor shall use the specimen form made a part of this Section. *Submittals not containing the form will be returned to the Contractor un-reviewed.* The Architect will not review project submissions until such time as the form is completed in its entirety. Identify each submittal and resubmittal using the form.
- B. Each individual submittal shall be identified with a 'submission log number' as specified here in this example: 033000.01-1
 - 1. The Section number for which the submittal applies, followed by a period, shall be indicated, "033000."
 - 2. The submittal within the Section shall be indicated by the next grouping "01". For instance and in this example, the concrete design mix may be submission "01", the waterstop catalog cut may be "02", and so on. Submittals shall be sequentially numbered within the Specification Section, i.e. 01, 02, etc.
 - 3. The number of times the submission was made shall be preceded by a dash and a numerical suffix as follows: "-1". In this example, the concrete design mix is being submitted for the first time. Use the number "1" for the first time it is being submitted.
 - 4. Subsequent submissions of the concrete design mix shall utilize the original number and a sequential numeric suffix, i.e. "2" for a resubmission, "3" for the second resubmission, and so on. Substitute the new number for the original "1".
- C. Where a layout drawing, containing different elements of the project, is being submitted and there is a question as to what the log number might be, then the Contractor shall contact the Architect so that an agreed upon log number can be assigned.
- D. It is incumbent on the Contractor to initially assign the submission log number designation to each submission. Submissions not containing a log number, as specified above, will be returned to the Contractor un-reviewed by the Architect.
- E. Every submittal shall also be accompanied by a Transmittal Letter (or "Speed Form") addressed to the Architect's Project Manager as hereinafter defined.

1.04 SUBMITTAL SCHEDULE

- A. Submittals must be prepared and transmitted as follows, unless otherwise approved by the Owner's Construction Representative:
 - 1. Within 15 working days after Notice to Proceed:
 - a. Skylights.
 - b. Tapered Shop Drawings.
 - c. Roofing Package (membrane, vapor barrier, adhesive, etc.).
 - d. Masonry Samples.
 - e. Asbestos Abatement submittals & Plan.

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2. If the contractor misses the milestone submittal timeframes listed above, the owner / agents can withhold requisition payments until the required paperwork is received. If there are any open submittals beyond 60 days of contract award, the owner may withhold contractor payments until all required paperwork is received.
3. Upon approval by the Owner's Construction Representative, non-critical submissions may be transmitted after the above time frame.
4. Prepare submittals including information in accordance with Submittal Identification and Procedures specified in this section.

1.05 COORDINATION OF SUBMITTALS

- A. Prior to submitting to the Owner's Construction Representative, fully coordinate all interrelated work. As a minimum, do the following:
 1. Determine and verify all field dimensions and conditions by field measuring existing conditions and the installed work of this Contract and work by others.
 2. Coordinate with all trades, subcontractors, vendors, system and equipment suppliers and manufacturers, public agencies, and utility companies and secure all necessary approvals, in writing.
- B. Make submittals in groups containing all associated items that in some way depend upon each other.
 1. This also applies to color charts, as one color may not be able to be selected without the selection of other colors so as to form a color-coordinated group.
 2. The Owner's Construction Representative may elect not to review partial or incomplete submissions, whereupon he will notify the Contractor of the additional submissions that are required before a review can be made.

1.06 TIMING OF SUBMITTALS

- A. Make submittals far enough in advance of scheduled dates of installation to provide time for reviews, for securing necessary approvals, for possible revisions and re-submittals, and for placing orders and securing delivery. The Architect will review submittals in a manner as expedient as possible, and will generally send a written response to the Contractor within seven (7) calendar days of receipt of submittals.
- B. Submissions may be returned reviewed, unreviewed, rejected, returned conditioned upon submission of related items, or for other reasons set forth in the Contract Documents.
- C. Make submissions well in advance as the returning, rejecting or disapproval of submissions or other similar circumstances are possible and are deemed "avoidable delays". Costs for these delays or those attributed to Contractor's tardiness in making submittals shall be borne by the Contractor.
- D. **All** submittals requiring Owner's Construction Representative's review (except operations manuals) as required under the technical specifications of these documents shall be submitted within **FORTY FIVE (45)** consecutive calendar days after the date of the Notice to Proceed. An amount of **\$250** per calendar day shall be deducted from payment due the Contractor for **each** day that an outstanding submittal exists, said amount being the cost associated with the Owner's Construction Representative's review.
- E. Operation and maintenance manuals shall be submitted at least **FORTY FIVE (45)** consecutive calendar days prior to scheduled startup of the unit or system.

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- F. If material or equipment is installed before it has been deemed to be in general compliance with the Contract Documents, as determined by the Owner's Construction Representative, the Contractor shall be liable for its removal and replacement at no extra charge and without an increase in contract time.

1.07 DESTINATION OF SUBMITTALS

- A. Each submission of documents shall be accompanied by a transmittal form containing the name of the project, the contract name, the Architect's project manager, a submittal ID number, and a description of content for the submitted items.
- B. A copy of the TRANSMITTAL FORM shall also be provided to the Owner's Construction Representative's inspector at the job site.
- C. Electronic submittals shall be transmitted through the Newforma® Project Center website; a Submittal Exchange website or by email; pending instruction by the Architect. H2M architects + engineers is using a project information application called Newforma® Project Center. One of its components is Newforma Info Exchange, a web application that facilitates sending and sharing transmittals, and file sharing.
- D. As an external team member on this project the Contractor will be required to access the H2M architects + engineers/Newforma Info Exchange website for information related to the project, including file transfers, RFI, Submittals, Action Items, and project Calendar information. The Contractor will have access to this website using any internet-capable computer running Internet Explorer or Firefox. All data transmitted through the H2M architects + engineers/Newforma Info Exchange website is encrypted and logged. Further instructions will be provided to the Contractor after the contract is awarded.
- E. Other submissions, such as material samples or other items as instructed by the Owner's Construction Representative, shall be sent to the Architect's office as follows:
H2M architects + engineers
2700 Westchester Avenue, Suite 415, Purchase, NY 10577

Attention: H2M Project Manager (Named at Pre-Construction Conference or in the Notice to Proceed)

1.08 CLARITY OF SUBMITTALS

- A. All printed materials shall be neat, clean, professionally drafted by hand or by computer, clear, legible, and of such quality that they can be easily reproduced by normal photocopying or wide format copy/print machines.
- B. All electronic submittals shall be produced with a minimum resolution of 300 dpi.
- C. Binders of information shall be separated into groups, subsystems, or similar equipment/function. Copies not conforming to this paragraph will be returned to the Contractor without the Owner's Construction Representative's review.

1.09 CONTRACTOR'S REPRESENTATION

- A. By making a submission, the Contractor represents that he has determined and verified all field measurements and dimensions, field construction criteria, site and building constraints in terms

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of limitations in moving equipment into an enclosed space, materials, catalog and model numbers and similar data and that he has checked and coordinated each submission with other work at or adjacent to the project site in accordance with the requirements contained in Section 013100 - PROJECT MANAGEMENT AND COORDINATION and the Contract Documents.

- B. Every SUBMISSION TRANSMITTAL FORM shall contain the Contractor's approval stamp and date showing that the submittal has been approved by the Contractor. The Owner's Construction Representative will not review submittals that have not yet been reviewed and approved by the Contractor.

1.10 ENGINEER/ARCHITECT'S REVIEW

- A. Owner's Construction Representative will review and comment on each submission conforming to the requirements of this Section.
 - 1. Architect's review will be for conformance with the design concept of the project and will be confined to general arrangement and compliance with the Contract Documents only, and will not be for the purpose of checking dimensions, weights, clearances, fittings, laying lengths, tolerances, interference's, for coordinating the work by others or subcontractors.
 - 2. The Architect's review of a separate item, or portion of a system, does not represent a review of an assembly or system in which the item functions.
- B. The Architect will mark submittals as follows:
 - 1. NO EXCEPTION TAKEN (A) - No corrections, no marks. The content of this submittal has been reviewed by the Architect and been found to be in general compliance with the Contract Documents. No further submission of this submittal is required and the information contained in the submittal may be built into the work in accordance with the Contract Documents.
 - 2. MAKE CORRECTIONS NOTED (B) - Minor amount of corrections. The content of this submittal has been reviewed by the Architect and has been found in general to be in compliance with the Contract Documents. The notations made on the submittal by the Architect shall be incorporated into the work in accordance with the terms and conditions of the Contract Documents. No further submission of this submittal is required.
 - 3. AMEND AND RESUBMIT (C) - The content of this submittal has been reviewed by the Architect and this review has determined that additional data and/or modification to the submitted data or other changes are required to bring the work represented in this submittal into compliance with the Contract Documents. This submittal shall be reviewed and revised in accordance with the Architect's comments and resubmitted to the Architect for review. The information contained on the resubmittal shall not be incorporated into the work until the submittal is returned to the Contractor marked "NO EXCEPTION TAKEN" or "MAKE CORRECTIONS NOTED".
 - 4. REJECTED (D) - The content of this submittal has been reviewed by the Architect and has been determined not to be in accordance with the requirements contained in the Contract Document and requires too many corrections or other justifiable reason. The submittal shall be corrected and resubmitted or a submittal of an alternate shall be provided. No items are to be fabricated under this mark.
 - 5. SUBMIT SPECIFIED ITEM (E) - The content of this submittal has been reviewed by the Architect and this review has indicated that the work displayed in the submittal is not in compliance with the Contract Documents. The Contractor shall submit another submittal for this portion of the work, which complies with the Contract Documents.
 - 6. RECEIVED (R) - This submittal is accepted on the project and filed for record purposes only, in accordance with the terms and conditions of the Contract Documents. Documents marked "RECEIVED" will not be returned.

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- C. No payment will be made on any item for which a submission is required if such submission:
 - 1. has not been made,
 - 2. has been made but was not stamped "No Exceptions Taken" by Architect,
 - 3. has been made and stamped "Make Corrections Noted", but contractor has not complied with Architect's notes marked on the submittal,
 - 4. has been made and stamped "No Exceptions Taken", but item provided does not conform to the shop drawing nor to the Contract Documents.
- D. Submittals not required by these specifications will not be recognized or processed.
- E. The Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received. Processing: To avoid the need to delay installation as a result of the time required to process submittals, allow sufficient time for submittal review, including time for re-submittals.
 - 1. Allow between 10 and 15 business days for initial review of the first round of submittals. Allow additional time if the Architect must delay processing to permit coordination with subsequent submittals.
 - 2. If an intermediate submittal is necessary, process the same as the initial submittal. Allow an additional 10 business days for processing each submittal.
 - 3. No extension of Contract Time will be authorized because of contractor's failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing.

1.11 RESUBMISSIONS

- A. Prepare new and additional submissions, make required corrections, and resubmit corrected copies until found in compliance with the Contract Documents.
- B. On, or with, re-submittals, clearly describe revisions and changes made, other than the corrections requested by Architect, which did not appear on the previous submissions.

1.12 CONTRACTOR'S RESPONSIBILITIES

- A. Architect's review of submittals shall not relieve the Contractor of his/her responsibility for any deviation from the requirements of the Contract Documents nor relieve the Contractor from responsibility for errors or omissions in the submittals.
- B. No portion of the work requiring a submission shall be commenced until the Architect has found the submission in general compliance with the Contract Documents.
- C. The Contractor shall provide written notification of any specification or drawing deviation.

1.13 EXCESS COSTS FOR ENGINEERING/ARCHITECTURAL SERVICES

- A. The Owner will charge to the Contractor, and will deduct from the partial and final payments due the Contractor, all excess engineering and architectural expenses incurred by the Owner for extra services (work) conducted or undertaken by the Architect as stipulated below:
 - 1. Services and other similar charges because of the Contractor's errors, omissions, or failures to conform to the requirements of the Contract Documents as related to administrative charges associated with non-compliance with the requirements for making project submissions.
 - 2. Services and other similar charges required to examine and evaluate any changes or alternates proposed by the Contractor and which may vary from the Contract Documents.

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3. Services and other similar charges as a result of the Contractor's proposed substitution of materials, equipment or products which require a redesign of any portion of the project, as contained in the Contract Documents at the time of bid.
4. Services and other similar charges as a result of the Contractor's proposed substitution of products which require an engineering and/or architectural evaluation, beyond the time stipulated in Section 012500 - PRODUCT SUBSTITUTION PROCEDURES, to determine if the substituted product is equal to that specified.
5. Services and other similar charges as a result of changes by the Contractor to dimensions, weights, sizes, voltages, phase, horsepower, materials of construction, and similar physical or operating characteristics of the product furnished which require redesign of the project in any way.
6. Services and other similar charges for the review of resubmissions of shop drawings that have been marked as "No Exceptions Taken" or "Make Corrections Noted".
7. Services and other similar charges for the review of shop drawings submitted more than two (2) times for the same product or portion of the work.

1.14 MISCELLANEOUS SUBMITTALS

- A. Provide a Submittal Schedule within seven (7) calendar days from the date of the Notice to Proceed. The Submittal Schedule shall list all submittals for the project referenced by draft log number. Provide the estimated date that the submittal will be transmitted to the Architect for review.
- B. Within seven (7) calendar days from the date of the Pre-Construction Meeting, submit a Proposed Products List. This list shall be a complete listing of all products proposed for use, with name of manufacturer, service headquarters, trade name and model number of each product. Partial listings will not be accepted.
- C. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.15 SUBCONTRACTOR LIST

- A. The Contractor shall submit, on AIA Form G705, within FIFTEEN (15) calendar days after the date of the Notice to Proceed, a list of all subcontractors, including the names of the major subcontractors that were submitted at the time of the bid.
- B. Indicate M/WBE subcontractors in accordance with the requirements contained in other portions of the Project Manual.

1.16 MATERIAL SAFETY DATA SHEETS (MSDS)

- A. Comply with "Right to Know" requirements of Chapter 551 of Laws of New York, 1980, concerning notification of the use of toxic substances.
- B. Any product or substance used by the Contractor or its subcontractors which is listed in Subpart Z of OSHA Part 1910 Title 29 of the Code of Federal Regulations entitled "Toxic and Hazardous Substances" shall be identified to the Owner/Architect by the Contractor's submission of a standard Material Safety Data Sheet (MSDS) in accordance with "Right To Know" requirements.
- C. Products will not be permitted to be kept on site without a MSDS.

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1.17 SHOP DRAWINGS

- A. Submit shop drawings for all fabricated work, for all manufactured items and for items specifically required by the specifications.
- B. Submit one (1) electronic copy of each standard drawing, catalog cut, or other material. All shop drawings or submittals that are not in the standard 8-1/2" x 11" format shall be submitted electronically and in paper. Samples shall be delivered directly to the office of the Architect. The Architect will return an electronic copy of each submittal once reviewed.
- C. Subcontractors shall submit shop drawings directly to the Contractor for checking. Thoroughly check subcontractors' shop drawings for measurements, sizes of members, details, materials, and conformance with the Contract Documents.
 - 1. Return submittals which are found to be inaccurate or in error.
 - 2. Do not submit to the Architect until all corrections have been made.
- D. Clearly show the relationship of the various parts of the project and where the information provided on the submission depends upon field measurements and existing conditions.
- E. The Contractor shall make all measurements, confirm existing conditions, and include them on the shop drawings before making a submission to the Architect.
- F. Submissions for a single item, or group of related items shall be complete.
- G. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
- H. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.
- I. When submitting manufacturers' catalogs, pamphlets or other data sheets, in lieu of prepared shop drawings, clearly mark the items being submitted for review.
- J. If the shop drawings contain any departures from the contract requirements, specifically describe them in the letter of transmittal.
 - 1. Where such departures require revisions to layouts, structural, architectural, electrical, HVAC or any other changes to the work as shown, Contractor shall, at his own expense, prepare and submit revised drawings accordingly.
 - 2. Make drawings the same size as the Contract Drawings and to the same scale.
- K. Submit newly prepared information drawn accurately to scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not a Shop Drawing.
- L. Shop Drawings include fabrication and installation Drawings, setting diagrams, schedules, patterns, templates and similar Drawings. Include the following information:
 - 1. Dimensions.
 - 2. Identification of products and materials included by sheet and detail number.
 - 3. Compliance with specified standards.
 - 4. Notation of coordination requirements.
 - 5. Notation of dimensions established by field measurement.

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6. Sheet Size: Except for templates, patterns and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 inches by 11 inches but no larger than 36 inches by 48 inches.
7. All Technical Submittals.

1.18 SAMPLES

- A. Where required, or where requested by the Architect, submit sample or test specimens of materials to be used or offered for use.
 1. Samples shall be representative, in all respects, of the material offered or intended, shall be supplied in such quantities and sizes as may be required for proper examination and tests, and shall be delivered to Architect, prepaid, along with identification as to their sources and types of grades.
 2. Submit samples well in advance of anticipated use to permit the making of tests or examinations.
- B. Samples will be checked for conformance with the design and for compliance with the Contract Documents.
- C. Work shall be in accordance with the approved sample. The use of materials or equipment for which samples are requested or required to be submitted is not permitted until such time that the Architect has completed his review.

1.19 MANUFACTURER'S INSTRUCTIONS

- A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to Architect.
- B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation. Provide manufacturer's instructions with shop drawings.

1.20 CERTIFICATIONS

- A. Submit certifications of compliance indicated in the Contract Documents.
- B. Certifications shall be complete and exact, they shall be properly authenticated by the written signature, in ink, of an owner, officer or duly authorized representative of the person, firm or organization issuing such certification and they shall guarantee that the materials or equipment are in complete conformance with the requirements of these specifications.

1.21 COLORS AND PATTERNS

- A. Unless the precise color and pattern are specified, whenever a choice of color or pattern is available in a specified product, submit accurate color and pattern charts for Architect's and Owner's review and selection.

1.22 MANUFACTURER'S SERVICE CENTER

- A. The product of a manufacturer who does not maintain an adequate nearby service center and a sufficient stock of spare parts are subject to rejection by Architect solely on that basis.

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- B. With each submission, submit information on manufacturer's facilities and give complete details of his service policies and capabilities, and a general idea of the stock of spare parts available. Submit this information in the form of a certification. Also include names, addresses and telephone numbers of at least three of the service center's present customers who are in the area of the project.

1.23 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Distribution: It is the contractor's responsibility to coordinate submittals with each subcontracting trade. Each contractor shall be required to provide their subcontractors with a complete list of their submittals in order that other contractors can request required submittal information.
 - 1. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.

1.24 DAILY CONSTRUCTION REPORTS

- A. Prepare a daily construction report recording the following information concerning events at the site, and submit one copy to the Architect and one copy to the Owner's Construction Representative by 10:00 a.m. the following day. Any contractor not submitting required reports will not receive approval in the subsequent application for payment until such time that all required information is submitted
 - 1. List of subcontractors at the site.
 - 2. Count of personnel at the site (substantiates payroll).
 - 3. High and low temperatures, general weather conditions.
 - 4. Accidents and unusual events.
 - 5. Meetings and significant decisions.
 - 6. Stoppages, delays, shortages, and losses.
 - 7. Meter readings and similar recordings.
 - 8. Emergency procedures.
 - 9. Orders and requests of governing authorities.
 - 10. Change Orders received, implemented.
 - 11. Services connected, disconnected.
 - 12. Equipment or system tests and startups.
 - 13. Partial Completions, occupancies.
 - 14. Substantial Completions authorized.

1.25 TEST RESULTS AND INSTALLATION

- A. Whenever field startup services are specified, the Contractor shall obtain from the manufacturer and submit to the Architect Manufacturer Startup Reports (MSR's). The report shall detail the results of the field visit and all special conditions resulting from the startup.
- B. Whenever field or factory tests are required on materials, equipment and systems, such tests shall be performed and the test results submitted to Architect in the form of a MSR.
- C. Do not deliver to the project or incorporate into the work any materials or equipment for which Architect has not completed his review and found same to be in general conformance with the Contract Documents.
- D. Submit MSR's within thirty (30) calendar days after the date of the startup or factory test.

1.26 SPARE PARTS LIST

- A. Prepare a list of all spare parts specified to be provided in other Sections. Compile the total list for the purposes of reviewing actual spare parts delivered versus spare parts specified to be provided. The list shall reference the Section, model number, and quantity to be provided.

1.27 WAIVER OF CERTAIN SUBMITTAL REQUIREMENTS

- A. Unless otherwise specified, the requirement to submit data and samples for products specified for approval will be waived for products specified by brand name if the specifically named products are furnished for the work. In such cases, the Contractor shall submit two (2) copies of required Product Data directly to the Architect's field representative for information and verification during its incorporation into the work. The SUBMISSION TRANSMITTAL FORM shall always be used.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

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CONTRACTOR'S COMPANY NAME
 ADDRESS

SUBMISSION TRANSMITTAL FORM

CLIENT NAME: Irvington Union Free School District
PROJECT TITLE: Facilities Storage Building at Irvington Campus

H2M PROJECT NO.: IRSD1903

Product, Item, or System Submitted:			
Submission Date:		Submission Log No.:	
Specification Section:		Paragraph Reference:	
Contract Drawing Reference(s):			
Manufacturer's Name:			
Manufacturer's Mailing Address:			
Manufacturer's Contact Information:	<i>Name</i>	() <i>Tel. no.</i>	<i>Email</i>
Supplier's Name:			
Supplier's Mailing Address:			
Supplier's Contact Information:	<i>Name</i>	() <i>Tel. no.</i>	<i>Email</i>
This item is a substitution for the specified item:	____ No		____ Yes
Contractor's Approval Stamp with Signature & Date	<u>Contractor's Brief Comments or Remarks</u> (attach separate letter as needed):		
	By making this submission, we represent that we have determined and verified all field measurements and dimensions, field construction criteria, site and building constraints in terms of limitations in moving the item into the enclosed space, materials, catalog and model numbers and similar data and that we have checked and coordinated this submission with other work at or adjacent to the installed location in accordance with the requirements contained in the Contract Documents.		

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END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Codes
- B. Governing agencies
- C. Permits

1.02 CODES

- A. Comply with the requirements of the various codes referred to in these Specifications. Such codes shall be the date of the latest revision in effect at the time of receiving bids.
- B. If there is a conflict between local, state, and/or Federal regulatory requirements, seek a consultation with the State Department of Labor. Resolve conflicts to the satisfaction of the State Department of Labor prior to commencing work.
- C. Electrical Work: Conform to the requirements of the National Electrical Code (NEC) unless otherwise shown or specified. The Owner will be the sole judge of the interpretation of these rules and requirements.

1.03 GOVERNING AGENCIES

- A. All work shall conform to and be performed in strict accordance with all governing agencies such as, but not limited to:
 - 1. Occupational Safety and Health Act - OSHA
 - 2. State Department of Environmental Conservation
 - 3. State Building Code
 - 4. State Fire Code
 - 5. National Fire Protection Association - NFPA
 - 6. National Electrical Code
 - 7. State Plumbing Code
 - 8. New York State Energy Code
 - 9. County Department of Health
 - 10. Town Codes, Rules, Laws and Ordinances
 - 11. Sewer District Sewer Use Code
 - 12. Local Water District
 - 13. Electric Utility
 - 14. Gas Utility
 - 15. State Education Department

1.04 PERMITS AND INSPECTIONS

- A. Representatives of the Owner shall have access to the work for inspection purposes. The Contractor shall provide facilities suitable to the Owner to facilitate inspections of the installed work.
- B. Obtain and pay for all permits, fees, licenses, certificates, inspections and other use charges required in connection with the work.
- C. Such permits include, but are not limited to:

1. Transportation and disposal of construction debris
2. Building permits that are required by the municipality where the work is located. Arrange for inspections of the work by the municipal building department before closing in the installed work, if so required. Work will not be accepted for payment until such inspections are performed and accepted by the building department.
3. Electrical Service
4. Telephone Service
5. Electrical Inspector's Incorporated, Certificate for Electrical Installation or preapproved electrical inspection agency

1.05 NOISE CONTROL

- A. Control noise in accordance with City and OSHA requirements.

1.06 PERFORMANCE BONDS

- A. The Contractor shall obtain, pay for and submit all bonds required in connection with the work.

1.07 LISTINGS

- A. Equipment and materials for which Underwriters' Laboratories, Inc. (UL) provides product listing service, shall be listed and bear the listing mark. Alternately, ETL Testing Laboratories, Inc. Product Safety Testing Listing is acceptable if the listed product has been tested to the applicable UL Standard.

1.08 FIRE RESISTANT CONSTRUCTION MATERIALS AND ASSEMBLIES

- A. Conform to the fire rating classifications based upon the test methods and acceptance criteria in the Standard, Fire Tests of Building Construction and Materials for which Underwriters' Laboratories, Inc. (UL) provides listings.
- B. Materials and assemblies shall comply with the acceptance criteria, detailed description of the assembly, its performance in the fire test and other pertinent details such as specification of materials, Classification coverage, and alternate assembly details.
- C. Alternatively, fire resistance rating classifications by other issuing organizations listed in the Fire and Building Codes are acceptable.

1.09 COORDINATION WITH ELECTRIC UTILITY COMPANY

- A. Comply with the utility company requirements for the incoming electric service.
- B. Comply with the utility company requirements for the incoming electric service. There are no utility company charges associated with the installation of the incoming service.

1.10 COORDINATION WITH GAS UTILITY COMPANY

- A. Comply with the gas utility company requirements including inspection for the incoming gas service.

1.11 COORDINATION WITH TELEPHONE UTILITY COMPANY

- A. Comply with the utility company requirements for the incoming telephone service.

1.12 UTILITY WORK WITHIN STATE HIGHWAY RIGHT-OF-WAY

- A. Utility Work, either overhead or underground, within the boundaries of the state highway right-of-way, shall conform with procedures set forth in the Department of Transportation publications "Department Rules and Regulations Governing the Accommodation of Utilities Within State Highway Right-of-Way (Part 131 - Title 17 Transportation) and "Issuance of Highway Work Permits" (Code 7.12-2).

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

PART 1 - GENERAL

1.01 ABBREVIATED SUMMARY

- A. This Section explains the format of the specifications.

1.02 SPECIFICATION FORMAT

- A. The Specifications are generally arranged according to the Construction Specifications Institute (CSI) format. Most of the technical requirements are specified in the technical specifications of the document, which are grouped into forty-eight (48) major divisions. Most of the legal and administrative requirements are included in Division 01, General Conditions, Information For Bidders, and the Contract (agreement).
- B. Technical sections are arranged in numerical order, however section numbers may not be consecutive from section to section.
- C. Page numbering is subordinate to each section.
- D. Most sections are generally broken down into three (3) parts:
 - 1. PART 1 - GENERAL
 - 2. PART 2 - PRODUCTS
 - 3. PART 3 - EXECUTION
- E. Not all these parts may be used and in some cases, the title of some of the parts may be different than listed above. Paragraph numbers are subordinate to each part.
- F. The Contractor is advised that the format described here is flexible in nature.
 - 1. There is some overlapping of specified information between various portions of the Specifications.
 - 2. In all cases, the entire requirements of the Contract Documents for the project shall apply.
- G. Explanations:
 - 1. Many technical sections begin with a paragraph titled "SECTION INCLUDES", "DESCRIPTION", or similar wording.
 - a. In these paragraphs, a brief listing of the specified products may appear or a brief description of the work generally specified in that section is presented.
 - b. These descriptions or listings are not all inclusive, but merely are provided as an aid in locating subject matter.
 - c. In some cases special cost related items of work are called to the attention of the Contractor in these opening paragraphs.
 - 2. "RELATED SECTIONS" or "RELATED WORK" or similar wording paragraphs list or reference related work specified elsewhere in the Contract Documents. Such listing is not all inclusive, rather, they are merely an aid to the Contractor in locating some of the other

Specification Sections wherein work is specified which has a particularly close interrelationship with the work specified in that section.

- a. It shall be understood that all of the Work, and all of the Specifications and other portions of the Contract Documents, are interrelated, and that the total of all requirements set forth in all of the Contract Documents shall be met.
 - b. Equipment suppliers and manufacturers shall be advised of the requirements for making submittals and delivering products, as specified in Division 1 sections, even if said sections are not referenced therein that section.
3. "REGULATORY REQUIREMENTS" or "REFERENCES" or similar wording paragraphs describe standards, laws, guidelines, regulations, and standards related to workmanship and installation of the products specified which shall be followed by the Contractor in completing the work specified therein that section as if it was written there in that section. All such requirements and references shall be latest issue in effect at the time of the bid opening.
 4. When a "GUARANTEE" or "WARRANTY" paragraph appears in the section it is calling attention to a guarantee which extends beyond the period of the Contractor's Guarantee called for in the administrative portion of the Contract Documents or it states special requirements specific to the equipment, systems or products specified in that section.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Work of this Section includes the requirements for pre-installation meetings.

1.02 PRE-INSTALLATION MEETINGS

- A. As required in individual specification sections, the Contractor shall convene a pre-installation meeting at the site prior to commencing work of the section.
- B. Pre-installation meetings are to be convened at least one week prior to commencing work on the section. The contractor shall arrange and require attendance of Owner's Construction Representative, Owner, and Architect and parties directly affecting, or affected by, work of the specific section.
 - 1. At least seven (7) calendar days advance notice is to be given.
 - 2. The contractor shall prepare agenda and preside at meeting. At a minimum the following items are to be discussed:
 - 3. Review conditions of installation, preparation and installation procedures.
 - 4. Review coordination with related work.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Requirements for monitoring the quality of the constructed project.
- B. Work of this Section also includes services of an independent testing laboratory for quality assurance testing.

1.02 REFERENCES

- A. ASTM C1077 - Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.
- B. ASTM D3740 - Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
- C. ASTM D4561 - Practice for Quality Control Systems for an Inspection and Testing Agency for Bituminous Paving Materials.
- D. ASTM E699 - Practice for Criteria for Evaluation of Agencies Involved in Testing, Quality Assurance, and Evaluating Building Components in Accordance with Test Methods Promulgated by ASTM Committee E6.

1.03 QUALITY ASSURANCE - CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Comply with specified standards as a minimum quality for the work except when more stringent tolerances, codes, or specified requirements indicate higher standards or workmanship that is more precise.
- C. Perform work by persons qualified to produce workmanship of specified quality.
- D. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.
- E. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

1.04 MOCK-UP

- A. Tests will be performed under provisions identified in this Section and identified in the respective product specification sections.
- B. Assemble and erect specified items with specified attachment and anchorage devices, flashing, seals, and finishes.
- C. Accepted mock-ups shall be a comparison standard for the remaining work.

- D. Where a mock-up has been accepted by the Architect and is specified to be removed, then the Contractor shall remove the mock-up and the clear area when directed to do so by the Architect.

1.05 QUALITY ASSURANCE - TESTING LABORATORY

- A. In order to establish compliance with the Contract Documents, materials shall be tested, examined and evaluated before they are incorporated into the work. During and after installations, additional tests, examinations, and evaluations shall be made to determine continued compliance throughout the course of the work.
- B. Testing laboratory shall be a reputable, experienced firm that is capable of performing all of the required testing and authorized to operate in the state in which the project is located.
- C. Perform all sampling and testing in accordance with specified procedures and use the materials, instruments, apparatus, and equipment required by the codes, regulations and standards. Where specific testing requirements or procedures are not described, perform the testing in accordance with all pertinent codes and regulations and with recognized standards for testing.
- D. In the event that samples and test specimens are not properly taken, handled, stored or delivered or if other requirements of this Section are not complied with, Architect reserves the right to delegate any or all of this work to others, or to take whatever action deemed necessary to ensure that sampling and testing are properly accomplished, for which all costs shall be borne by Contractor.
- E. Architect reserves the right to disapprove the use of a specific testing laboratory, even after prior approval, if the laboratory fails to meet or comply with the requirements of this Section. If this should occur, immediately discharge the testing laboratory and retain the services of a different laboratory acceptable to Architect.
- F. The testing laboratory shall meet the following criteria:
 - 1. Be capable of performing all of the required tests.
 - 2. Be regularly engaged in performing the types of services required.
 - 3. Have adequate facilities, materials, equipment, and personnel to perform the services.
 - 4. Have an adequately trained, experienced and qualified staff.
 - 5. Have at least one registered professional engineer licensed in the state in which the project is located who shall be capable of performing field tests, supervising laboratory testing and interpreting test results. The professional engineer shall be thoroughly knowledgeable in materials, soils, asphalt paving and concrete.
 - 6. Shall be able to be on the Project site within two hours after being notified.
 - 7. Comply with the requirements of ASTM C1077, ASTM D3740, ASTM D4561, ASTM E548 and ASTM E699.
 - 8. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.

1.06 REFERENCE STANDARDS

- A. Conform to reference standards by date that the project was last bid.
- B. Obtain copies of standards when required by Contract Documents.

- C. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.
- D. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.07 SCHEDULING - LABORATORY SERVICES

- A. Except where otherwise specified, the Architect will determine the number of samples to be taken, the date and time samples will be taken and tests made, the number and type of tests to be performed, who will collect the samples, how they will be handled and stored and when laboratory personnel are required on site.
- B. Architect will notify Contractor of his/her decision to take samples and/or have tests made and provide him with the pertinent information. Contractor is responsible for notifying the testing laboratory and for having the testing performed, on schedule.
- C. In addition to the above, Contractor shall make his own arrangements for the sampling and testing of materials he proposes to incorporate into the work. This shall not be paid for out of the cash allowance.
- D. Notify Architect at least 72 hours in advance of the times at which scheduled samples or tests will be conducted.
- E. If samples and/or tests cannot be taken or performed when required, delay the work until such time that they can be accomplished. Where possible, any work that has been installed but has not been sampled or tested as required, shall be tested by other means. Upon Architect's request, uncover any work, which has been buried or covered, and perform special tests designated by Architect. If the work cannot be tested by other means, Architect may declare the work unacceptable. All costs associated with noncompliance and for special testing shall be borne by the Contractor and not be paid for out of the cash allowance.
- F. Should the testing laboratory be scheduled to take or collect samples or to perform tests, and finds that it is unable to do so as a result of delays in construction, inclement weather, or any other reason, reschedule the tasks for a date acceptable to Architect. Costs associated with times testing laboratory is unable to perform scheduled services shall be borne by the Contractor and will not be paid for under the allowance.
- G. Plan all work and operations to allow for the taking and collection of samples and allow adequate time for the performance of tests. Delay the progress of questionable work until the receipt of the certified test reports.

1.08 FIELD OBSERVATION OF CONTRACTOR'S WORK

- A. The Architect will provide periodic observation of the Contractor's work.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions. Verify that the existing substrate is capable of structural support or attachment of new Work being applied or attached. Examine and verify specific conditions described in individual specification sections. Verify that utility services are available, of the correct characteristics, and in the correct locations.

3.02 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance. Seal cracks or openings of substrate prior to applying next material or substance.
- B. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 FIELD QUALITY CONTROL

- A. Allow representatives of the testing laboratory access to the work at all time. Provide all equipment, labor, materials, and facilities required by the laboratory to properly perform its functions. Cooperate with and assist laboratory personnel during the performance of their work.
- B. Test specimens and samples shall be taken by the person(s) designated in other Sections, or as directed by Architect. Conduct field sampling and testing in the presence of Architect. Provide all materials, equipment, facilities and labor for securing samples and test specimens and for performing all field-testing.

END OF SECTION

STATEMENT OF SPECIAL INSPECTION AND TESTS

H2M

Irvington Union Free School District
Main Street School Renovations
Main Street School
SED No.: 66-04-02-02-0-001-016

SECTION 014500.01**STATEMENT OF SPECIAL INSPECTION AND TESTS**

CLIENT PROJECT ADDRESS	STATEMENT OF SPECIAL INSPECTIONS AND TESTS As required by the 2015 International Building Code (IBC)	
BCNYS § 1704.3 requires the project Design Professional to complete the Statement of Special Inspections and Tests. Completion of the Statement of Special Inspections & Tests and submission to the Building Department with the Construction Permit Application is a condition for issuance of the Building Permit.		
Owner Irvington School District	Building Main Street Building	
Project Title Main Street School Renovations		
Project # IRSD 1910	Project Address 101 Main St., Irvington, NY	
Architect/Engineer H2M architects + engineers		
Name of Person Completing this Statement X Scott Lehn, PE	Phone (631)756-8000	Date 11/17/2021
Comments		

INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)	C O N T I N U O U S	P E R I O D I C	REFERENCE STANDARD	B R C E N F Y E S R E N C E	C R H E E Q C U K I R I E F D	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
A. Steel Construction						
1. Material verification of high-strength bolts, nuts and washers.		X	Applicable ASTM material specifications. AISC 360-10 & N5	1704.3	x	051200
2. Inspection of high-strength bolting.		X	AISC 360-10 & N5	1704.3	x	051200
3. Material verification of structural steel.			ASTM A 6 or A 568 AISC 360-10 & N5	1704.3	x	051200
4. Material verification of weld filler materials.			AISC 360-10 & N5	1704.3	x	051200
5. Inspection of welding:			AWS D1.1, D1.3, D1.4; ACI 318: 3.5.2 AISC 360-10 & N5	1704.3, 1704.3.1,	x	051200

STATEMENT OF SPECIAL INSPECTION AND TESTS

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Irvington Union Free School District

Main Street School Renovations

Main Street School

SED No.: 66-04-02-02-0-001-016

INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)	C O N T I N U O U S	P E R I O D I C	REFERENCE STANDARD	B R C E N F Y E S R E N C E	C R H E Q C U K I R I E F D	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
a. Structural steel		X	NOTE: Special inspector shall perform ultrasonic testing of all full penetration welds.	1704.3, 1705.12.1	x	051200
b. Reinforcing steel		X				
6. Inspection of steel frame joint details.		X		1705.2.3	x	051200
B. Concrete Construction				1705.3 Table 1705.3		
1. Inspection of reinforcing steel, including prestressing tendons, and placement.		X	ACI 318: Ch. 20, 25.2, 25.3, 26.5.1-26.5.3	1908.4		
2. Inspection of reinforcing steel welding.			AWS D1.4; ACI 318: 26.5.4	Table 1705.3		
3. Inspection of bolts to be installed in concrete prior to and during placement.	X		ACI 318: 17.8.2	Table 1705.3		
4. Verify use of required design mix.		X	ACI 318: Ch. 19, 26.4.3, 26.4.4	1904.1, 1904.2, 1908.2, 1908.3		
5. Sampling fresh concrete: slump, air content, temperature, strength test specimens.	X		ASTM C 172, C 31; ACI 318: 26.4.5, 26.12	1704.4, 1905.6, 1914.10		
6. Inspection of placement for proper application techniques.	X		ACI, 318: 26.4.5	1908.6, 1908.7, 1908.8, 1908.10		
7. Inspection for maintenance of specified curing temperature and techniques.		X	ACI, 318: 26.4.7-26.4.9	1908.9		
8. Inspection of prestressed concrete.	X		ACI 318: 26.9.2.1	Table 1705.3		
9. Erection of precast concrete members.		X	ACI 318: Ch. 26.8			

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INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)	C O N T I N U O U S	P E R I O D I C	REFERENCE STANDARD		B R C E N F Y E S R E N C E	C R H E Q C U K I R I E F D	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
10. Verification of in-situ concrete strength prior to stressing of tendons and prior to removal of shores and forms from beams and slabs.		X	ACI 318: 26.10.2				
C. Masonry Construction A= Level A Quality Assurance B = Level B Quality Assurance C = Level C Quality Assurance			ACI 530/ ASCE5/ TMS402 Table 3.1.1	ACI530.1 /ASCE6/ TMS602	1705.4		
Levels A and B A1. Verify to certificates to ensure compliance: B1. Verify certificates to ensure compliance.		X					
Level B B2. Proportions of site prepared mortar and grout.		X					
B3. Placement of masonry units and construction of mortar joints.		X					
B4. Location and placement of reinforcement, connectors, tendons, anchorages.		X					
B5. Prestressing technique and installation.		X					
B6. Grade and size of tendons and anchorages.		X					
B7. Grout specs prior to grouting.	X						
B9. Placement of grout.	X						
B10. Grouting of tendons.	X						
Level C:					1705.4		

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C1. Size and location of structural elements.		X	ACI530/ ASCE5/ TMS402	ACI530.1 /ASCE6/ TMS602	1705.4		
C2. Type, size, and location of anchors.	X	X					
C3. Specified size, grade, and type of reinforcement.		X					
C4. Welding of reinforcing bars.	X						
C5. Cold/hot weather protection of masonry construction.		X					
C6. Prestressing force measurement and application.	X	X					
C7. Inspection prior to grouting.		X					
C8. Grout placement.	X						
C9. Preparation of grout specimens, mortar specimens, and/or prisms.	X						
C10. Compliance with documents and submittals.		X					
D. Wood Construction: Fabrication of wood structured elements and assemblies.					1705.5 1705.11. 1 1705.12. 2		
E. Soils					1705.6		
1. Site preparation.		X					
2. During fill placement.	X						
3. Evaluation of in-place density.	X						
F. Pile Foundations: Installation and load tests.					1705.7- 1705.9		
G. Pier Foundations: Seismic Design Category C, D, E, F.					1705.12- 1705.12. 9		

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INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)	C O N T I N U O U S	P E R I O D I C	REFERENCE STANDARD	B R C E N F Y E S R E N C E	C R H E Q C U K I R I E F D	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
H. Wall Panels and Veneers: Seismic Design Category E, F.				1705.12 - 1705.12. 9		

INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)	C O N T I N U O U S	P E R I O D I C	REFERENCE STANDARD	B R C E N F Y E S R E N C E	C R H E Q C U K I R I E F D	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
I. Sprayed Fire-Resistant Materials				1705.14		
1. Structural member surface conditions.				1705.14.2		
2. Application.				1705.14.3		
3. Thickness.			ASTM E 605	1705.14.4		
4. Density.			ASTM E 605	1705.14.5		
5. Bond strength.			ASTM E 736	1705.14.6		
J. Exterior Insulation and Finish Systems (EIFS)				1705.16		
K. Special Cases						
L. Smoke Control				1705.18		
M. Special Inspections for Seismic Resistance: Applicable to specific structures, systems, and components.						
1. Structural steel.	X		AISC Seismic	1705.12.2		
2. Structural wood.	X			1705.11.1		
3. Cold-formed steel framing.		X		1705.11.2		
4. Storage racks and access floors.		X		1705.12.7		
5. Architectural components.		X		1705.11		

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Irvington Union Free School District

Main Street School Renovations

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INSPECTION AND TESTING (Continuous & Periodic is as Defined by the BCNYS)	C O N T I N U O U S	P E R I O D I C	REFERENCE STANDARD	B R C E N F Y E S R E N C E	C R H E Q C U K I R I E F D	IDENTIFY SPEC SECTION AND PROVIDE CLARIFYING NOTES IF NECESSARY
6. Mechanical and electrical components.		X		1705.11		
7. Seismic isolation system.		X	ASCE7	1705.12.8		
N. Structural Testing for Seismic Resistance: Applicable to specific structures, systems, and components.				1705.13		
1. Testing and verification of masonry materials and assemblies.				1708.1		
2. Testing for seismic resistance.				1708.2		
3. Reinforcing and prestressing steel.			ACI 318			
4. Structural steel.			AISC Seismic			
5. Mechanical and electrical equipment.						
6. Seismically isolated structures.						
O. Structural Observations						
Applicable to specific structures.						
P. Test Safe Load						
Q. In-Situ Load Tests				1708.1		
R. Preconstruction Load Tests				1709.1		
S. Other (list)						

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Asbestos and lead-based paint certification.
- B. Moisture control.

1.02 RELATED SECTIONS

- A. Section 014100 - Regulatory Requirements
- B. Section 015719 - Temporary Environmental Controls

1.03 ASBESTOS AND LEAD-BASED PAINT CERTIFICATION

- A. Contractor shall submit the enclosed "Asbestos and Lead-Based Paint Certification" upon completion of all work.

1.04 MOISTURE CONTROL

- A. The Contractor shall maintain a strict policy and protocol for the control of water infiltration and moisture build-up during the course of the project. The plans and specifications are not intended to depict each and every condition or detail of construction. As the knowledgeable party in the field, the Contractor is in the best position to verify that all construction is completed in a manner which will provide a watertight structure. The Contractor has the sole responsibility for ensuring the watertight integrity of the structure. The Contractor's contractual obligations include, but are not limited, to the following:
- B. Water Infiltration: If the Contractor observes water infiltration (unintended) into a completed building or an ongoing construction site, he must immediately report the condition to the Owner and Architect, and shall immediately take steps to investigate the source of the water infiltration, identify the responsible party (person who performed work that resulted in water infiltration) and devise a procedure to promptly eliminate water infiltration into the building.
- C. Handling of Water-Damaged Building Materials and Construction:
 - 1. Contractor shall inspect all building materials delivered to the site for pre-existing water damage, as well as existing mold growth.
 - 2. If in-place construction becomes wet, notify the Owner and Architect immediately. The Owner and Architect will determine whether or not the work shall be removed and replaced, or if the type of material can be permitted to dry.
 - 3. Under no circumstances may new or additional construction be placed over, or otherwise enclose, wet building materials.
- D. Visible Mold/Mildew:
 - 1. If the Contractor observes any substance that appears to be mold or other fungal growth and/or an unidentified substance within a completed building or the ongoing construction site, he shall immediately suspend construction operations in the area, and report the condition to the Owner and Architect.
 - 2. No person shall be allowed back into the affected area without permission of the Owner.

1.05 SUBMITTALS

- A. Contractor shall submit completed and notarized "Certification of Asbestos and Lead-Based Paint" form.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

This space left intentionally blank.

**Certificate of Asbestos and Lead-Based Paint
(New Work)**

Client's Name: _____

Project Location: _____

Project Address: _____

Project Name: _____

Project Number: _____

CERTIFICATION:

This Contractor hereby certifies that no asbestos-containing material and lead-based paint, as defined by applicable federal and state regulations, has been furnished or installed at the referenced project:

Contractor Name: _____

Signature: _____

Address: _____

Telephone: _____ Date Executed: _____

This Form Shall Be Notarized

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes requirements for temporary facilities and controls, including temporary utilities, support facilities, and security and protection facilities.
- B. Temporary utilities include, but are not limited to, the following:
 - 1. Drainage.
 - 2. Water Service and distribution.
 - 3. Sanitary facilities, including toilets, wash facilities, and drinking-water facilities.
 - 4. Ventilation.
 - 5. Electric power service.
 - 6. Lighting.
 - 7. Temporary Heating.
- C. Support facilities include, but are not limited to, the following:
 - 1. Waste disposal facilities.
 - 2. Field offices.
 - 3. Storage and fabrication sheds.
 - 4. Lifts and hoists.
 - 5. Staging areas.
 - 6. Construction aids and miscellaneous services and facilities.
 - 7. Scaffolding and platforms
- D. Security and protection facilities include, but are not limited to, the following:
 - 1. Environmental protection.
 - 2. Stormwater control.
 - 3. Tree and plant protection.
 - 4. Pest Control.
 - 5. Site enclosure fence.
 - 6. Security enclosure and lockup.
 - 7. Barricades, warning signs, and lights.
 - 8. Covered walkways
 - 9. Temporary enclosures.
 - 10. Temporary partitions.
 - 11. Fire protection.
- E. Unless work of this section is indicated to be provided under a specific contract, Contractor must provide, maintain and remove required temporary facilities necessary to perform his own construction activities.
- F. Accessible Temporary Egress: Comply with applicable provisions in ICC/ANSI A117.1.

1.02 QUALITY ASSURANCE

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

5. Environmental protection regulations.
- B. Standards: Comply with NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations," ANSI A10 Series standards for "Safety Requirements for Construction and Demolition," and NECA Electrical Design Library "Temporary Electrical Facilities."
 1. Electrical Service: Comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service in compliance with NFPA 70 "National Electric Code."
- C. Inspections: Arrange for authorities having jurisdiction to inspect and test The temporary utility before use. Obtain required certifications and permits.

1.03 PROJECT CONDITIONS

- A. Temporary Utilities: The contractor will prepare a schedule indicating dates for implementation and termination of The temporary utility. At the earliest feasible time, when acceptable to the Owner, change over from use of temporary service to use of permanent service.
- B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary services and facilities as the work progresses. Do not overload facilities or permit them to interfere with progress. Take necessary fire-preventive measures. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist on-site.

1.04 DIVISION OF RESPONSIBILITIES

- A. General: These Specifications assign the Contractor responsibilities.
- B. The Contractor is responsible for the following:
 1. Installation, operation, maintenance and removal of The temporary facility considered as its own normal construction activity, as well as the costs and use charges except as listed below.
 2. Plug-in electric power cords and extension cords, supplementary plug-in task lighting, and special lighting necessary exclusively for its own activities.
 3. Its own storage and fabrication sheds.
 4. Hoisting requirements, including hoisting loads in excess of 2 tons, hoisting material or equipment into spaces below grade, and hoisting requirements outside the building enclosure. (Rigging Insurance must be provided by The prime contractor)
 5. Collection and disposal of its own hazardous, dangerous, unsanitary, or other harmful waste material.
 6. Secure lock-up of its own tools, materials and equipment.
 7. Construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities.
 8. Maintaining temporary facilities provided by Contractor.
 9. Complying with the regulations of the Commissioner of Education - 8 NYCRR 155.5 - Uniform Safety Standards for School Construction and Maintenance Projects specified in Division 1 Section "015001 - Uniform Safety Standards for School Construction."
 10. Containers for non-hazardous waste and debris generated by their own demolition and construction operations.

1.05 USE CHARGES

- A. General: Cost or use charges for temporary facilities are not chargeable to Owner, Architect or Owner's Construction Representative and shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, the following:
 - 1. The Owner's Construction Representative.
 - 2. Other Contractors.
 - 3. Owners construction forces.
 - 4. Occupants of Project.
 - 5. Architect .
 - 6. Testing Agencies.
 - 7. Personnel of authorities having jurisdiction.
- B. Water Service: Use water from the Owner's existing water system without metering and without payment of use charges. Access to water shall be approved by the Owner.
- C. Electric Power Service: Temporary electric power including set-up and maintenance is the responsibility of the Electrical Contractor.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. General: Provide new materials. If acceptable to the Architect / Construction Manager, the Contractor may use undamaged, previously used materials in serviceable condition. Provide materials suitable for use intended.
- B. Lumber and Plywood:
 - 1. For job-built temporary offices, shops, and sheds within the construction area, provide UL-labeled, fire-treated lumber and plywood for framing, sheathing, and siding.
 - 2. For signs and directory boards: provide exterior grade APA HDO plywood of sizes and thicknesses indicated.
 - 3. For vision barriers, provide minimum 3/8-inch-thick exterior plywood.
 - 4. For safety barriers, sidewalk bridges, and similar uses, provide minimum 5/8-inch-thick exterior plywood over appropriate wood framing.
- C. Paint:
 - 1. Paint surfaces exposed to view from Owner occupied areas in a color selected by the Owner's Construction Representative. Maintain coverage throughout the construction period.
- D. Tarpaulins: Provide waterproof, fire-resistant, UL-labeled tarpaulins with flame-spread rating of 15 or less. For temporary enclosures, provide translucent, nylon-reinforced, laminated polyethylene or polyvinyl chloride, fire-retardant tarpaulins.
- E. Water: Provide potable water approved by local health authorities. Protect water sources with approved backflow or vacuum breaker devices.
- F. Open-Mesh Chain Link Fencing: Provide 0.120-inch-thick, galvanized steel posts, and 2.875" diameter. Gate posts with 6 foot high mesh on stanchion posts spaced 8-foot on center maximum. Provide lockable gates with galvanized chains and security padlocks. Furnish keys to

the Owner, Owner's Construction Representative, Prime Contractor representatives, and necessary construction personnel.

- G. Temporary Roofing: 5/8" FR plywood roof sheathing and 45 mil reinforced EPDM membrane
- H. Temporary Flooring protection : " Ram Board" or equivalent with taped joints.

2.02 EQUIPMENT

- A. General: Provide new equipment. If acceptable to the Architect, the Contractor may use undamaged, previously used equipment in serviceable condition. Provide equipment suitable for use intended.
- B. Water Hoses: Provide 3/4-inch, heavy-duty, abrasion-resistant, flexible rubber hoses 100 feet long, with pressure rating greater than the maximum pressure of the water distribution system. Provide adjustable shutoff nozzles at hose discharge and vacuum breakers at hose bib connections .
- C. Fire Extinguishers: Provide hand-carried, portable, UL-rated, Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide hand-carried, portable, UL-rated, Class ABC, dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for the potential exposures.
 - 1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

PART 3 - EXECUTION

3.01 CONTRACTOR FIELD OFFICES

- A. Contractors may, with permission from the Owner and Owner's Construction Representative, establish a field office for their own use. Offices for the individual prime contractors, sub-contractors, specialty contractors and the like shall be of size and design as approved by the Owner and Owner's Construction Manager. Offices shall be located in the designated staging area. The representative contractor shall arrange for telephone service and electric service, if required, directly with the utility company. (No field offices or storage trailers will be allowed within 100 feet of any building.)
- B. Maintain, in the The contractor's field office, all articles for First Aid treatment. The contractor shall also establish standing arrangements for the immediate removal and hospital treatment of any employees and other persons on the job site who may be injured or who may become ill during the course work.

3.02 TEMPORARY AND PERMANENT SERVICES, GENERAL

- A. The Contractor's use of any permanent system or service of the building or portions thereof shall be subject to the Owners approval.
- B. The Contractor shall be responsible for any and all damage to permanent services used, and shall make good any and all damage to the satisfaction of the owner, prior to final completion and acceptance.
- C. NOTE - In accordance with OSHA and other applicable regulations, the representative Contractors performing erection of "skeleton" type work are solely responsible for the netting,

guard rail protection and such other safety devices as deemed necessary to protect the workers and public from harm.

3.03 TEMPORARY LIGHT AND POWER

- A. Temporary Electric Power Service: Electrical Contractor shall provide and pay all costs to provide a weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics to accommodate performance of work during the construction period.
1. Responsibility: All work under this section to be provided by the Electrical Contractor.
 2. Applicability: This section applies to all renovation and new construction work areas for this Project.
 3. Electrical Contractor shall make arrangements with utility company for temporary and permanent services immediately after award of contract.
 4. Temporary or permanent services for temporarily or permanently installed building equipment such as sump pumps, boilers, cabinet heating and/ or cooling units and fans shall be furnished, installed, operated and maintained so that the said equipment may be operated for drainage and temporary heat when required and/ or when so ordered by the Architect and Owner's Construction Representative.
 5. Electrical Contractor shall maintain all parts of the electrical system (temporary and permanent) active and in-service at all times throughout the contract duration. All temporary lighting to be controlled by standard switches per code (outside of power panels).
 6. Electrical contractor shall provide temporary generator power to maintain power to critical circuits during main electric service switch over. Critical circuits shall include fire alarm, emergency lighting, communication, information technology, heating units, etc. Coordinate required circuits with owner. Contractor shall assume a minimum of (2) 50 kw generators and temporary panels as necessary. Generators shall be located at the building exterior. Provide feeder cables, adequately sized, in accordance with NEC to feed temporary panels or existing sub-panels. Contractor shall include required fuel for operation.
 7. Electrical Contractor shall maintain power during the hours established by Owner's Construction Representative.
 8. Temporary Service: Install service and grounding in compliance with the National Electric Code (NFPA 70). Include necessary meters, transformers, overload protected disconnect and main distribution switch gear. Comply with all NECA, NEMA and UL Standards
 9. Provide temporary service with an automatic ground-fault interrupter feature, activated from the circuits of the system.
 10. Power Distribution System: Provide circuits of adequate size and proper characteristics for The use. In general run wiring overhead. Rise vertically where wiring will be least exposed to damage from construction operations.
 11. Provide metal conduit, tubing or armored cable for protection of temporary power wiring where exposed to possible damage during construction operations. Where permitted by code, wiring of circuits not exceeding 110-120 Volt 20 Amp rating and wiring of lighting circuits may be non-metallic sheathed cable in areas where located overhead and exposed. Do not wire temporary lighting with plain, exposed (insulated) electrical conductors. Provide metal enclosures or boxes for wiring devices.
 12. Provide overload-protected disconnect switch as required by code.
 13. For power hand tools and task lighting, provide temporary 4-gang outlets at The floor level, spaced so that a 50-foot extension cord can rThe The work area. Provide separate 110-120 Volt, 20 Amp circuit for The 4-gang outlet (4 outlets per circuit).
 14. Temporary electric power for Owner's Representative's field office.
 15. Temporary power and lighting for any sidewalk bridges.

16. Maintaining all existing systems, including but not limited to, power, lighting, fire alarm, intercom, kitchen freezers and refrigerators, etc., within the existing building operational at all times for Owner occupancy and construction.

B. TEMPORARY ELECTRICAL AND TELEPHONE SERVICES

1. Temporary Power Source: At The building / renovation area, use the existing electrical power distribution system for temporary power source.
2. Owner's Requirements: Do not disrupt the Owner's needs for continuous power at The building.
3. Electrical Contractor shall provide temporary power and lighting facilities for use of all trades. All temporary light and power shall be in accordance with the required Codes and Safety Standards. The temporary light and power shall be used until permanent light and power is completed or portions of the building(s) are enclosed.
4. Owner's Construction Representative on-site trailer already has power and data/tel wiring
5. All other contractor trailer use / connection charges for power and telephone to be paid by the respective contractor.

C. TEMPORARY POWER DISTRIBUTION

1. General Requirements: Electrical Contractor shall provide feeders and branch circuits of adequate size and proper characteristics as required to supply temporary receptacle and lighting loads. Size service and feeder conductors to restrict voltage drop to maximum 5 percent at 80 percent power factor. Provide properly sized overcurrent protection for The temporary electrical circuit.

D. RECEPTACLE REQUIREMENTS

1. General Requirements: Provide temporary receptacle outlets as required for operation of portable tools and appliances during the construction period.
2. Minimum Requirements: Provide a minimum of one quad 120 volt receptacle per 2500 square feet of building floor area, with maximum spacing of 50 feet on center.
3. Branch Circuits: All temporary receptacle branch circuits to be rated 20 amps with a maximum of (3) duplex receptacles per circuit. Temporary receptacle branch circuits shall be independent of temporary lighting circuits.

E. LIGHTING REQUIREMENTS

1. General Requirements: Electrical Contractor shall provide both interior and exterior lighting at areas where existing lighting has been removed and at new construction areas, as required to provide adequate illumination for safe and proper construction operations and Project Site security.
2. Minimum Requirements: Provide illumination levels adequate for construction operations and safe traffic conditions. As a minimum provide one 200 watt lamp per 400 square feet of building floor area, with maximum spacing of 20 feet. Any rooms in excess of 500 sf will receive one 400 watt metal halide fixture for The 1000 sq. ft. of area.
3. Stairways: Provide one 200 watt lamp per landing at The stairway.
4. Barricades: Provide adequate lighting for personnel safety at barricades, ladders, openings and other similar locations.
5. Supplemental Lighting: If required, supplemental lighting beyond minimum requirements shall be provided via suitable portable lighting units with cord and plugs, and shall be paid for by the Contractor or Sub-Contractor requiring such additional lighting.
6. Branch Circuits: All temporary lighting branch circuits to be loaded to a maximum of 1400 watts per 20 amp circuit. Temporary lighting branch circuits shall be independent of temporary receptacle circuits.

7. Restrictions: Do not use permanent lighting systems for temporary construction lighting purposes.

F. MAXIMUM LOADS

1. General: Lighting and power loads connected to the temporary power distribution system shall be limited to the following maximum individual loads:

	Load Type	Maximum
a.	120 V, 1 Phase	1.5 KVA
b.	208 V, 1 Phase	2.5 KVA
c.	208 V, 3 Phase	5.0 KVA

2. General: The temporary power distribution system shall be sufficiently sized to provide temporary power as required within this section. Meter and Meter connections to be part of electrical contractors base bid.

G. ELECTRICAL WELDERS

1. Separate Power Sources Required: Power for electric welders and for other loads larger than the maximum allowable sizes shall be taken from portable power sources provided, paid for and operated by the Contractor or Sub-Contractor requiring the use of such equipment. Remove such power sources when no longer needed.

H. ELECTRICAL ENERGY COSTS

1. Paid By Owner: Charges for electrical energy usage for temporary power and lighting will be paid by the Owner, when taken from the Owner's electrical services. Contractor and Sub-Contractors shall exercise measures to conserve energy usage. Use of Owner supplied electric for items not specific to project (e.g. heating construction shanties, etc.) will not be permitted.

I. USE CHARGES

1. General: Cost or use charges for temporary facilities are not chargeable to the Owner or the Architect, Engineer, or Owner's Construction Representative. The Architect and Owner will not accept a prime contractor's cost or use charges for temporary services or facilities as a basis of claim for an adjustment in the Contract Sum or the Contract Time.
 - a. Water Service Use Charges: Water from the Owner's existing water system may be used without metering, and without payment for use charges.
 - b. Electric Power Service Use Charges: Electric power from the Owner's existing system may be used without payment of use charge

3.04 TEMPORARY TOILET FACILITIES

- A. Sanitary Facilities: Sanitary facilities include temporary toilets, wash facilities and drinking water fixtures. Comply with governing regulations including safety and health codes for the type, number, location, operation and maintenance of fixtures and facilities; provide not less than specified requirements. Install in locations which will best serve the project's needs. Owner's existing facilities shall not be used.
- B. Responsibilities: The General Construction Contractor is responsible for temporary sanitary facilities and their maintenance, cleaning and supplies for use by all trades. Sufficient quantity/locations to properly handle the amount of workers on-site.

- C. Supply and maintain toilet tissue, paper towels, paper cups and other disposable materials as appropriate for The facility, including Owner's Construction Representative temporary offices for full contract duration. Provide covered waste containers for used material.
- D. Install self-contained toilets to the extent permitted by governing regulations.
- E. Provide separate toilet facilities for male and female construction personnel.
- F. Provide separate toilet facilities for Owner's Construction Representative located at Staging Area at the direction of Owner's Construction Representative.

3.05 TEMPORARY HEATING

- A. The Mechanical Contractor will maintain 60 degree temperature in all areas via temporary and/or permanent systems. The Mechanical Contractor will submit a detailed plan including sketches indicating his proposed temporary heating system for engineer approval within 1 week of contract award. The Electrical Contractor will provide permanent or temporary power for the Mechanical Contractor's units for temporary heating. General Work Contractor will insure all windows / doors and work areas are fully enclosed. (Any missing components at time of temporary heat activation will be enclosed via 5/8 inch thick plywood, 2" rigid polyisocyanurate and 6-mil fire-retardant polyethylene sheeting for a weather-tight insulated enclosure.)
- B. The fuel, equipment, materials, operating personnel and methods used therefore shall be at all times satisfactory to the Architect and Owner's Construction Representative and adequate for the purpose intended. The use of electric heaters is not acceptable. All required fuel is part of this contract.
- C. The Contractor shall maintain the critical installation temperatures provided in the technical provisions of the specifications herein for all work in those areas where same is being performed.
- D. The maintenance of proper heating, ventilation and adequate drying out of the work is the responsibility of the contractor and any work damaged by dampness, insufficient or abnormal heating, shall be replaced to the satisfaction of the Architect by and at the sole expense of the contractor.
- E. Before and during the placing of gypsum and the application of other interior finishes, taping, varnishing, painting, etc. and until final acceptance by the Owner of all work covered by the Contract, the contractor shall, unless otherwise specified in the contract documents, maintain a temperature of 60 degrees F. Coordinate with Division 9 of the Technical Specifications.
- F. Use of the permanent system, if approved by engineer and owner permission granted, shall not shorten, or negate any equipment, or system guarantees required under this contract. (the warranty period starts upon the date of Substantial Completion). Two additional filter changes are to be provided by Mechanical Contractor. A program of use, maintenance and restoration will be submitted with request for use of systems for temporary services.

3.06 TEMPORARY WATER

- A. The Plumbing Contractor shall:
 - 1. Provide and maintain a temporary water system of size and capacity as required below to supply the needs of all Contractors for the work.

2. Provide no less than two 3/4 inch hose bibs conveniently located at The building wing.
3. Provide and pay for all connections and permits.
4. Install such temporary water system so that service shall be available at the commencement of the work. The permanent water risers and lines may be used for temporary water supply. The permanent services shall be turned over to the Owner in perfect condition. Any repairs required due to temporary use shall be made at the sole expense of the plumbing contractor.
5. Protect temporary and permanent lines against any damage.
6. Remove all temporary lines when directed by the Owner's Construction Representative when such lines are no longer required.
7. Water source is only available from building. If contractor decides distance is too far he should use water storage tanks or struck at no additional charge to the owner.

B. The Contractor shall:

1. Provide all hose and other extensions from connections installed by the Plumbing Contractor and all labor, materials and supplies required to supply water to the work.
2. Prevent water damage to the work.

3.07 STORAGE FACILITIES

- A. The Contractor shall provide temporary storage shanties, tool houses and other facilities as required for their own use. Temporary structures shall be located at the staging area and shall be removed upon completion of the work or when directed.
- B. Materials delivered to the site shall be safely stored and adequately protected against loss or damage. Particular care shall be taken to protect and cover materials that are liable to be damaged by the elements.
- C. Due to limited on site storage space, The Contractor shall coordinate delivery of his materials with the Owner's Construction Representative who will determine when large deliveries shall be made and shall be designate storage locations on site for delivered materials. All stored materials must be stored in locked, watertight trailers, paid for by applicable contractor.

3.08 SCAFFOLDING AND STAGING

- A. All scaffold, staging and appurtenances thereto shall comply in total to the requirements of Safety and Health Regulations for Construction Chapter XVII of OSHA, Part 1926 and all related amendments.

3.09 RUBBISH CONTAINER

- A. The Contractor shall provide suitable rubbish container device(s) for his own use (both demolition and construction debris), properly maintained and serviced, replaced as required and protected from access by the public fencing as may be specified herein or approved by the Architect and Owner's Construction Representative.
- B. Contractor and Subcontractor shall sweep up and gather together daily all his own rubbish and removed materials and place same in containers.

3.10 CONSTRUCTION FENCING

- A. Construction fencing and barriers shall be provided by the General Construction Contractor, enclosing all work and storage areas as outlined in staging, plan and specified within. Temporary construction fencing shall be of good quality and neat in appearance.
- B. Site access gates shall be provided as required, complete with all operating hardware and security devices.
- C. Should fencing be required to be relocated or modified during the course of the project due to additional access needed by the contractor, same shall be done at the total expense of the contractor.
- D. The construction fence shall be maintained in good order by all contractors throughout the life of the project.
- E. Note: Should any contractor damage or cause the need for repair to the construction fence, all costs involved with said repair will be back-charged to the contractor creating the need for repair.
- F. General Construction Contractor shall provide a 60' x 150' fenced staging area at the location designated on the drawing for use by all trades. All fenced areas to be 6' high galvanized chain link fencing, 9 ga fabric on 10' long framed sections on stanchions. Gate locations as directed by Owner's Construction Representative. If additional storage is necessary, the contractors may use the remote staging area where Owner's Construction Representative's trailer is located.

3.11 JANITORIAL SERVICE/DAILY CLEANUP

- A. The Contractor shall furnish daily janitorial services for the project and perform any required maintenance of facilities as deemed necessary by the Architect and Owner's Construction Representative during the entire life of the contract. If any contractor fails to keep the site safe and broom clean within 4 hours of being notified by Architect or Owner's Construction Representative, either verbally or in writing, the Owner's Construction Representative will have the cleanup work performed by others and the contractors will be back charged accordingly.
 - 1. The Contractor shall provide daily trash collection and cleanup of the project area and shall dispose of all discarded debris, and the like in a manner approved by the Owner's Construction Representative.

3.12 BURNING

- A. Burning will not be permitted.

3.13 MAINTENANCE OF PERMANENT ROADWAYS

- A. The General Construction Contractor shall immediately remove dirt and debris which may collect on permanent roadways created by their work, deliveries, manpower, equipment, etc.
- B. Temporary roads / entrance mats will be maintained by General Construction Contractor to insure that no mud, dust, dirt goes onto asphalt areas.

3.14 FIRE PREVENTION CONTROL

- A. The Contractor shall comply with the safety provisions of the National Fire Protection Association's "National Fire Codes" pertaining to the work and, particularly, in connection with any cutting or welding performed as part of the work.

3.15 TEMPORARY FIRE PROTECTION

- A. The Contractor shall take all possible precautions for the prevention of fires.
 - 1. Where flame cutting torches, blow torches, or welding tools are required to be used, their use shall be as approved by the Owner's Construction Representative at the site.
 - 2. When welding tools or torches of any type are in use, have available in the immediate vicinity of the work a fire extinguisher of the dry chemical 20 lbs. Type. The fire extinguisher(s) shall be provided and maintained by the Contractor doing such work.
- B. Fuel for cutting and heating torches shall be gas only and shall be contained in Underwriters laboratory approved containers.
- C. Storage of gas shall be in locations as approved by the Owner and subject to Fire Department regulations and requirements.
- D. No volatile liquids shall be used for cleaning agents or as fuels for motorized equipment or tools within a building except with the express approval of the Owner and/or Architect and in accordance with local codes. On-site bulk storage of volatile liquids shall be outside the buildings at locations directed by the Owner, who shall determine the extent of volatile liquid allowed within the building at any given time.
- E. The Contractor shall comply with the following requirements relating to compressed gas:
 - 1. Where compressed gas of any type is used for any purpose at the site, it shall be contained in cylinders complying with ICC regulations. Gases of different types shall not be stored together except when in use and when such proximity is required.
 - 2. All gas cylinders shall be stored in sheds constructed of noncombustible materials. Sheds shall be well ventilated and without electric lights or fixtures and shall be located as far from other buildings as is practicable. All gas cylinders not in actual use, or in proposed immediate use, shall be removed from the building under construction or reconstruction. Empty gas cylinders shall be removed prior to bringing in a replacement cylinder. Cylinders shall at all times be supported and braced in an upright position. When not in use, the protective cap shall be screwed over the valve.
 - 3. All persons required to handle gas cylinders or to act as temporary firemen (Fire Watchers) shall be able to read, write and understand the English language; they shall also be required by the Contractor to read Part 3 of Pamphlet P-1 "Safe Handling of Compressed Gases" published by the Compressed Gas Association, 500 Fifth Avenue, New York, NY 10036.
 - 4. Where local ordinances are in effect regarding gas cylinders, (their use, appurtenances and handling), such ordinances shall supplement the requirements of this paragraph. All personnel engaged in fire watch shall be certified by the Local Fire Department having jurisdiction.
 - 5. Any cylinder not having the proper ICC markings or re-inspection marking, or any cylinder with a leak shall be isolated immediately away from any building and the supplier shall be immediately notified; such other precautions as may be required to prevent damage or injury shall also be taken by the Contractor.

- F. The Contractor shall comply with the following requirements relating to welding and cutting:
1. All cutting and/or welding (electric or gas) must be done only by skilled, certified and licensed personnel.
 2. During welding or cutting operations, a contractors man shall act as a fire watcher. The fire watcher shall have proper eye protection and suitable fire fighting equipment including fire extinguisher (bearing current inspection Certificate), protective gloves and any other equipment deemed necessary.
 3. Welding or cutting shall not be done near flammable liquid, vapors or tanks containing such material.
 4. Where cutting or welding is done above or adjacent to (within two feet) combustible material or persons, a shield of incombustible material shall be installed to protect against fire or injury to sparks or hot metal.
 5. Tanks supplying gases for welding or cutting are to be placed in an upright position securely fastened, and close as practical to the operation. Tanks, actives or spares, shall be protected from excess heat and shall not be placed in stairways, hallways or exits. When not in use, protective valve cap shall be screwed on the cylinder.
 6. Adequate fire extinguishing equipment shall be maintained at all welding or cutting operations.
 7. The Contractor shall secure all required inspections.
 8. All equipment, hoses, gauges, pressure reducing valves, torches, etc., shall be maintained in good working order and all defective equipment shall immediately be removed from the job.
 9. No person shall be permitted to do any welding or cutting until his name, address and current license number have been submitted in writing to the Owner.
- G. Contractors for work outside the building shall commence operations promptly on award of Contract, and shall be responsible for same being kept clear of materials and debris in connection with their own work and that of other Contractors. If a Contractor for outside work allows other contractors to deposit material and debris over its lines, the Contractor shall be responsible for all delay and extra cost occasioned thereby.

3.16 DISCONTINUE, CHANGES AND REMOVAL

- A. All Contractors shall:
1. Discontinue all temporary services required by the Contract when so directed by the Construction Manager or Architect.
 2. The discontinuance of any such temporary service prior to the completion of the work shall not render the Owner liable for any additional cost entailed thereby and The Contractor shall thereafter furnish, at no additional cost to the Owner, any and all temporary service required by such Contractors work.
 3. Remove and relocate such temporary facilities as directed by the Construction Manager or the Architect without additional cost to the Owner, and shall restore the site and the work to a condition satisfactory to the Owner.

3.17 VENTILATION AND HUMIDITY CONTROL FOR CONSTRUCTION:

- A. General Construction Contractor will provide temporary ventilation as required for protecting the building from any adverse effects of high humidity during abatement and construction activities. Select dehumidification and ventilating equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements and have sufficient quantity of units to produce necessary ambient conditions.

1. The Contractor shall be responsible for his own temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity.
2. Ventilate enclosed area to dissipate humidity, and to prevent accumulation of dust, fumes, vapors or gases.
3. Provide equipment as necessary for air and fresh exchange for the work area per OSHA standards.
4. Remove temporary ventilation equipment prior to the completion of construction.
5. If Contractor fails to adequately ventilate the building during the construction, abatement / roofing process, thereby causing humidity and possible mold issues, the owner will hire others to properly address and deduct costs from the Contractor accordingly.
6. General Construction Contractor will provide negative air machines of sufficient size/qty to fully ventilate the square footage of work areas and exhaust any dust/fumes through flexible duct hose to exterior top eliminate any odors / smoke.
7. Any contractor that allows water infiltration into any building shall be held responsible for the cleanup and provision of commercial dehumidifiers of sufficient size and quantity to prevent the generation of mold spore growth. Failure on the contractors part to address this issue within 4 hours of notice, will result in the Owner hiring outside parties to accomplish the required work in order to insure a safe environment. Owner will subsequently backcharge the contractor responsible for the water infiltration for all associated costs of hiring this outside contractor to carry out the work required.

3.18 TEMPORARY ROADS AND PERMANENT PAVED AREAS:

- A. General Construction Contractor shall construct and maintain temporary road areas adequate to support loads and to withstand exposure to traffic during construction period. See staging plan for construction requirements, materials, thicknesses, locations, etc.
 1. Includes access for delivery through staging area to building work areas, and to equipment and storage areas and sheds.
 2. Provide dust-control treatment that is nonpolluting and non-tracking. Reapply treatment as required to minimize dust.
 3. Temporary areas are installed and/or maintained for access to all required areas of the sites.
 4. Contractors will be permitted to utilize existing campus roads, as designated (as segregated by the Owner - if required).
 5. Road Cleaning: Maintain roads and walkways in an acceptably clean condition. This includes the removal of debris daily, if required, and/or a minimum of once a week due to all project traffic. Road cleaning equipment to be wet/vacuum type. The General Construction Contractor will clean roads for debris from building-related activities.
 6. General Construction Contractor shall provide snow plowing of temporary road, parking area, access route, and a 5' walkway to office trailer. Provide snow removal and walking of walkways to Owner's Construction Representative office trailer. The school district will provide snow plowing of established routes.
 7. Staging Areas:
 - a. Temporary parking by construction personnel shall be allowed only in areas so designated and confirmed with the District.
 - b. Traffic Regulations:
 - 1) Access through Owner's entrances shall be limited. Confirm access locations and time frames with the District or Owner's Construction Representative when required.
 - 2) Utilize only entrances/temporary roads as designated.
 - 3) Maintain all District traffic regulations and site access.

- 4) Construction parking will not be allowed adjacent to District buildings, additions or monuments. Construction parking will be located in areas designated by the District or Owner's Construction Representative.
- 5) Construction employee parking to be located as directed by the Owner's Construction Representative.

3.19 TRAFFIC CONTROLS:

- A. General Construction Contractor shall provide temporary traffic controls at junction of temporary roads with public roads. Include warning signs for public traffic and "STOP" signs for entrance onto public roads, barricades, flagmen, etc. Comply with requirements of authorities having jurisdiction.

3.20 DEWATERING FACILITIES AND DRAINS

- A. The Prime Contractor is directly responsible for dewatering of their excavations. The responsibility of dewatering of the site as to facilitate the work will be the responsibility of the General Construction Contractor, coordinate with the Owner's Construction Representative
- B. Comply with requirements in applicable Division 31 Sections for temporary drainage and dewatering facilities and operations not directly associated with construction activities included in individual Sections. Where feasible, common use of dewatering and drainage facilities is recommended. Maintain Project site, excavations, and construction free of water.
 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties, nor endanger permanent drainage systems. Provide temporary drainage where roofing or similar waterproof deck construction has been completed.
- C. Remove snow and ice, on a daily basis, to minimize accumulations.

3.21 ROOF PROTECTIONS

- A. The General Construction Contractor shall provide temporary protection on the roof surface when it is necessary for work to take place on completed roof areas. Other Primes shall be held responsible to notify the General Construction Contractor of their work and required roof protection areas.
- B. When requested by other trades as noted above, the General Construction Contractor shall provide a minimum of 2 inch thick Polyisocyanurate or Extruded Polystyrene (40 psi) rigid insulation with a 5/8" plywood overlay to protect existing roofing system from damage. Provide removable weighting systems to protect against wind uplift / blow-offs of these protective materials.
- C. Based upon the requirements noted above, the General Construction Contractor shall assume responsibility for any damage(s) to the roofing system caused by the work of other trades, except that financial responsibility for any damage(s) to the roofing system shall be that of the Contractor responsible for the damage(s) as determined by the Owner's Construction Representative.

3.22 SIGNAGE

- A. The General Construction Contractor shall provide signs as required below. Install signs where required or indicated to inform public and persons seeking entrance to project site. All signage and posts provided shall become the property of the District at the conclusion of the project.

- B. Prepare temporary signs to provide directional information to construction personnel and visitors.
- C. Construct signs in accordance with section 619 of the NYS DOT standard specifications (MUTCD overall sign size, letter size, metal signage). Support on breakaway metal posts or attach to fencing using zip ties to prevent unauthorized removal; do not attach signs to buildings or permanent construction.
- D. Paint sign panel and applied graphics with exterior-grade alkyd gloss enamel over exterior primer. Engage an experienced sign painter or fabricator to apply graphics. Signs shall have an orange background with black letters/graphics unless directed otherwise.
- E. Include relocating temporary site safety and directional signs as many times as required or directed by the Owner's Construction Representative.
- F. The General Construction Contractor shall furnish, install and relocate all construction signage as required at The project site.
- G. Project Sign Requirements:
 - 1. Ten (10) signs shall be provided and located (and relocated) as designated by the District or Owner's Construction Representative for construction traffic control/flow at entrances/exits.
 - 2. Four (4) signs for "Construction Parking".
 - 3. Four (4) signs to direct deliveries
 - 4. Ten (10) signs for "Emergency egress only - Construction Area" per OSHA standards.
 - 5. Ten (10) signs for "No Smoking" safe work site at multiple locations as directed by Owner's Construction Representative.
 - 6. Fifteen (15) signs for "Construction Area - Do Not Enter" mount on fence as directed by the Owner's Construction Representative.
 - 7. Ten (10) signs for "No Trespassing" mounted on construction fence as directed by the Owner's Construction Representative.
- H. A pre-mobilization meeting to establish location and quantities of all signage will be held with contractor, Construction Manager, and the Owner. Prior to the start of any actual work the signage must be reviewed / approved by the Owner's Construction Representative.

3.23 ENVIRONMENTAL PROTECTION:

- A. The General Construction Contractor shall provide protection, operate temporary facilities, and conduct construction with means and methods that comply with local and state environmental regulations and that minimize possible air, waterway, and subsoil contamination, pollution or other undesirable effects. Avoid using tools and equipment that produce harmful noise. Restrict the use of noise-producing tools and equipment to hours that will minimize complaints from persons, residential occupants, or firms near Project site.

3.24 STORMWATER CONTROL

- A. The General Construction Contractor shall provide earthen embankments, silt fencing, haybales, and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding by runoff of stormwater.

3.25 SECURITY ENCLOSURE AND LOCKUP:

- A. The Contractor shall provide protection and security for partially completed areas of construction. Provide barricades to prevent unauthorized access, vandalism, theft, and similar violations of security.

3.26 BARRICADES, WARNING SIGNS AND LIGHTS:

- A. Comply with standards and code requirements for erecting structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and public of possible hazard.
 - 1. For safety barriers, sidewalk bridges, and similar uses, provide minimum 5/8-inch thick exterior grade APA BC plywood with structurally adequate supports and/or scaffolding as approved by the Owner's Construction Representative.

3.27 TEMPORARY ENCLOSURES

- A. The General Construction Contractor shall provide temporary enclosures for protection of construction from exposure to inclement weather and for safety of any roof related openings. Close openings in roof deck with load bearing wood frame construction members (sized for design roof loads), 5/8" exterior grade, structural 1, APA BC plywood and watertight EPDM adhered membrane.
- B. The General Construction Contractor shall fully enclose all windows / door openings. Maintain access and egress for workers via secured temporary doors / gates. During periods of temporary heat provisions, provide 5/8 inch, exterior grade, APA BC plywood with 2 inch rigid polyisocyanurate and 6 mil polyethylene sheeting for a weather-tight, secure and insulated enclosure. Temporary doors shall have an exit device and door closer.
- C. Any other temporary enclosures for specific openings for any contractor to perform their work shall be the responsibility of the contractor requiring / creating the opening. These openings shall be installed to protect the building from exterior elements, security issues, odors and noise resulting from construction operations.

3.28 TEMPORARY PARTITIONS

- A. The General Construction Contractor shall erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate work areas.
 - 1. Construct dustproof, floor to ceiling partitions of not less than 3-5/8" - 20 ga. studs; 2 layers of 6 mil fire-retardant polyethylene sheets inside / outside; 5/8 inch thick exterior grade plywood sheathing; 5/8 inch thick interior, Type X gypsum board, taped spackled (1 coat) and painted.
 - 2. Cover floor with 2 layer fire retardant polyethylene and extend 18 inches vertically at The side. Overlap and tape all joints.
 - 3. Sound insulate partitions to provide noise protection to occupied areas
 - 4. Caulk joints and perimeter to prevent dust migration. Equip partitions with dustproof doors and security locks.
 - 5. In addition to any temporary partition locations shown on drawings, the General Construction Contractor shall include in its base bid a minimum of six (6), 9 foot by 12 foot temporary partitions meeting criteria listed above for use and located where directed by the Owner's Construction Representative. The location shall be equipped with a 3 foot wide by 7 foot high hollow metal door/frame with hinges, closer and exit device hardware.

3.29 AREA OF SPECIAL PROTECTION

- A. In the event of an emergency (designated by the sounding of the fire alarm system) all construction activities must immediately cease. Contractor's work force will evacuate themselves from work areas and remain outside of work areas until the "all clear" is given. No work operations will be tolerated during the evacuation of the building or during an emergency.
- B. Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways, and subsoil might be contaminated or polluted or that other undesirable effects might result. Avoid use of tools and equipment that produce harmful noise. Restrict use of noise-making tools and equipment to hours that will minimize complaints from persons or firms near the site.

3.30 OPERATION, TERMINATION AND REMOVAL:

- A. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.
- B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage.
 - 1. Maintain operation of temporary enclosures on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
 - 2. Protection: Maintain markers for underground lines. Protect from damage during excavation operations.
- C. Termination and Removal: Unless the Architect requests that it be maintained longer, remove The temporary facility when the need has ended and no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been affected because of interference with the temporary construction / facilities. Repair damaged work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are the property and responsibility of the General Construction Contractor.
 - 2. At Substantial Completion, clean, repair and renovate permanent facilities used during the construction period.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. The Work of this Section includes the furnishing of the Owner's Construction Representative's Field Office (Trailer).
 - 1. The Owner's Construction Representative's Field Office shall be furnished by the General Construction Contractor.
 - 2. It shall be provided within the time period specified hereinafter.
- B. The General Construction Contractor shall also furnish the following to the Owner/ Owner's Construction Representative's all in accordance with the specifications contained herein as follows:
 - 1. Miscellaneous equipment and supplies
 - 2. Materials
 - 3. Computer system with associated peripheral computer related equipment
 - 4. Services as may be specified herein.
- C. The Electrical Contractor shall install two (2) new telephone services (telephone and fax/modem) for the exclusive use of the Owner's Construction Representative's. The telephone services shall be provided to the Construction Manager's construction trailer located on the site as selected by the Owner's Construction Representative's. The costs associated with providing the Owner's Construction Representative's's telephone services shall be included in the price as-bid and is not eligible for payment out of any cash allowance.
- D. This Section also specifies the requirements for Field Offices to be established by all Prime Contractors for the exclusive use of the respective Prime Contractor.

1.02 CARE AND PLACEMENT

- A. Field offices shall be placed where directed by the Owner's Construction Representatives's in accordance with site utilization requirements.
- B. All field offices shall be installed to meet all standards of the Occupational Safety and Health Act of 1970 and subsequent revisions.
- C. In the event of damage to existing facilities, including but not limited to: tanks, driveways, walks, pavement, buildings, pipes, conduits, valves, and electrical facilities then immediately make all repairs and replacements to an equal condition prior to the event.

1.03 QUALITY PERFORMANCE

- A. Comply with and perform all work in accordance with the requirements of local authorities and utility companies having jurisdiction.

1.04 SUBMITTALS

- A. The General Construction Contractor shall submit the following:
 - 1. Floor plan of the proposed Field Office of the Owner's Construction Representative's.
 - 2. Catalog cuts of miscellaneous equipment and supplies if they are different from that specified.

- B. The Contractor shall also provide a listing of the companies providing specified services with telephone number and contact name. Provide references for each company when requested.

PART 2 - PRODUCTS

2.01 OFFICE OF PRIME CONTRACTORS

- A. The General Construction and the other Prime Contractors shall provide and maintain during the life of this contract separate and suitable offices at the site that shall be used as the Contractor's superintendent office.
- B. Provide adequate facilities for maintaining record documents, for holding small meetings and a telephone upon which calls may be received from Owner, Architect and others. The telephone shall be equipped with a fax machine and an answering machine.
- C. Each Contractor shall install, maintain, and repair if necessary, temporary electric and telephone to their own field office.

2.02 MATERIALS, EQUIPMENT AND SERVICES FURNISHED TO THE OWNER BY THE GENERAL CONSTRUCTION CONTRACTOR

- A. The General Construction Contractor shall also furnish the following equipment and services that shall not be eligible under any cash allowance. All items specified herein shall be new and remain the property of the Owner unless otherwise stated. The following shall be furnished:
 - 1. Two (2) 23-gallon plastic wastepaper basket.
 - 2. New 50-person industrial first aid station, OSHA approved, by Acme United or equal, order no. ACM-1403 (Huntington Business Products) or equal.
 - 3. Thermometer, with indoor and outdoor sensing bulbs, and high, low instantaneous reading, with magnetic reset function by Radio Shack or equal.
 - 4. Two U.L. and F.M. approved fire extinguishers with a minimum rating of 4A-60B:C.
 - 5. Standard manufacturer operating manuals for all equipment supplied.
 - 6. One (1) 30" x 60" desk with 4 side drawers and a locking center drawer.
 - 7. One (1) new swivel task chair for use with desk equal to order no. SUP-12223643 by Superior Chair (Huntington Business Products).
 - 8. One (1) new rolling stand with top, Model No. 76MR/76TP from Plan Hold, catalog #27, or equal.
 - 9. Two (2) 48" x 60" reference tables.
 - 10. Six (6) folding chairs.
- B. Janitorial Services - Provide janitorial services two (2) times each week. Thoroughly clean and dust entire office and leave in a condition satisfactory to Architect. Provide this service through final completion.
- C. Ownership of Furnishings - All items to be provided by Contractor under this paragraph shall remain the property of the Owner unless otherwise stated.
- D. Internet Access Service - The Contractor shall also pay for monthly Internet access fees at a cost not to exceed \$45.00 per month for the length of the contract up to the date of final completion.
 - 1. This cost shall be included in the price as bid and shall be billed directly to the General Construction Contractor.

FIELD OFFICES

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2. The service provider shall be selected by the Architect. The General Construction Contractor shall arrange for the service.
 3. Internet access will be used by the Architect and the Owner to send email to manufacturers, vendors, Architect's home office, the Contractor's home office, other prime Contractors, regulatory agencies and the like.
 4. The Contractor may use this service at the discretion of the Architect. Only project related transmissions will be allowed.
 5. If high speed DSL or cable service is available, then the Contractor shall arrange for this service in lieu of a dial up service.
- E. All items specified herein are subject to the approval of the Architect or the Owner's Construction Representative's.
- F. Equipment shall be delivered to the site and turned over to the Architect via a type written transmittal form.
- G. All equipment that is to remain the property of the Contractor shall be new.
1. Equipment that is to remain the property of the Owner shall also be new and be provided in it's factory packaging, unopened until delivered to the Owner/Architect.
 2. Maintenance of all supplied equipment shall be the Contractor's responsibility up to substantial completion.
- H. All items shall be delivered prior to the first application for payment, but no later than the day the Owner's Construction Representative's's Trailer is delivered.
- I. Construction Manager's Field Trailer:
1. Office - The General Construction Contractor shall furnish, equip, and maintain a field office at the site for the exclusive use of Owner/Architect.
 - a. The field office shall be of substantial weatherproof construction, with a usable floor space of not less than 10' x 40' overall.
 - b. Office may be in an approved, near new condition, independent trailer, completely skirted with insulation and with sufficient landings and stairs at each door.
 - c. Submit a scaled floor plan of the trailer.
 2. Duration - Provide office by no later than 30 calendar days from the date of the Notice To Proceed and maintained during the life of the Contract, up to the date of the Final Certificate.
 3. Location - As directed by Owner/Architect or Owner's Construction Representative's. Relocate during the progress of the work, without additional cost to Owner, as may be required by the Owner/Architect or Owner's Construction Representative's.
 4. Utilities - Provide the following in sufficient size, quantity, and capacity, as approved by the Owner/Architect.
 - a. Windows for natural light and ventilation, with locks, screens, and shades or curtains.
 - b. Lighting acceptable to the Owner/Architect/Owner's Construction Representative's.
 - c. Door with screen, with hasp and padlock and five keys for Owner/Architect's use. Two (2) doors minimum. Provide two (2) commercial grade foot mats at each door.
 - d. Air conditioning unit and heater in each room, sized to maintain an indoor temperature of 60 deg. F with an outdoor temperature range of 10 deg. F to 90 deg. F.
 - e. 110 volts, 100-amp electric service with sufficient receptacles spaced around the room.

2.03 REMOVALS

- A. Remove all items provided under this Section except as otherwise specified.

PART 3 - EXECUTION

3.01 REMOVAL OF UTILITIES, FACILITIES AND CONTROLS

- A. Remove temporary above grade or buried utilities, equipment, facilities and materials.
- B. Remove underground installations to a minimum depth of 2 feet or as specified elsewhere.
- C. Regrade area to existing slope and elevation and restore the surface to its existing condition or to the condition shown on the Contract Drawings.
- D. The General Construction Contractor shall inventory all equipment that has been turned back to the Contractor prior to agreeing to final payment.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. This Section includes the general requirements for products that are to be furnished, installed, or otherwise incorporated into the project.

1.02 QUALITY ASSURANCE APPLIES TO ALL PRODUCTS

- A. In addition to the Contractor's warranties and guarantees on materials and equipment required under the General Conditions of the Contract and the Technical Specifications contained hereinafter, the Contractor shall also be responsible for all materials, equipment, and products that have or is planned to be incorporated into the work.
 - 1. The Contractor shall be responsible for the finished work and that it accurately and completely complies with these Contract Documents.
 - 2. The Contractor shall be responsible for work performed by subcontractors, equipment suppliers, and material vendors.
 - 3. The Contractor shall be satisfied as to the product's performance before it is ordered for installation. At the Contractor's option, he/she shall have tested each product to determine compliance with these specifications.
- B. The Architect may check all or any portion of the work and the Contractor shall afford all necessary assistance to the Architect in carrying out such checks.
 - 1. Such checking by the Architect shall not relieve the Contractor of any responsibilities for the accuracy or completeness of the work.
 - 2. Such checking is a courtesy service being provided by the Owner and does not relieve the Contractor of his/her responsibilities under this Construction Contract.
- C. If witnessed shop tests or inspections are required at the point of manufacture, the Contractor shall keep the Architect advised as to the progress of the work to allow inspection at the proper time and place. Provide at least two (2) weeks advance notice before scheduled shop tests.
- D. Should a dispute arise as to the quality of workmanship, equipment or material performance, then the final decision regarding acceptability with these Contract Documents shall be that of the Owner.
- E. At the request of the Architect, the Contractor shall promptly provide the services of a competent representative of the manufacturer at the project site, fully equipped and prepared to answer questions, perform tests, make adjustments and to prove compliance with the Contract Documents free of all additional charges. Proof of compliance shall be the responsibility of the Contractor, and such special visits to the project site by the manufacturer shall not be eligible under any cash allowances or stipulated man-hours necessary to startup the system and/or train the Owner as may be specified in the Technical Specifications.

1.03 QUALITY ASSURANCE - EQUIPMENT

- A. Erect and install products under the supervision of a competent and experienced superintendent. The method of installation, including anchorage, clearances, and tolerances for rotating assemblies, methods of support for equipment and adjacent piping, shall be as recommended by the equipment manufacturer unless detailed on the Drawings or specified.
- B. All material furnished shall be new, and guaranteed free from defects in workmanship, installation, and design.

- C. Design and fabricate equipment in conformance with ANSI, ASTM, ASME, ASHRAE, IEEE, NEC and NEMA Standards.
 - 1. Equipment shall withstand the stresses that may occur during fabrication, testing, transportation, installation and conditions of operation.
 - 2. Pumps shall conform to the requirements of the Hydraulic Institute.
 - 3. Equipment shall comply with the latest OSHA regulations and the ANSI Safety Standards.
- D. Equipment shall be products of manufacturers who produce evidence of their ability to promptly furnish any and all interchangeable replacement parts as may be needed at any time within the expected life of the equipment.
- E. Manufacturers shall also have readily available access to suitable and accurate testing facilities for performing the required shop tests.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. Equipment shall have been in successful regular operation under comparable conditions for a period of at least five (5) years.
 - 1. This time requirement does not apply when the manufacturer posts an Owner/Architect acceptable Performance Bond or Letter of Credit for the duration of the time period that will guarantee replacement of the equipment in the event of failure.
 - 2. The bond shall be in a form that is acceptable to the Owner's legal council.
- B. The Owner reserves the right to reject any material or equipment manufacturer who, although he appears to be qualified and meets the technical requirements, does not provide satisfactory evidence indicating adequate and prompt post-installation repair and maintenance service, as required to suit the operational requirements of the Owner.
- C. Whenever it is required that the Contractor furnish materials or manufactured articles or shall do work for which no detailed specifications are set forth, the materials or manufactured articles shall be of the best grade in quality and workmanship obtainable on the market from firms of established good reputation, or, if not ordinarily carried in stock, shall conform to the usual standards for first-class materials or articles of the kind required.
- D. Perform work in full conformity and harmony with the intent to secure the best standard of construction and equipment of the work as a whole or in part.
- E. Items of any one type of material or equipment shall be the product of a single manufacturer.
 - 1. For ease of the Owner in maintaining and obtaining service for equipment and for obtaining spare parts from as few places as possible, to the maximum extent possible, use equipment of a single manufacturer.
 - 2. The Architect reserves the right to reject any equipment from various manufacturers if suitable equipment can be secured from fewer manufacturers and to require that source of materials be unified to the maximum extent possible.
- F. Substitute equipment shall not be fabricated nor installed until after written decision to accept request is received from the Architect.

2.02 NAMEPLATES

- A. Each unit of equipment shall have the manufacturer's name or trademark on a stainless steel nameplate securely affixed in a conspicuous place.
- B. The manufacturer's name or trademark may be cast integrally with stamp, or otherwise permanently marked upon the item of equipment.
- C. Such other information as the manufacturer may consider necessary for complete identification shall be shown on the nameplate.

2.03 FABRICATIONS

- A. Insofar as possible, shop prefabricate all items complete and ready for installation.
- B. Accurately fabricate all items to the details shown on the Drawings and on the shop drawings found in compliance with the Contract Documents.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Prior to work under any Section, carefully inspect the existing work and verify that it is complete to the point where the work under that Section may properly commence.
- B. Avoid the need to remove and replace work and to avoid unnecessary cutting and patching.
- C. Inspect all surfaces to be sure that they have been properly prepared before applying new work to such surfaces.
- D. Verify that all work can be installed in strict accordance with the drawings and the approved shop drawings. Immediately report discrepancies to Architect.
- E. Do not proceed with the work under any Section until these conditions are obtained.

3.02 INSTALLATION

- A. Furnish and install materials and equipment in accordance with the instructions of the applicable manufacturer, fabricator or processors, except as otherwise provided in the Contract Documents.
- B. All work shall be done in a workmanlike manner and set to proper lines and grades. The work shall be square, plumb and/or level as the case may be.
- C. Where performance criteria are specified, do all work necessary to attain the required end results.

3.03 FIELD QUALITY CONTROL

- A. Neither observations by Architect nor inspections, tests or approvals by other persons shall relieve the Contractor from his obligations to perform the work in accordance with the requirements of the Contract Documents.

- B. If the Contract Documents, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any work to specifically be inspected, tested or approved by some public body, the Contractor shall assume full responsibility therefore, pay all costs in connection therewith, and furnish the Architect with the required certificates of inspection, testing or approval.
- C. The Owner reserves the right to independently perform laboratory tests on random samples of material or performance tests on equipment delivered to the site.
 - 1. These tests, if made, will be conducted in accordance with the appropriate referenced standards or specification requirements.
 - 2. The entire shipment represented by a given sample, samples or piece of equipment may be rejected on the basis of the failure of samples or pieces of equipment to meet specified test requirements.
 - 3. All rejected materials or equipment shall be removed from the site, whether stored or installed in the work, and the required replacements shall be made, all at no additional cost to Owner.

3.04 ADJUST AND CLEAN

- A. Upon the completion of installations, and as a condition of its acceptance, visually inspect all work, adjust all components for proper alignment and touch-up abrasions and scratches to make them completely invisible.
- B. Thoroughly examine all materials and equipment with protective or decorative finishes for defects and damage prior to being covered.
 - 1. In the case of buried items of work, restore protective surface covers so as to conform to the Contract Documents prior to being backfilled, buried or embedded, as the case may be.
 - 2. In the case of exposed items of work, for which a decorative finish is required, all scratches, discoloration's, unmatched colors, disfigurements and damages shall be repaired and touched-up so as to provide a neat, clean finish, and be uniform in color.

3.05 UNCOVERING WORK

- A. Unless otherwise specified or directed by Architect, no work shall be covered until it has been observed, tested, photographed, measured, and authorized to be covered by Architect.
- B. Tie distances to above ground physical structures as reference points to all underground utilities, conduits, pits, manholes, valves, and pipelines shall be obtained by the Contractor prior to covering the work. Immediately comply with the Architect's direction to uncover the work if tie distances were not obtained.
- C. If any work has been covered with Architect's consent and Architect considers it necessary or advisable that covered work be observed or tested, the Contractor, at Architect's request, shall uncover, expose or otherwise make available for observation, or testing as Architect may require, that portion of the work in question, furnishing all necessary labor, material and equipment.
 - 1. If it is found that such work is defective, the Contractor shall bear all the expenses of such uncovering, exposure, observation, and testing of satisfactory reconstruction, including compensation for additional engineering services and an appropriate deductive change order shall be issued.

2. If, however, such work is not found to be defective, the Contractor shall be allowed an increase in the contract price or an extension of the contract time, or both, directly attributable to such uncovering, exposure, observation, testing and reconstruction if he makes a claim therefore as provided in the General Conditions.

3.06 DEFECTIVE WORK

- A. The repair, removal, replacement and correction of defective work is a part of this Contract and shall be promptly performed in accordance with the requirements set forth in the General Conditions or other portions of the Contract Documents. All costs in connection with the correction of defective work shall be borne by the Contractor.
- B. Products that fail to maintain the performance or other salient requirements of the Contract Documents, shows undue wear, or other deleterious effects during the maintenance period, shall be considered defective.

END OF SECTION

PRODUCT DELIVERY, STORAGE AND HANDLING

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PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. The Section includes the transportation, handling, storage and protection of products that are to be incorporated into the work.
- B. The procedures for turning equipment over to the Owner for installation by others is also included herein.

1.02 GENERAL

- A. Items shall be delivered as complete assemblies direct from the manufacturer with all internal wiring, piping, valving, and control devices intact except where partial disassembly is required by transportation regulations, protection of components, or where physical constraints may exist or be created for the setting of the item.
- B. Coordinate the disassembly and reassembly requirements with the manufacturer. Determine the need and extent of reassembly prior to bid.
 - 1. All labor, material and equipment costs associated with the disassembly and reassembly of the product shall be included in the Contract Price.
 - 2. Where reassembly of equipment is necessary, then the manufacturer shall provide reassembly instruction at the project site.
 - 3. A technician shall be present during the entire reassembly procedure and the manufacturer shall certify, in writing, that the unit was reassembled properly in accordance with instructions provided by the manufacturer and that all as-specified warranties remain in effect.
 - 4. The manufacturer's reassembly inspection time shall be in addition to the field service time specified and shall be included in the Contract Price. This time shall not be eligible for payment under any cash allowance item.
- C. In the case where equipment is to be installed by others, then the supplying contractor shall be responsible for its reassembly. If reassembly is necessary and the unit(s) are to be set inside an enclosure or building, reassemble the equipment inside said enclosure. The equipment once reassembled shall be turned over to the installing contractor as specified below.

1.03 PACKING

- A. Transport products in containers, crates, boxes or similar means such that the products are protected against damage that may occur during transportation.
- B. All parts shall be packaged separately or in container where parts of similar systems are grouped.
- C. Part numbers shall be indicated on the individual part. Use indelible ink to mark part numbers.
- D. All equipment shipments shall be included with a parts list showing a description (name) of the part and the manufacturer's part number.
 - 1. The parts list shall be shipped in a plastic zippered envelope with the words "Parts List" lettered on it in indelible ink.
 - 2. The parts list shall be placed inside the shipping container so that it is on the top of the contents.

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- E. Equipment shall be shipped with storage, handling and installation instructions.
 - 1. The Engineer reserves the right to withhold payment for equipment delivered to the site until such time as the storage, handling and installation instructions are supplied by the manufacturer.
 - 2. In the case where operation and maintenance manuals have been provided by the manufacturer, which includes the installation instructions, then the installation instructions shall also be included with the equipment shipment.
- F. Delicate instruments and devices, reagents, chemicals, and glassware shall be shipped in packaging normally provided by the manufacturer.
- G. The Contractor shall require the manufacturer to be responsible for the proper packing of all products.

1.04 SHIPPING AND DELIVERY

- A. Product deliveries shall be accompanied with a bill of lading indicating the place of origination and the Contractor's purchase order number.
- B. Inspect shipments immediately upon delivery, to assure compliance with requirements of the Contract Documents and those products are undamaged.
- C. Promptly remove damaged material and unsuitable items from the job site.
- D. Provide equipment and personnel to handle products by methods to prevent soiling; disfigurement or damage.

1.05 STORAGE

- A. Store sensitive products and all spare parts in weather tight, climate controlled enclosures in an environment favorable to product.
- B. Store and protect products in accordance with the manufacturer's instructions.
- C. All other products that are to be installed underground or products such as pipe, valves, and fittings shall be stored outdoors but shall be blocked off the ground and covered with impervious sheet coverings.
- D. Store fabricated products above the ground on blocking or skids.
- E. Store loose granular materials in well-drained areas on solid surfaces to prevent mixing with foreign matter.
- F. Provide adequate ventilation to avoid condensation.
- G. In accordance with manufacturer's instructions protect bearings, couplings, shafts, rotating components, and assemblies. Protection of said equipment shall be continuous until the time the equipment is placed into permanent service.

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- H. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and free from damage or deterioration.
- I. Do not store volatile liquids in any building on site.
- J. Storage of products shall be the responsibility of the supplying contractor. The installing contractor shall take all necessary precautions to protect the equipment being furnished by others.
- K. Store with seals and labels intact and legible.

1.06 EQUIPMENT INSTALLED BY OTHERS

- A. All products, except products noted on the Drawings or specified, shall be furnished and installed under this Contract.
 - 1. Only noted or specified products shall be furnished under this Contract for installation by others.
 - 2. If it is not noted on the Drawings or specified, then the product shall be furnished and installed under the Contract.
- B. The Contractor shall furnish these products to the Owner. These products shall be stored as specified above.
- C. The Owner will then advise the installing contractor that the product(s) are ready for installation.
 - 1. In the case where the product is stored in a proper enclosure, but not stored inside the building to be constructed under this project, then the installing contractor shall move the product into the building to a location adjacent to the final location shown on the Drawings.
 - 2. In all cases, the installing contractor shall be responsible for moving from storage, uncrating, anchoring, mounting and installing the product as required by the Contract Documents.
- D. The Contractor and installing contractor(s) shall be present at the time the equipment is turned over to the Owner. Immediately thereafter, the Owner will turn the product over to the installing contractor for installation.
- E. The Owner, Contractor, Architect and the installing contractor shall inspect the condition of the product at this time.
 - 1. Any defects in the product will be noted and the Contractor will be advised to make all repairs immediately.
 - 2. The installing contractor shall still be required to install the product if the damage is deemed cosmetic by the Architect.
 - 3. The manufacturer's installation instructions or wiring diagram shall be turned over to the installing contractor at this time by the Contractor.
 - 4. Any damage occurring to the product during moving, setting and mounting the unit(s) shall be the responsibility of the installing contractor.
 - 5. The Contractor is advised to take photographs to document the condition prior to it being turned over to the installing contractor.
 - 6. The installing contractor is advised to take photographs to document the condition prior to its acceptance.

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- F. The supplied unit(s) remain the property of the Contractor until final acceptance of the work.
- G. Any damage caused to the unit(s) due to improper installation, workmanship, and non-compliance with the manufacturer's written installation instructions shall be the responsibility of the contractor who caused said damage. The burden of proof shall rest with the supplying Contractor.
- H. In the event the Contractor discovers misuse, abuse or improper installation of the unit(s) by the installing contractor, then he shall immediately notify the Architect in writing. The Architect will investigate the accusations and make a determination. The Architect's determination shall be binding and agreed to by both parties.
- I. If the Architect's determination substantiates the accusations of the Contractor, then the Contractor shall install the unit(s), the costs for which will be paid for as extra work. All costs associated with the extra work change order, including engineering and attorney fees of the Owner and Contractor will be deducted from money due the installing contractor.

1.07 PROTECTION OF WORK

- A. The Contractor shall protect the installed work. All costs for protection shall be borne by the Contractor. Provide coverings as necessary to protect installed products from damage, from traffic and subsequent construction operations. Remove when no longer needed.
- B. Cover and protect equipment from dust, moisture or physical damage. Protect finished floor surfaces prior to allowing equipment or materials to be moved over such surfaces. Maintain finished surfaces clean, unmarred and suitably protected until accepted by the Owner.
- C. Additional time required to secure replacements and to make repairs will not be considered by the Architect to justify any extension in the Contract Time of Completion. In the event of the damage, promptly make replacement and repairs to the approval of the Engineer at no additional costs.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section 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. Provisions of this Section apply to the construction activities of the Contractor. Contractors are reminded that they will need to hire tradesman skilled in the patching finishes that are impacted by their activities. (e.g. plumber will need to have a mason patch back existing walls opened for new roughing , Heating Contractor will hire carpenter for existing ceiling replacements after new air handler installed, etc)
- D. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section 013100 - PROJECT MANAGEMENT AND 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 all trades. Refer to specification sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

1.02 RESPONSIBILITIES

- A. General: The Contractor is responsible to perform cutting and patching for their portion of the Work. Patching work shall restore all surfaces to their original condition.
- 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 General Construction Contractor and shall be paid for by the prime Contractor responsible. The Owner's Construction Representative shall be the sole judge of the responsibility for such cutting and patching, and shall prepare change orders to delete monies from the responsible prime Contract and credit those monies to the General Construction Contractor.
 - 1. Each Contractor shall cooperate with the Owner's Construction Representative to accomplish cutting and patching with minimal disruption to the construction and at reasonable cost.

1.03 SUBMITTALS

- A. Cutting and Patching Plan: If the Owner requires approval of cutting and patching procedures before proceeding, submit a plan describing cutting and patching procedures well in advance of the time cutting and patching will be performed and request approval to proceed. Include the following information, as applicable, in the submittal:
 - 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 the 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, including their new locations, and those that will be required to be placed temporarily out-of-service. Indicate how long service will be disrupted and when service will be restored..
6. Where cutting and patching involves adding reinforcement to structural elements, submit details and engineering calculations showing integration of additional reinforcement with the original structure.
 - a. 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.
 - b. Submit a detailed plan, including an area-specific drawing, indicating how dust mitigation and noise control will be handled to prevent disruption/dusting of adjacent areas. Identify routes of waste removal and dumpster locations, material handling from staging area, placement of protections, controls, etc.

1.04 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. Bearing and retaining walls.
 - b. Structural concrete.
 - c. Structural steel.
 - d. Lintels.
 - e. Structural decking.
 - f. Miscellaneous structural metals.
 - g. Exterior curtain-wall construction.
 - h. Equipment supports.
 - i. Piping, ductwork, vessels, and equipment
- 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.

- 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.

1.05 WARRANTY

- A. Existing Warranties: Replace, patch, and repair material and surfaces cut or damaged by methods and with materials in such a manner so as not to void any existing or required warranties.
- B. Utilize manufacturer certified installers for work on any existing roof area, which are impacted, to ensure that the owners current warranty is maintained in full force.

PART 2 - PRODUCTS

2.01 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 not available or cannot be used, use materials whose installed performance will be equal to or surpass that of the existing materials.

PART 3 - EXECUTION

3.01 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 but not limited to; Owner's Construction Representative, mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

3.02 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 the 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.

3.03 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.
 - 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.
- C. Patching: Patch with durable seams that are as invisible as possible or to match existing where exposed for aesthetic appearance. Comply with specified tolerances. Patching will be done utilizing tradesmen skilled for the surface to be patched. (e.g. mason for brickwork, ceramic tile installer for ceramic tile, etc)
 - 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. If patched area does not match the adjacent surface, the contractor will refinish the entire wall to achieve a uniform surface.
 - 3. Where removal of walls or partitions extends one finished area into another, patch and repair floor, ceiling and wall surfaces in the new space. Provide an aligned, flush surface of uniform color and appearance. Provide grinding, leveling and/or self-leveling of surfaces since adjacent room surfaces may vary in elevation. Remove existing floor and wall coverings and ceiling materials 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.

3.04 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

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before applying primer and paint or other finishing materials. Restore damaged pipe covering to its original condition

END OF SECTION

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PART 1 - GENERAL

1.01 SUMMARY

- A. Waste Management Goals for the Project
 - 1. A minimum of 75% construction waste materials by weight produced from this project to be recycled.
- B. This document includes:
 - 1. Requirements and procedures for compliance with United States Green Building Council (USGBC) LEED New Construction (NC), Version 2009 Credit MR 2 (Construction Waste Management).

1.02 RELATED SECTIONS

- A. All sections of the Specifications related to the demolition & construction of the building.
- B. Section 013563 - Sustainability Certification Project Requirements (LEED)

1.03 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. 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.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage & Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.04 SUBMITTALS

- A. Waste Management Plan: Submit three copies of plan within 30 days of date established for commencement of the Work.
- B. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit three copies of report. Include separate reports for demolition and construction waste. Include the following information:
 - 1. Material category.
 - 2. Generation point of waste.
 - 3. Total quantity of waste in tons.
 - 4. Quantity of waste salvaged, both estimated and actual in tons.

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5. Quantity of waste recycled, both estimated and actual in tons.
 6. Total quantity of waste recovered (salvaged plus recycled) in tons.
 7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.
- C. Waste Reduction Calculations: Before request for Substantial Completion, submit three copies of calculated end-of-project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.
- D. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
- E. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
- F. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- G. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- H. LEED Submittal: LEED letter template for Credit MR 2, signed by Contractor, tabulating total waste material, quantities diverted and means by which it is diverted, and statement that requirements for the credit have been met.
- I. Qualification Data: For Waste Management Coordinator and refrigerant recovery technician.
- J. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.05 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.
- B. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. Waste Management Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:
1. Review and discuss waste management plan including responsibilities of Waste Management Coordinator.
 2. Review requirements for documenting quantities of each type of waste and its disposition.
 3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
 4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
 5. Review waste management requirements for each trade.

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1.06 WASTE MANAGEMENT PLAN

- A. General: Develop plan consisting of waste identification, waste reduction work plan, and cost/revenue analysis. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.
- B. Waste Identification: Indicate anticipated types and quantities of site-clearing and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.
- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
- D. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
- E. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
- F. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
- G. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
- H. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
- I. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location on Project site where materials separation will be located.

PART 2 - PRODUCTS

2.01 NOT USED

PART 3 - EXECUTION

3.01 PLAN IMPLEMENTATION

- A. General: Implement waste management plan as approved by Architect. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
 - 1. Comply with Division 01 Section "Temporary Facilities and Controls" for operation, termination, and removal requirements.
- B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan. Coordinator shall be present at Project site full time for duration of Project.

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- C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.
 - 1. Distribute waste management plan to everyone concerned within 3 days of submittal return.
 - 2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
 - 2. Comply with Division 01 Section "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.02 SALVAGING DEMOLITION WASTE

- A. Salvaged Items for Sale and Donation: Not permitted on Project site.

3.03 RECYCLING DEMOLITION AND CONSTRUCTION WASTE

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

3.04 RECYCLING CONSTRUCTION WASTE

- A. Packaging
 - 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
 - 2. Polystyrene Packaging: Separate and bag materials.
 - 3. Pallets: As much as possible, require using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
 - 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B. Site-Clearing Wastes: Chip brush, branches, and trees on-site.

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C. Wood Materials

1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

3.05 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.
 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials unless there the proper permits are obtained and there is a designated area on the Owners property.
- C. Disposal: Transport waste materials off Owner's property and legally dispose of them.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Cleaning during the progress of the work.
- B. Maintain all premises and public properties/roadways free from accumulations of waste, debris, dirt, mud and rubbish caused by operations on a daily basis.
- C. At completion of work, remove waste materials, rubbish tools, equipment, machinery and surplus materials, and clean all exposed surfaces; leave project clean, dust free and ready for occupancy,
- D. Remove all overspray caused by construction operations from adjacent construction, surfaces and vehicles.
- E. Cleaning prior to final payment

1.02 SCHEDULING

- A. Sequence, schedule, and coordinate final cleaning work with the final cleaning work to be performed by other prime contractors.

1.03 SAFETY REQUIREMENTS

- A. Standards: Maintain project in accord with OSHA and other applicable safety and insurance standards.
- B. Hazard Control / Cleaning Products:
 - 1. Store volatile organic containing / flammable waste in covered metal containers and remove from premises daily.
 - 2. Provide adequate ventilation during use of VOC containing or noxious substances.
- C. Conduct cleaning and disposal operations to comply with local ordinances, OTC regulations and local anti-pollution laws and ordinances.
- D. Dispose of all waste legally, off-site.
- E. Do not dispose of VOC / flammable waste such as mineral spirits, oil, or paint thinners into storm or sanitary drains.
- F. Do not burn or bury rubbish and waste materials on project site.
- G. Do not dispose of any waste into surface waters such as ponds, lakes, streams or waterways

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Cleaning materials shall be appropriate to the surface and materials being cleaned.
- B. Materials: Use only cleaning materials recommended by manufacturer of surface to be cleaned

- C. Provide pads to protect finished surfaces from cleaning materials.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Post signs to advise building occupants if wet and/or slippery floor conditions exist during cleaning operations.

3.02 PROGRESS CLEANING

- A. Keep all buildings, enclosures, and confined areas where work is being performed under the Contract free from unattended combustible materials.
- B. Remove rust spots as they develop.
- C. Execute daily cleaning to ensure that building, grounds, and public properties and roadways are maintained free from accumulations of waste materials, rubbish, dirt, mud and dust.
- D. Wet down dry materials and rubbish to lay dust and prevent blowing dust.
- E. Each day, each contractor shall adhere to the following:
 - 1. Areas of intense activity, such as cutting and sawing must be swept clean and reorganized at the end of each day. Utilize dust control methods such as plastic containment enclosures and/or wetting of surfaces.
 - 2. Areas of moderate activity, such as installation of plumbing, ductwork, electrical work, must be returned to operating / safe order at the end of each day.
 - 3. Debris below scaffolds including areas of shoring and re-shoring, must be kept sufficiently cleared and consolidated to keep walkways free of tripping hazards at all times. These work areas must also be swept clean immediately after removal of scaffolds, shoring, etc.
 - 4. All swept up debris, waste materials, and packing must be removed and placed in a dumpster by the end of the workday.
 - 5. All stored material must be protected and kept in good order.
 - 6. As portions of the work are completed, all used and excess materials shall be removed promptly.
 - 7. Daily Clean-up and good housekeeping is the responsibility of each contractor individually and will be monitored by the Owner's Construction Representative. If any contractor fails to perform cleaning when directed or does not properly clean within 4 hours of being notified by Owner's Construction Representative, the Owner will hire others and charge the responsible contractor accordingly.
 - 8. Contractors shall promptly comply with requests to organize scattered materials.
 - 9. Daily sweep and weekly damp mop of all work areas.
- F. Each Contractor is responsible for furnishing dumpsters or other such containers as required for collection, storage and legal disposal of all debris and rubbish resultant from their individual construction operations (both demolition and daily construction debris). The Owner's Construction Representative shall direct contractors to locate, maintain and move such containers as necessary and legally dispose of waste as containers are filled. Each contractor shall separate and recycle waste as required by authorities, contract requirements and local regulations / ordinances.

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- G. The General Construction Contractor shall vacuum clean areas when ready to receive finish painting, and continue vacuum cleaning, on an as needed basis, until the building(s) is (are) ready for Substantial Completion.
- H. Handle materials in a controlled manner to reduce handling to the extent possible. Do not drop or throw materials from heights.
- I. Schedule cleaning operations so that dust and other containment resulting from cleaning process will not fall on wet, newly painted surfaces.

3.03 FINAL CLEANING

- A. Remove dust, dirt, grease, stains, paint drips and runs, plastic, labels, tape, glue, rope, and other foreign materials from visible interior and exterior surfaces.
- B. Do not move dust from spot to spot. Remove directly from the surface on which it lies by the most effective mean such as appropriately treated dusting cloths or vacuum tools. When doing high cleaning, do not allow dust to fall from high areas onto furniture and equipment below.
- C. Dismantle and remove all temporary structures, scaffolding, fencing, and equipment. Remove waste materials, rubbish, lumber, block, tools, machinery, and surplus materials.
- D. Perform the following prior to final payment:
 - 1. Broom clean all exterior concrete surfaces and vacuum clean all interior concrete surfaces.
 - 2. Dust and spot clean painted and vinyl covered walls.
 - 3. Vacuum clean acoustic ceilings.
 - 4. Repair, patch, and touch-up marred surfaces to specified finish and to match adjacent surfaces.
 - 5. Remove foreign material from exterior masonry.
 - 6. Wash and clean interior and exterior window surfaces. All glass shall be clean and free of dirt, grime, streaks and excessive moisture. Wipe drippings and other marks from windowsills, sashes and woodwork. Do not use windowsills in lieu of ladders.
 - 7. Polish bright metal by damp wiping and drying with a suitable cloth. If a polished appearance is not thereby produced, apply appropriate metal polish.
 - 8. Clean and polish all stainless steel surfaces, including control panels supplied under this Contract.
 - 9. Clean all paved roads, lots and drives which were paved as work under this Contract and all existing paved surfaces using a mechanical street cleaner.
 - 10. Repair or repaint damaged pavement markings.
 - 11. Clean supply vents and exhaust grilles. Clean gutters and downspouts.
 - 12. Remove all rust spots and stains from new and pre-existing concrete, painted surfaces, and all other surfaces.
 - 13. Wash all existing floors that were in any way impacted by the construction operations.
 - 14. Rake clean landscaped surfaces. Final mow all areas grassed and sodded during the work.
 - 15. Inspect interior and exterior surfaces, and all work areas, to verify that the entire work is clean and ready for use by the Owner. The project will not be considered substantially complete until all final cleaning has been performed.
 - 16. Magnet sweep all exterior lawn and walkway areas to ensure that stray nails / screws, etc. remain in lawn areas nor on walkways.

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3.04 RUBBISH REMOVAL

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

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Work of this Section includes the following:
 - 1. Starting systems
 - 2. Testing, adjusting, and balancing
 - 3. Updating of manufacturer's operations and maintenance manuals and wiring diagrams
- B. Work of this Section also includes stipulated man-hours that shall be provided by the **Prime Electrical Construction Contractor** for startup participation of equipment and systems.

1.02 STARTING SYSTEMS

- A. The Contractor shall coordinate, schedule, and sequence the start-up of various equipment and systems.
- B. Where the start-up of a system or piece of equipment is dependent upon the start-up of other system(s) or equipment, then the Contractor shall schedule and sequence the start-ups to coincide.
- C. Notify the Architect at least 14 calendar days prior to the start-up of each item or system so that he can schedule the startup with the Owner, utilities, and other Prime Contractors.
- D. Where applicable, verify that each piece of equipment or system has been checked for proper:
 - 1. lubrication,
 - 2. drive rotation,
 - 3. belt tension,
 - 4. motor starter heater size,
 - 5. fuse size,
 - 6. water pressures,
 - 7. terminal connections,
 - 8. control sequence,
 - 9. for conditions which may cause damage or delay the start-up procedure.
- E. Verify that the equipment has been installed in accordance with the manufacturer's requirements.
- F. Complete all pre-startup checklists that may be required by the system vendor.
 - 1. In the event that start-up activities are delayed as a result of the Contractor's failure to properly check the completed installation and a manufacturer's representative is on the job site waiting for corrections to be made, then the Architect may, at his/her sole discretion, postpone start-up until such time as the corrections have been made without any extra costs.
 - 2. The Owner may deduct from money due the Contractor the excess cost of engineering associated with having the Architect present during the start-up.
 - 3. The deduction shall be equal to the Architect's effective billing rate times the total number of hours delayed during the start-up activities.
- G. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- H. Verify that wiring and support components for equipment are complete and tested.

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- I. Execute start-up under supervision of applicable Contractor's personnel in accordance with manufacturer's instructions.
- J. The Contractor shall have the job site superintendent present during all start-up activities.
- K. Provide manufacturer's authorized technician at the site when specified and in accordance with the requirements contained in Section 014500 - Quality Control.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

PART 1 - GENERAL

1.01 SUBMITTALS

- A. Submit the following documents to the Architect before Substantial Completion:
 - 1. Project Record Documents as specified in Section 017839 - PROJECT RECORD DOCUMENTS.
 - 2. Operations and Maintenance Manuals prepared in accordance with Section 017823 - OPERATING AND MAINTENANCE DATA and be updated as a result of start-up activities.
 - 3. Manufacturer's Start-up Reports (MSR's) for all equipment and systems where manufacturer field time is specified.
 - a. Each MSR shall be signed by the field technician(s) who attended the start-up.
 - b. If the manufacturer is taking exception to the installation or if the warranty is voided, he shall provide a statement to that effect and provide reasons and justification to explain the company's position.
 - 4. One binder containing original counterparts of all warranties, guarantees, bonds, or affidavits as specified in the Technical Specification Sections. These documents shall contain the original signatures and be placed in a plastic sheet protector, one document per protector.
 - 5. Spare parts checklist itemizing all spare parts furnished under the Contract summarized by Section.
 - 6. Electrical Underwriter's Certificate where the prime construction contract includes electrical construction or where this Contract is for a Prime Electrical Construction Contract.
- B. Submit the following items to the Architect with the final application for payment:
 - 1. Final Application for Payment and continuation (G732a/CMa and G703)
 - 2. Contractor's Certified Payrolls
 - 3. OSHA cards for all workers
 - 4. Contractor's Affidavit of Payment of Debts and Claims (G706)
 - 5. Contractor's Affidavit of Release of Liens (G706A)
 - 6. Final list of Subcontractors (G705)
 - 7. Subcontractor's Affidavit of Payment of Debts and Claims (G706) - (for each subcontractor used)
 - 8. Subcontractor's Affidavit of Release of Liens (G706A) - (for each subcontractor used)
 - 9. Consent of Surety to Final Payment (G707)
 - 10. 2 year Maintenance Bond - 100% of contract including change orders
 - 11. Contractors letter guaranteeing workmanship 2 years
 - 12. Product data, Maintenance manuals and Warranty Information
 - 13. As Built Documentation
 - 14. Attic Stock / Spare Parts (provide proof of delivery transmittal signed by owner)
 - 15. Training and Demonstrations (provide sign-in from training session)
 - 16. Asbestos Affidavit and waste manifests
- C. All documents shall be complete, signed, dated, and notarized (where applicable) and be subject to the Architect's acknowledgment of receipt or approval.

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PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. This Section specifies the requirements for Operations and Maintenance Manuals required to be prepared by system suppliers and equipment manufacturers.
- B. The Contractor shall submit Operations and Maintenance Manuals for all equipment.
- C. Where the technical specifications call for the submission of manuals, said manuals shall be prepared in accordance with the requirements contained herein. It being understood that manuals shall be submitted for all equipment even if it is not specifically called out in the specifications.

1.02 MANUAL CONTENTS AND FORMAT

- A. All Operations and Maintenance Manuals shall be as specified hereinafter.
- B. The binder shall be 8 1/2" x 11", metal hinge, vinyl, large capacity by National or Equal. It shall show the name of the manufacturer or supplier and project name on the spine of the binder.
- C. A cover shall be provided showing the names of the Owner, Architect, Contractor, and Manufacturer.
 - 1. It shall show the Contractor's order number and manufacturer's project number.
 - 2. The address of the manufacturer, service station telephone number, project title, contract number, and year shall also be shown.
- D. Provide tabbed color dividers for each separate product and system.
 - 1. The name of the product shall be typed on the tab.
 - 2. A separate tab shall also be provided for information such as troubleshooting instructions, spare parts list, etc.
- E. An index shall be provided in the back of the binder, with a separate tab, providing a quick way for the operator to find key and important topics contained in the manual.
- F. A separate listing for all charts, graphs, tables, figures and shop drawings shall be provided directly following the table of contents.
- G. Each manual shall contain one (1) copy of all shop drawings deemed in compliance with the Contract Documents by the Architect submitted for the equipment or system for which the manual is prepared.
 - 1. Only these shop drawings shall be included in the manual.
 - 2. All shop drawings larger than 8 1/2" x 11" shall be folded and placed in a heavy duty, top loading plastic sheet protector with the title of the drawing showing; one (1) drawing per protector page.
- H. Each manual shall contain the following as a minimum:
 - 1. Table of contents
 - 2. Final version of the warranty statement approved by the Architect
 - 3. Nameplate data of each component, year of installation, contract number and specification number
 - 4. Name, address and telephone number of the manufacturer and the manufacturer's local representative(s)

5. Installation instructions
 6. Operation instructions including adjustments, the interrelation of components and the control sequence describing break-in, start-up, operation and shutdown
 7. Emergency operating instructions and capabilities
 8. Maintenance requirements include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair and reassembly instructions; and alignment, adjusting, balancing, and checking instructions
 9. Troubleshooting guide and corrective maintenance (repair) procedures for all electrical and mechanical equipment. These guides shall list the most frequent and common problems, together with the symptoms, possible causes of the trouble, and remedies
 10. Drawings (pictures or exploded views) which clearly depict and identify each part, suitable for assembly and disassembly of entire system and each component
 11. Wiring and control diagrams, if applicable
 12. Panelboard circuit directories including electrical service characteristics, if applicable
 13. Part list with current prices; ordering information; and recommended quantities of spare parts to be maintained in storage
 14. Charts of valve tag numbers, with location and function of each valve, keyed to the process and instrumentation diagram prepared as part of the Contract Documents
 15. Name, address, and telephone number of nearest parts supply house and nearest authorized repair service center.
 16. List of recommended spare parts and the recommended number of each per unit and per group of units.
- I. All electronic Operations and Maintenance Manuals shall be as specified hereinafter.
1. All files shall be in Adobe PDF format and submitted on compact discs.
 2. Files shall be organized by specification section and then by product.
 3. An electronic index and list of all charts, graphs, tables, figures, and shop drawings shall be included.
 4. All information provided in the paper Operations and Maintenance Manual shall be included in the electronic version.
- J. Submit two (2) copies of a preliminary draft manual at least fourteen (14) calendar days prior to the date set for start-up.
1. The Architect will review the manual for content and compliance with these specifications.
 2. Written comments will be provided, but the manual will not be returned.
 3. This copy of the manual will be retained on the site until such time as the final, updated manual is provided.
- K. Two (2) weeks after the date the unit was placed into service and the Owner has gained beneficial use, submit five (5) copies of the final updated Operations and Maintenance Manual. Refer to Section 017500 - STARTING AND ADJUSTING for requirements related to updating the manual(s).
- L. Where installation instructions are not included with the manual, they shall be shipped at least ten (10) days prior to the date the equipment is scheduled for installation.

1.03 RETAINAGE

- A. The Architect will retain from payment due the Contractor, for failure to submit manuals as specified, an amount equal to 2% of the scheduled value for the equipment or system for which the manual applies. This Contract requirement only applies when a manual is specified to be provided in the Technical Specifications for a particular system or piece of equipment.

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PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. This Section includes:
 - 1. Maintenance of documents
 - 2. Recording of record information
 - 3. Submission of record documents

1.02 PLANS AND SPECIFICATIONS FURNISHED TO THE CONTRACTOR

- A. Two (2) complete sets of Contract Documents (plans, specifications and addenda) will be furnished to the Contractor.
- B. Additional sets will be furnished to the Contractor at \$250 per set.
- C. One (1) complete set of Contract Documents shall be kept in the field office.

1.03 MAINTENANCE OF DOCUMENTS

- A. The Contractor shall maintain at the site one (1) set of the following: drawings, specifications, addenda, change orders, approved shop drawings, test reports, operation and maintenance manuals, and shop drawing log.
- B. The Contractor shall make these documents available for use by the Owner, Architect, regulatory agencies and other parties designated by the Owner.
- C. Maintain these documents in a clean, dry, legible condition throughout the entire contract period.
- D. Make documents available at all times for inspection by Engineer and Owner.

1.04 RECORDING OF RECORD INFORMATION

- A. Affix a stamp to each Contract Drawing and Shop Drawing reading as follows: "RECORD DOCUMENT" - "NAME OF PROJECT" - "CONTRACTOR NAME" in 2-inch high printed letters. The stamp shall be specifically prepared for this project.
- B. Keep the record documents current as the work progresses. Record information concurrent with construction progress.
- C. Do not permanently conceal any work until required information has been recorded.
- D. Legibly mark the Contract Plans to record actual construction, including, but not limited to the following:
 - 1. All as-built work.
 - 2. All approved field changes and conditions.
- E. Shop Drawings: Maintain as record documents. Legibly mark-up to show changes made due to field conditions encountered during construction.

- F. The contractor shall be required to keep accurate record drawings, in hard copy format, as well as AutoCAD 2008 or newer digital format, of the work actually performed which is in accordance with the contract documents and that which deviates from them.
- G. As work progresses, the contractor shall maintain an on the field set of hard copy drawings, a complete and accurate set of field notes clearly delineating all work as it is actually installed. This set of drawings shall be available at all times for the engineer to review and shall be examined at all jobsite meetings.
- H. Do not permanently conceal any work until required information has been recorded.
- I. Concurrent with each submission of a contractor partial payment requisition, the contractor shall submit a paper copy of up to date record drawings, including the latest corrections. Incomplete or inaccurate record drawings will be sufficient grounds for refusal to process payment requisition.
- J. Final record drawings shall be hard copy format and AutoCAD 2008 or newer digital format, completed by a competent draftsman or CAD operator with the following information as a minimum:
 - 1. Complete and accurate listing of all imbedded and underground conduits. Drawings shall accurately show all exact locations of conduits including horizontal and vertical dimensions and explicitly list all conduits and fix their location off of building structures or monuments. Imbedded conduits shall include those below the floor slab and those installed in building walls.
 - 2. Complete and accurate listing of all exposed conduits.
 - 3. In a neatly logically organized table, a complete listing of all conduits with each individual conduit being given its own number and each junction or pullbox being given its own designation. This table shall list the starting and ending point of all major home runs along with all branch conduits and conduits main function.
 - 4. In a neatly logically organized table a complete listing of all conductors within the conduits listed above. Each conductor table shall individually list the conductors installed within each conduit and for each conductor shall designate the starting point or termination, complete path through all conduits and junction boxes, final point or termination, conductor color or marking and circuit function. This shall be done for each conductor installed through the project.
 - 5. An accurate frontal elevation drawing of all motor control centers, control centers other major equipment installed. Drawings shall show all devices as installed in door or faces or equipment.
 - 6. A dimensioned drawing of all equipment installed including generator sets, load banks, transformers and all major equipment.
 - 7. Field changes of dimension and detail.
 - 8. Changes made by Change Order.
 - 9. Clarification plans not on original contract.
- K. At final contract closeout engineer will review preliminary set of final record drawings. After approval of this submission, the contractor will be required to submit one (1) set of hard copy drawings and one (1) digital CD-ROM disc including all as-built drawings in AutoCAD 2008 or newer format as detailed above. No portion of the line item bid amount in the proposal for the record drawings will be released until final record drawings have been submitted and approved. No exceptions.

1.05 SUBMITTAL OF RECORD DOCUMENTS

- A. At Substantial Completion, the Contractor shall deliver one (1) preliminary record set of as-built documents to the Architect with all changes conspicuously ballooned or otherwise emphasized.
- B. The work will not be considered substantially complete until such time as the preliminary record documents are delivered and acceptable to the Architect. Mark this set "Preliminary Record Drawings".
- C. Prior to Final Completion, the Contractor shall conform the preliminary record drawings to the comments made by the Architect. The Contractor shall provide one (1) set of full-scale paper as-built drawings and one (1) electronic copy in portable document format (PDF).
- D. As-built drawings shall be the same size as the Contract Drawings, with 1/2-inch margins space on three sides and a 2-inch margin on the left side for binding.
- E. Each drawing shall bear in the title box the words "FINAL RECORD DRAWINGS" and the name of the Contractor in heavy black lettering 1/2 inch high and be certified as complete and accurate.
- F. As a convenience, Architect will make available to the Contractor electronic media of the Contract Drawings for the sole purpose of the Contractor preparing as-built drawings.
- G. Electronic media made available is without guarantee of compatibility with the Contractor's software or hardware.
 - 1. If the Contractor wishes to take advantage of this offer, the Contractor will be required to execute an indemnification and hold harmless agreement with the Architect.
- H. At completion of project project prior to the final project close-out meeting, deliver marked-up record documents to the Engineer.
- I. Accompany submittal with transmittal letter, containing:
 - 1. Date.
 - 2. Project title and number.
 - 3. Contractor's name and address.
 - 4. Title and number of each record document.
 - 5. Certification that each document as submitted is complete and accurate.
 - 6. Signature of Contractor or its authorized representative.
- J. Upon completion of the work, Contractor shall prepare and furnish the Engineer a set of marked up prints of the as-built drawings for review, with all changes conspicuously circled or otherwise emphasized.
- K. Prior to final payment, Contractor shall conform the drawings to the comments made by the Engineer and then provide the Owner a complete reproducible sets of as-built drawings on 24" x 36" paper and a set in digital CD-ROM AutoCAD 2008 or newer format.
- L. As-built drawings shall be the same size as the contract drawings, with 1/2 inch margins space on three sides and a 2 inch margin on the left side for binding. Each drawing shall bear the legend "AS-BUILT" and the name of the Contractor in heavy black lettering 1/2 inch high and be certified as complete and accurate.

- M. As a convenience, Engineer will make available to the Contractor electronic media of the contract drawings for the sole purpose of the Contractor preparing as-built drawings. Electronic media made available is without guarantee of compatibility with the Contractor's software or hardware. If the Contractor wishes to take advantage of the offer, the Contractor will be required to execute an indemnification and hold harmless agreement with the Engineer and pay the Engineer \$20.00 per contract set to cover the cost of providing electronic media. Payment shall be by check, payable to Holzmacher, McLendon & Murrell, P.C., in advance of picking up the requested materials. Electronic media shall be returned to the Engineer upon acceptance of the as-built drawings by the Owner.

1.06 RELATED DOCUMENTS

- A. Provide certificate of release of liens if requested by the Architect.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. The Section includes the requirements for delivering spare parts specified to be furnished under the provisions of the Contract Documents.

1.02 QUALITY ASSURANCE

- A. Spare parts shall be delivered as complete assemblies direct from the manufacturer such that the part is fully functional and ready to be installed.

1.03 DELIVERY, STORAGE AND HANDLING OF SPARE PARTS

- A. Comply with the requirements of Section 016500 for packing, delivery, storage and handling requirements for all parts delivered to the site of the work.
- B. All spare parts required to be furnished under a Section of the Specifications shall be packaged in one separate box, crate or container with the words "SPARE PARTS" lettered on all sides of the container.
- C. The equipment name or system name for which the spare parts are being provided shall also be lettered on the container.
- D. A separate packing list for the spare parts shall be included in the container.
- E. The Contractor shall store all spare parts indoors immediately upon delivery of the spare parts to the site. Spare parts will not be accepted by the Owner/Architect if the spare parts have been stored outdoors for more than 8 hours upon delivery to the site.
- F. The storage location shall be secure.

1.04 TURN OVER OF SPARE PARTS

- A. Spare parts shall be turned over to the Owner/Engineer approximately two (2) weeks prior to the Architect's preparation of the Final Punch List.
 - 1. Spare parts will not be accepted until this time.
 - 2. The Certificate of Substantial Completion will not be issued until all spare parts are delivered.
- B. The following procedure shall be followed:
 - 1. The Contractor shall provide a formal letter of transmittal listing the name or description of the part, part number, model number, manufacturer (or supplier), and system component name and the Section where it was specified to be provided.
 - 2. Two (2) counterparts of the letter shall be provided.
 - 3. The Contractor shall turn each part individually over to the Owner/Architect.
 - 4. The Owner/Architect will initial next to the part description on each counterpart of the transmittal letter.
 - 5. The initials represent that the part was received.
 - 6. One transmittal counterpart will be returned to the Contractor.

SPARE PARTS
Irvington Union Free School District
Facilities Storage Building at Irvington Campus
Facilities Storage Building
SED No.: 66-04-02-02-2-022-001

H2M

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Work of this Section includes the requirements for demonstrating and training of installed systems, equipment, and products.
- B. Manufacturer field services and the credit for unused service time is also included herein.

1.02 MANUFACTURER'S FIELD SERVICES

- A. When specified in individual specification sections require field services to be provided, said services shall be provided by qualified, authorized and factory trained representative(s) of the manufacturer (supplier).
- B. Field services shall generally consist of:
 - 1. installation supervision,
 - 2. verify terms of the manufacturer's warranty,
 - 3. equipment and system calibration,
 - 4. startup supervision,
 - 5. and operation and maintenance instructions to the Owner's employees.
- C. Such services do not include service time to correct a factory fault, correct problems resulting from a factory wiring or control logic error, or errors caused by poor or improper installation by the Contractor.
- D. The time specified to be provided under the specification sections shall be exclusive of travel time to and from the facility or site. For the purposes of this Contract, one (1) day shall be defined as eight (8) hours exclusive of breaks or mealtime.
- E. The times specified to be provided by the manufacturer does not relieve the manufacturer from providing sufficient service time to place the equipment or systems into satisfactory operation and to obtain the specified performance. The manufacturer shall provide, as a minimum, the times specified in the Specification Sections.
- F. Where manufacturer services are specified for control panel or control center startup, the representative shall be experienced and trained to work on and field rewire such devices.
 - 1. Field representatives for control panel startup shall understand the control sequence specified and, in the case of programmable logic controllers, are able to make revisions to the factory program using handheld programming devices or laptop computers.
 - 2. The Owner will not pay for time spent in the field to correct a PLC programming problem.

1.03 SUBMITTALS

- A. The Contractor shall prepare a list of all manufacturer specified field time required by the technical specifications. Compile this summary listing and submit it to the Engineer for review in accordance with the requirements contained in Section 013300 - SUBMITTALS.
- B. Manufacturer's Startup Reports

1.04 QUALITY CONTROL

- A. The Contractor shall adhere to all instructions provided by the manufacturer's authorized representative.
- B. All verbal instructions necessary to satisfy performance of the equipment or the system shall be immediately provided by the Contractor. The manufacturer shall document all verbal orders in writing at a time suitable to the Contractor.
- C. All written instructions provided in operation, maintenance, and installation guides and manuals, provided by the manufacturer of such equipment and or system, shall be complied with by the Contractor.
- D. The Contractor shall comply with all manufacturer requirements such that written or implied warranties remain in full force during the time period so specified elsewhere in the technical specifications.
- E. Should manufacturer's instructions conflict with Contract Documents, request clarification from Engineer before proceeding.
- F. Actions and/or non performance by the Contractor that may void manufacturer warranties shall not constitute a release of the specified warranty, and all warranty claims made by the Owner shall be paid for by the Contractor as if the manufacturer's warranty was still in effect.

1.05 SCHEDULING - FIELD SERVICES

- A. The Contractor shall arrange field service on dates acceptable to the Owner and Architect.
- B. The service visits shall be scheduled at least 2 weeks in advance so that the Owner and Architect can adequately staff the date.
- C. Operator training will not be allowed until such time as the Manufacturer's Operation and Maintenance Manuals have been supplied and approved by the Architect.
 - 1. The field service technician shall review the contents of the manual with designated employees of the Owner.
 - 2. Field services will not be deemed provided until the MSR is provided.

1.06 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of products to Owner's personnel prior to date of Substantial Completion.
- B. Utilize manufacturer's and vendor's Operation and Maintenance Manuals as basis for instruction. Review contents of the manual with the Owner's personnel in detail to explain all aspects of operation and maintenance.
- C. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of the equipment or of the system.
- D. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

- E. The Contractor shall arrange to have the manufacturer's Operation and Maintenance Manuals updated with information that has been added during start-up activities.
- F. The final manual shall contain the most recent information and reflect all operational and maintenance aspects of the final installed and functioning system or equipment component of the system.
- G. Any changes to control panel wiring diagrams or interconnection wiring schematics shall be made and new prints provided as an update to previously approved manuals.
- H. Manufacturer field time shall be as specified in individual Sections of the Technical Specifications.
- I. For control panels, explain the control sequence, timing structure, and safety precautions when working inside the panel, terminal wiring system, PLC program, if applicable, operator interface(s) and control logic.
- J. Explain PLC LED input and output numbering system, if applicable. If control relays are used, explain technique for their replacement.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Removal of portable equipment from work areas.
- B. Protection of existing equipment and building.

1.02 SCHEDULING

- A. Schedule Work to coincide with other trades and availability of site access.
- B. Complete new utility installations prior to connections to existing utilities.
- C. Coordinate removal, storage and protection of equipment connected to electrical systems scheduled to be re-installed.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.01 PROTECTION OF EXISTING WORK

- A. All existing structures, piping, utilities or materials stored in the existing building shall be protected against damage as may be required by the Architect. The Contractor shall be responsible for any damage to the existing or installed works and appurtenances during construction operations and such damage shall be corrected by replacing the items damaged to their original condition and position at the Contractor's cost and expense and to the satisfaction of the Architect.

3.02 PREPARATION PRIOR TO WORKING ON WELL PUMP

- A. All portable equipment shall be removed from the area of the existing building indicated. Equipment shall be stored as directed by the Architect.
- B. Existing equipment which can not be removed from the building shall be protected from damage by the Contractor's operation. Walls, floor and equipment shall be adequately covered by plywood or other protective materials for the duration of the contract. No holes are permitted to be cut through the walls of the existing building, nor is the roof, any walls or other permanent part of the existing building to be removed to facilitate work under this Contract unless indicated otherwise. The Contractor shall protect existing water piping and water containing equipment from freezing.
- C. All existing equipment in the existing building shall be protected from damage by the Contractor's operation.
- D. The Contractor shall be required to restore the existing building and equipment to a condition equal to what it was prior to the Contractor starting work. Any equipment that is damaged shall be replaced at the Contractor's cost.

3.03 CLEANING UP

- A. The Contractor shall keep the project site free from waste materials and rubbish during the progress of the work and shall make a thorough cleaning of the building and site when the work is completed. Cleaning shall be done to the satisfaction of the Architect.
- B. After completion of the contract, the Contractor will be required to clean up the site of all spoil, clays, gravel, etc. and level off all trenches and pits and dispose of all material as directed by the Engineer and leave the site in as good condition as at the beginning of the contract.
- C. All material used to protect the pump station shall be removed. All portable equipment shall be reinstalled in the pump station and all piping shall be reconnected. The pump station shall be restored to its prior condition and shall be left broom cleaned.
- D. Buildings, grounds, paving, sidewalk, etc. shall be restored and left in a condition at least equal to that existing prior to the beginning of the work.

END OF SECTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Demolition and removal of selected portions of building or structure.
 - 2. Demolition and removal of selected site elements.
 - 3. Salvage of existing items to be reused or recycled.

1.03 DEFINITIONS

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

1.04 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition shall remain the property of Owner.
 - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.05 PREINSTALLATION MEETINGS

- A. Predemolition Conference: Conduct conference at Project site.
 - 1. Inspect and discuss condition of construction to be selectively demolished.
 - 2. Review structural load limitations of existing structure.
 - 3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
 - 5. Review areas where existing construction is to remain and requires protection.
 - 6. Review procedures for turning over salvaged materials to the Owner and protected off-site storage of materials to be reused in the work of the project.

1.06 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For refrigerant recovery technician.
- B. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting the public, pedestrian access and circulation areas and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
- C. Schedule of Selective Demolition Activities: Indicate the following:
 - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
 - 2. Interruption of utility services. Indicate how long utility services will be interrupted.
 - 3. Coordination for shutoff, capping, and continuation of utility services.
 - 4. Use of elevator and stairs.
 - 5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- D. Inventory: Submit a list of items to be removed, salvaged and delivered to Owner prior to start of demolition.
- E. Photographs or Video: Submit before Work begins.
- F. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.
- G. Warranties: Documentation indicated that existing warranties are still in effect after completion of selective demolition.

1.07 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.
- B. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.08 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

1.09 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: Hazardous materials are present in buildings and structures to be selectively demolished. A report on the presence of hazardous materials is on file for review and use and is included in this Division of the specifications. Examine report and / or the appropriate specification section to become aware of locations where hazardous materials are present.
 - 1. Hazardous material remediation is specified elsewhere in the Contract Documents.
 - 2. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.
 - 3. Owner will provide material safety data sheets for suspected hazardous materials that are known to be present in buildings and structures to be selectively demolished because of building operations or processes performed there.
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.
 - 2. Provide a Fire Watch or other method acceptable to the authority having jurisdiction should the existing fire protection facilities have to be shut down during the work.
 - 3. Do not disable or disrupt building fire or life safety systems without five (5) days prior written notice to Architect.

1.10 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties. Notify warrantor before proceeding.
- B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.01 EXAMINATION

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

- B. Review record documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in record documents.
- C. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.
- E. Engage a professional engineer to perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
 - 1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.
- F. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.
 - 1. Inventory and record the condition of items to be removed and salvaged. Provide photographs of conditions that might be misconstrued as damage caused by salvage operations.
 - 2. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

3.02 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
 - 1. Comply with requirements for existing services/systems interruptions specified in Section 011000 "Summary."
- B. Existing Services/Systems to be removed, relocated, or abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. Arrange to shut off indicated utilities with utility companies. Provide 5 days notice to the Architect prior to any utility shut-downs.
 - 2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 - 3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated to be removed.
 - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap, plug or reconnect remaining piping with same or compatible piping material.
 - b. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - c. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug or reconnect remaining ducts with same or compatible ductwork material.
- C. Refrigerant: Remove refrigerant from mechanical equipment to be selectively demolished according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.03 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Comply with requirements for access and protection specified in Section 015000 "Temporary Facilities and Controls."
- B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building. Maintain existing required widths of egress pathways throughout.
 - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 - 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 - 4. Cover and protect furniture, furnishings, and equipment that have not been removed.
 - 5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."
- C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
 - 1. Strengthen or add new supports when required during progress of selective demolition.

3.04 SELECTIVE DEMOLITION, GENERAL

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

8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 9. Dispose of demolished items and materials promptly.
- B. Reuse of Building Elements: Project has been designed to result in end-of-Project rates for reuse of building elements as follows. Do not demolish building elements beyond what is indicated on Drawings without Architect's approval.
1. Building Structure and Shell: 75 percent.
 2. Nonshell Elements: 50 percent.
 3. Nonshell Elements: 40 percent.
- C. Removed and Salvaged Items:
1. Clean salvaged items.
 2. Pack or crate items after cleaning. Identify contents of containers.
 3. Store items in a secure area until delivery to Owner.
 4. Transport items to Owner's storage area designated by Owner or as indicated on Drawings.
 5. Protect items from damage during transport and storage.
- D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.05 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least 1 inch (25 mm) at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.
- B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.
- C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.
- D. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.

3.06 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
1. Do not allow demolished materials to accumulate on-site.
 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- B. Burning: Do not burn demolished materials.

- C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.07 CLEANING

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

3.08 SELECTIVE DEMOLITION SCHEDULE

- A. Remove, store, relocate, salvage and protect the following materials and equipment:
 - 1. Existing Items to Be Removed: Items indicated on contract drawings and items listed in technical specifications sections.
 - 2. Existing Items to Be Removed, relocated and/or Salvaged: Items required to be removed, relocated salvaged and/or stored to complete the work as indicated or called for in these construction documents.
- B. Existing Items to Remain: to complete and conform to the work of the project shall be as indicated on the contract drawings and items listed in the technical specification sections.

END OF SECTION

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The purpose of this section is to outline the scope of work and work procedures required for the removal of asbestos containing tar at the existing bell tower louver that is anticipated to be encountered during the renovation project.
- B. Determination of limits of asbestos abatement was based upon the Final Report of Environmental Services by WSP USA Solutions Inc. dated March 8, 2021. The contractor shall verify in field the limits of asbestos abatement prior to bid.
- C. Federal (EPA and OSHA) and New York State Department of Labor (NYS DOL) regulations (ICR 56.11), Project Drawings and Project Documents.
- D. The Contractor shall be aware of all conditions of the Project and is responsible for field verifying quantities and locations of all ACM to be removed prior to submission of any bid. Failure to do so shall not relieve the Contractor of its obligation to furnish all labor and materials necessary to perform the Work. The quantities presented in this Specification are approximate and should not be used solely as the basis for any bid. In the event that suspect materials not included in this Specification are encountered while the work is in progress, such material shall be tested for asbestos content or assumed positive for asbestos content, and removed in accordance with the procedures herein. Any discovery of new ACM shall not delay the progress of the Work. Payment for any additional work shall be considered on a case-by-case basis by the Architect.
- E. Any special job conditions, including any site specific variances are to be obtained by the Contractor, and any fees associated with procuring these variances shall be included in the Contractor's bid.
- F. The Contractor's industrial hygiene practices during asbestos abatement will be monitored by the Owner's representative; however the Contractor shall be responsible for monitoring his own construction safety work practices for compliance with the OSHA regulations.

1.02 SPECIAL JOB CONDITIONS

- A. Any special job conditions, including any site specific variances, are to be obtained by the Contractor, and any fees associated with procuring these variances shall be included in the Contractor's bid.

1.03 CODES, PERMITS AND COMPLIANCE

- A. The Contractor shall assume full responsibility and liability for compliance with all applicable Federal, State, and local laws, rules, and regulations pertaining to Work practices, protection of workers, authorized visitors to the site, persons, and property adjacent to the Work.
- B. Perform asbestos related Work in accordance with Federal and New York State regulations. Where more stringent requirements are specified, adhere to the more stringent requirements.
- C. State Licenses: The Contractor must maintain current licenses pursuant to the New York State Department of Labor (NYSDOL) and New York State Department of Environmental Conservation (NYSDEC) for all Work related to this Project.

1.04 APPLICABLE STANDARDS AND REGULATIONS

- A. The Contractor shall comply with the following codes and standards, except where more stringent requirements are shown or specified:
- B. Federal Regulations:
 - 1. 29 CFR 1910.1001, "Asbestos" (OSHA)
 - 2. 29 CFR 1910.1200, "Hazard Communication" (OSHA)
 - 3. 29 CFR 1910.134, "Respiratory Protection" (OSHA)
 - 4. 29 CFR 1910.145, "Specification for Accident Prevention Signs and Tags" (OSHA)
 - 5. 29 CFR 1926, "Construction Industry" (OSHA)
 - 6. 29 CFR 1926.1101, "Asbestos, Tremolite, Anthophyllite, and Actinolite" (OSHA)
 - 7. 29 CFR 1926.500 "Guardrails, Handrails and Covers" (OSHA)
 - 8. 40 CFR 61, Subpart A, "General Provisions" (EPA)
 - 9. 40 CFR 61, Subpart M, "National Emission Standard for Asbestos" (EPA)
 - 10. 49 CFR 171-172, Transportation Standards (DOT)
- C. New York State Regulations:
 - 1. 12 NYCRR, Part 56, "Asbestos", Industrial Code Rule 56 (DOL)
 - 2. 6 NYCRR, Parts 360, 364, Disposal and Transportation (DEC)
 - 3. 10 NYCRR, Part 73, "Asbestos Safety Program Requirements" (DOH)
 - 4. New York State Department of Health (NYSDOH) Training Requirements
- D. Standards and Guidance Documents:
 - 1. American National Standard Institute (ANSI) Z88.2-80, Practices for Respiratory Protection
 - 2. ANSI Z9.2-79, Fundamentals Governing the Design and Operation of Local Exhaust Systems
 - 3. EPA 560/585-024, Guidance for Controlling Asbestos Containing Materials in Buildings (Purple Book)
 - 4. EPA 530-SW-85-007, Asbestos Waste Management Guidance

1.05 DELIVERY AND STORAGE

- A. Deliver non-contaminated materials to the job site in original packages with containers bearing manufacturer's name and label.
- B. Store all materials at the job site in a suitable and designated area.
 - 1. Store materials subject to deterioration/damage away from wet/damp surfaces and under cover.
 - 2. Protect materials from unintended contamination.
- C. Remove damaged or deteriorated materials from the job site. Materials contaminated with asbestos shall be disposed of as asbestos debris as herein specified.

PART 2 - PRODUCTS

2.01 PROTECTIVE CLOTHING

- A. Provide personnel utilized during the Project with disposable protective whole body clothing, head coverings, gloves and foot coverings. Provide disposable plastic or rubber gloves to protect hands. Cloth gloves may be worn inside the plastic or rubber for comfort, but shall not

be used alone. Make sleeves secure at the wrists and make foot coverings secure at the ankles by the use of tape, or provide disposable coverings with elastic wrists or tops.

2.02 DISPOSAL BAGS, DRUMS, AND CONTAINERS

- A. Provide 6 mil polyethylene disposal bags printed with asbestos caution labels. Bags shall also be imprinted with U.S. Department of Transportation required markings.
- B. If the asbestos waste has the potential to damage or puncture the disposal bags, burlap sacks shall be utilized as a liner inside the polyethylene disposal bags to prevent puncture or damage to the disposal bags. In addition, 30 or 55 gallon capacity fiber or metal drums capable of being sealed air and water tight may also be used. Affix asbestos caution labels on lids and at one-third points around drum circumference to assure ready identification.
- C. Containers and bags must be labeled with the names of the waste generator and the location at which the waste was generated in accordance with 40 CFR Part 61 NESHAPS.
- D. Labeled ACM waste containers or bags shall not be used for non-ACM waste. Any material placed in labeled containers or bags, whether turned inside out or not shall be disposed of as ACM waste.

2.03 HEPA VACUUM EQUIPMENT

- A. All dry vacuuming performed under this contract shall be performed with High Efficiency Particulate Absolute (HEPA) filter equipped industrial vacuums conforming to ANSI Z9.2.
- B. Provide tools and specialized equipment including scraping nozzles with integral vacuum hoods connected to a HEPA vacuum with flexible hose.

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

- A. Perform all asbestos removal Work using wet removal procedures. Dry removal procedures are not permitted.

3.02 WORK AREA PREPARATION

- A. Work Area preparation shall be performed in accordance with NYSDOL regulations.
- B. Remove all items attached to or in contact with ACM. HEPA vacuum and wet wipe with amended water all removed items prior to their removal from the Work Area and before the start of asbestos removal operations.

3.03 REMOVAL OF ASBESTOS CONTAINING MATERIALS

- A. Asbestos-containing materials shall be removed in accordance with NYSDOL and the Contract Documents.
- B. Sufficiently wet asbestos materials with a low pressure, airless fine spray of surfactant to ensure full penetration prior to material removal. Re-wet material that does not display evidence of saturation.

- C. One Worker shall continuously apply amended water while ACM is being removed.
- D. Perform cutting, drilling, abrading, or any penetration or disturbance of asbestos containing material in a manner to minimize the dispersal of asbestos fibers into the air. Use equipment and methods specifically designed to limit generation of airborne asbestos particles. All power operated tools used shall be provided with HEPA equipped filtered local exhaust ventilation.
- E. Power or pressure washers will not be allowed to be used for asbestos removal or clean-up procedures.

3.04 ACM WASTE CONTAINERIZING, DECONTAMINATION AND LOAD OUT PROCEDURES

- A. Packaging of ACM shall conform to OSHA Standard 29 CFR 1926.1101, DOT 49 CFR 171, 172, and 173, and EPA Standard 40 CFR Part 61 and the requirements as herein specified.
- B. 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.

3.05 WORK AREA CLEANING PROCEDURES

- A. Following completion of gross abatement and after all accumulations of asbestos waste materials have been containerized, decontamination procedures shall be followed as specified in Title 15 or ICR 56, unless otherwise stated in the variance(s) utilized by the Contractor.
- B. Following each decontamination procedure the PM shall inspect the Work Area for effectiveness of the cleanings. If necessary, additional cleaning shall be performed by the Contractor as directed by the PM.

3.06 ASBESTOS WASTE

- A. Applicable Regulations: All asbestos waste shall be stored, transported and disposed of in accordance with the following regulations as applicable:
 - 1. NYS DEC 6 NYRCC part 360 and 364
 - 2. US EPA NESHAPS 40 CFR 61
 - 3. US EPA Asbestos Waste Management Guidance EPA/530 SW85

END OF SECTION

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Formwork, shoring, bracing and anchorage.
- B. Concrete reinforcement and accessories.
- C. Cast-in-place concrete, equipment pads.
- D. Concrete curing and finishing.
- E. Grout.

1.02 REFERENCES

- A. ACI 301 - Specifications for Structural Concrete; 2016.
- B. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000 (Reapproved 2009).
- C. ACI 305R - Guide to Hot Weather Concreting; 2010.
- D. ACI 308R - Guide to External Curing of Concrete; 2016.
- E. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2018).
- F. ANSI/ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement.
- G. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2016.
- H. ASTM A775/A775M - Standard Specification for Epoxy-Coated Steel Reinforcing Bars; 2017.
- I. ASTM C150/C150M - Standard Specification for Portland Cement; 2016.
- J. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a (Reapproved 2016).
- K. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2019.
- L. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2018.
- M. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2019.
- N. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2019.
- O. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types); 2018.

P. ASTM D2103 - Standard Specification for Polyethylene Film and Sheeting; 2015.

Q. CRSI 63 - Recommended Practice for Placing Reinforcing Bars.

1.03 SUBMITTALS

A. Submit under provisions of Section 013300 - SUBMITTALS.

B. Shop Drawings: Indicate reinforcement sizes, spacings, and locations of reinforcing steel and wire fabric, bending and cutting schedules, splicing, and supporting and spacing devices. Indicate formwork dimensioning, materials, arrangement of joints and ties.

C. Design Data: Provide a concrete mix design for each type of concrete to be utilized on the project prior to commencement of work. The Contractor's testing laboratory shall develop concrete mix designs and test all materials and mixes for conformance with these specifications. The costs associated with development of the design mix and testing of samples shall not be paid out stipulated cash allowance and shall be included in the bid price.

D. Furnish the Engineer's field representative with transit-mix delivery slips.

1.04 QUALITY ASSURANCE

A. Perform work in accordance with ACI 301.

B. Maintain one copy of document on site.

C. Concrete Testing Service: Engage a testing laboratory acceptable to the Architect to perform material evaluation tests and to design concrete mixes under provisions of Section 014500 - QUALITY CONTROL.

D. For each mix proposed, make and cure four (4) standard 6 inch concrete test specimens in the lab in accordance with ASTM C192. Furnish compression test results made in accordance with ASTM C39/C39M. Break two (2) cylinders at seven (7) days and two (2) at twenty-eight (28) days.

1.05 QUALIFICATIONS

A. Prepare shop drawings under seal of professional structural engineer licensed in the state in which the project is located.

1.06 REGULATORY REQUIREMENTS

A. Conform to ACI 304R and all applicable codes for placement of concrete and related work.

1.07 COORDINATION

A. Coordinate work prior to commencement of work.

B. Coordinate work of other sections in forming and setting openings, slots, recesses, chases, sleeves, bolts, anchors and other inserts.

C. Notify Engineer minimum 72 hours prior to commencement of concreting operations.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Conform to ACI 301.
- B. Plywood Forms: Douglas Fir species; solid one side grade; sound undamaged sheets. Thickness of wood shall be as required to support weight of concrete with minimal deflection.
- C. Steel Forms: Minimum 16 gage (1.5 mm) thick, stiffened to support weight of concrete with minimum deflection.
- D. Tubular Column Type Forms: Round, spirally wound laminated fiber material; inside surface treated with release agent.
- E. Form Ties: Snap-off metal, of fixed length, cone ends.
- F. Reinforcing: ASTM A615/A615M, 60 ksi (414 MPa) yield grade billet steel deformed bars; uncoated; size and dimensions as indicated on the plans.
- G. Welded Steel Wire Fabric: Plain type, ANSI/ASTM A185; in flat sheets; size and dimensions as indicated on the plans.
- H. Cement: ASTM C150/C150M, Type I - Normal.
- I. Fine and Coarse Aggregates: ASTM C33/C33M.
- J. Water: Clean and not detrimental to concrete.

2.02 ACCESSORIES

- A. Air Entraining Admixture: ASTM C260/C260M.
- B. Chemical Admixture: ASTM C494/C494M, Type as required.
- C. Bonding Agent: Polymer resin emulsion manufactured by SPECCO INDUSTRIES, INC., or specifically approved equal.
- D. Vapor Barrier: ASTM D2103, 6 mil (0.15 mm) thick clear polyethylene film.
- E. Non-Shrink Grout: Premixed compound with non-metallic aggregate, cement, water reducing and plasticizing agents; capable of minimum compressive strength of 2400 psi (16.5 MPa) at 48 hours and 7000 psi (48.3 MPa) at 28 days.
- F. Expansion Joints: ASTM D1751; 1/2 inch (13 mm) thick asphalt impregnated fiberboard or felt.
- G. Form Release Agent: Colorless material which will not stain concrete, absorb moisture or impair natural bonding or color characteristics of coating intended for use on concrete; manufactured by SPECCO INDUSTRIES, INC. or specifically approved equal. Agent shall not be detrimental to the environment.

- H. Sealant: ASTM D1190; hot applied rubber compound manufactured by THE BURKE COMPANY or specifically approved equal.
- I. Absorptive Mat: Burlap-polyethylene, 8 oz/sq yd (270 g/sq m), bonded to prevent separation during use.
- J. Membrane Curing Compound: ASTM C309, Type 2, Class A.
- K. Clear Sealer: Siloxane type; manufactured by THE BURKE COMPANY or specifically approved equal.

2.03 MIXES

- A. Mix concrete in accordance with ASTM C94, Alternative No. 2, to achieve the following:
 - 1. Compressive Strength (28 day): 4,000 psi
 - 2. Slump:
 - a. 3 +/-1 inches (initial/conventional mix)
 - b. 7 +/-1 inches (final/pump mix)
 - 3. Air Entrainment: 5 ½ +/-1 percent
 - 4. Water/Cement Ratio: 0.50 maximum
 - 5. Large Aggregate: ¾" crushed stone, ASTM C33/C33M, No. 67
- B. Use admixtures only when approved by the Engineer.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions prior to commencement of work.
- B. Verify lines, levels, and measurement before proceeding with formwork. Ensure that dimensions agree with the plans.

3.02 PREPARATION

- A. Hand trim sides and bottom of earth forms; remove loose dirt.
- B. Align form joints.
- C. Do not apply form release agent where concrete surfaces are to receive special finishes or applied coatings which may be affected by the agent.
- D. Where new concrete is dowelled to existing work, drill holes in existing concrete, insert steel dowels and pack with non-shrinking grout.
- E. Prepare previously placed concrete by cleaning with steel brush and apply bonding agent in accordance with manufacturer's instructions.

3.03 INSTALLATION

- A. Place, support, and secure reinforcement against displacement at the locations and to the dimensions as indicated on the plans.

- B. Use reinforcing splices at a minimum of locations and only at locations of minimum stress. Review locations of splices with Engineer.
- C. Splice overlap shall be a minimum length of 40 diameters.
- D. Ensure reinforcement, inserts, embedded parts, formed joint fillers, joint devices and waterstops are not disturbed during concrete placement.
- E. Install joint fillers in accordance with manufacturer's instructions.
- F. Extend joint filler from bottom of slab to within 1/2 inch (13 mm) of finished slab surface.
- G. Install joint devices in accordance with manufacturer's instructions.
- H. Maintain records of concrete placement. Record date, location, quantity, air temperature and test samples taken.
- I. Place concrete continuously between predetermined expansion, control and construction joints.
- J. Do not interrupt successive placement; do not permit cold joints to occur.

3.04 INSTALLATION - SLABS

- A. Place slabs in checkerboard pattern.
- B. Saw cut control joints at an optimum time after finishing. Cut slabs with 3/16 inch (4.8 mm) thick blade, cutting 1/4 of depth of slab thickness.
- C. Separate slabs on grade from vertical surfaces with joint filler. Extend joint filler from bottom of slab to within 1/4 inch (6 mm) of finished slab surface.
- D. Steel trowel all surfaces except as noted.
- E. Cure floor surfaces in accordance with ACI 308R.
- F. Apply curing compound in accordance with manufacturer's instructions in 2 coats with second coat at right angles to the first.

3.05 TOLERANCES

- A. Equipment Pads: Provide Class B tolerance to floor slabs according to ACI 308R.

3.06 FIELD QUALITY CONTROL

- A. Field inspection and testing of concrete will be performed under provisions of Section 014500 - QUALITY CONTROL.
- B. Testing firm will take cylinders and perform slump and air entrainment tests in accordance with ACI 301.
- C. Four concrete test cylinders will be taken for every 50 cu yds, or fraction thereof, for each class of concrete placed each day.

- D. One additional test cylinder will be taken during cold weather and be cured on site under same conditions as concrete it represents.
- E. One slump test will be taken for each set of test cylinders taken.

3.07 PROTECTION

- A. Protect finished work until completion of project.
- B. Protect concrete from damage and deformation until project is accepted by the Owner.

3.08 SCHEDULE: CONCRETE FINISHES

- A. Equipment Pads: Broom finish, trim edge.
- B. All Other Finishes: Steel trowel surface, unless otherwise noted.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Repair of cracked, spalled, calcinated and hollow areas on concrete tank interior floors and walls.

1.02 SUBMITTALS

- A. Submit under provisions of Section 013300 - SUBMITTALS.
- B. Submit manufacturers' product data and application requirements for proposed materials used to repair spalls and cracks.
- C. Submit documentation on characteristics of proposed media for abrasive blasting.
- D. Submit documentation indicating product applicators are trained and approved by product manufacturer.

1.03 REGULATORY REQUIREMENTS

- A. Coatings shall comply with NYCRR, Part 205, of the New York State Department of Environmental Conservation (NYSDEC).
- B. Transport debris and rubbish in accordance with New York State Department of Environmental Conservation Law, Article 27, Treatment and Disposal of Refuse and Other Solid Waste.

1.04 EXISTING CONDITIONS

- A. Allow Owner to conduct an inspection after tank cleaning to identify areas for repair.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. All repair mortar shall fully bond to existing surfaces and be free of chlorides.
- B. Bonding Agent and Reinforcement Protection: The bonding agent and reinforcement protection shall be a 3-component, solvent free, moisture tolerant, epoxy-modified, cementitious product specifically formulated as a bonding agent and an anti-corrosion coating. This product shall be Armatec 110 EpoCem as manufactured by SIKA CORP.
- C. Water: Potable, clean and free from oils, acids, alkali organic matter and other deleterious material.
- D. Filler: TNEMEC 63-1500.

PART 3 - EXECUTION

3.01 PROTECTION

- A. Protect pipe openings so that no materials enter into the lines during preparation and repair.

3.02 SURFACE PREPARATION

- A. Interior Abrasive blasting: Utilize abrasive blasting to remove all existing coatings and deposits at area to be repaired. Remove loose material to sound substrate. Equipment shall have ample capacity to furnish the required volume of compressed air to operate the blast effectively. The air shall be free of oil or moisture. Media shall be composed principally of silica grains. Do not utilize previously used media for abrasive blasting. Conduct abrasive blasting to prevent spread of media to adjoining property.
- B. Surfaces to be repaired and coated shall be clean.
- C. Mechanical chipping: Where necessary, and as directed by the Engineer, use chipping hammers to remove unsound concrete.

3.03 REPAIR/RESTORATION

- A. Interior Wall and Floor Crack Repair
 1. Rout with dovetail profile to a depth of ½-inch.
 2. Remove mortar at the ends of exposed wire and steel until corrosion free steel is exposed. Remove rust deposits and loose material from steel by blasting to a near white finish (SSPC-10). Coat bare steel with 20 mils (2 coats of 10 mils each) of SIKa ARMATEC 110 EPOCEM.
 3. Saturate surface with clean water.
 4. When repair area is saturated surface dry, coat entire concrete surface of repair area with 20 mils of SIKa ARMATEC 110 EPOCEM.
 5. Prepare two-component, polymer-modified, cementitious, non-sag mortar in accordance with manufacturer's standards.
 6. Apply in accordance with manufacturer's recommendations.
 7. Cure in accordance with ACI recommendations for Portland Cement Concrete.
- B. Interior Wall and Floor Repairs
 1. Remove all loose material to sound substrate.
 2. When surface preparation of area to be repaired is completed, coat entire concrete surface of repair area with 1/16-inch of TNEMEC 63-1500.

3.04 CLEANUP

- A. Maintain work area in a neat, orderly fashion. Debris such as used sand, muck, rust, scale, shall be frequently cleaned up and removed from the site. Thinners used to clean spray guns and other tools and equipment shall be held in containers and removed from the site to an approved disposal area by the Contractor. Do not clean equipment in tank.
- B. After completion of repair, thoroughly clean tank interior. Sweep broom clean.
- C. Upon completion of the work, remove all excess material, rigging, empty containers, and supplies, from the site. Buildings and grounds shall be left in as good condition as when work was started.

END OF SECTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
 - 1. Concrete toppings.

1.03 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.04 ACTION SUBMITTALS

- A. The contractor shall comply with the requirements of Division 01 Specification of the Project Manual, Section 013300 - SUBMITTALS.
- B. Product Data: For each type of product indicated.
- C. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
 - 1. Indicate amounts of mixing water to be withheld for later addition at Project site.
 - 2. Submit mix design mixtures for each type of concrete to be used on the Project at least 30 calendar days prior to the first scheduled concrete pour. The Contractor's testing laboratory shall develop concrete mix designs and test all materials and mixes for conformance with ACI 301 and these specifications. The costs associated with development of the design mix and testing of samples shall be included in the bid price.
 - 3. Submit the following:
 - a. Name, address, and telephone number of Contractor's laboratory.
 - b. Mix proportions.
 - c. Source of cement, type, brand, and certified copies of mill reports, including physical and chemical analysis.
 - d. Sources of fine aggregates and results of test made in accordance with ASTM C33/C33M and ASTM C40.
 - e. Source of coarse aggregates and results of tests made in accordance with ASTM C33/C33M.
 - f. Catalog cuts of all admixtures.
 - g. Furnish test results of slump, air entrainment and water-cement ratio for each mix design.
 - 4. For each mix proposed, make and cure four (4) standard 6 inch concrete test specimens to the laboratory in accordance with ASTM C192/C192M. Furnish compression test results made in accordance with ASTM C39/C39M. Break two (2) cylinders at seven (7) days and two (2) at 28 days.
 - 5. If the concrete is intended to be pumped, design mix accordingly and submit certification that it has been tested for pumping.

6. If adopted mix fails to produce concrete meeting the requirements for strength and placibility, the Architect may order additional cement or adjustments to mix proportions at no extra cost to the Owner.
- D. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, spacing, locations, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement including steel bars and wire fabric.
- E. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
 1. Location of construction joints is subject to approval of the Architect, if not shown on the drawings.

1.05 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and testing agency.
- B. Welding certificates.
- C. Material Certificates: For each of the following, provided by manufacturers:
 1. Cementitious materials.
 2. Admixtures.
 3. Form materials and form-release agents.
 4. Steel reinforcement and accessories.
 5. Curing compounds.
 6. Bonding agents.
 7. Adhesives and Vapor retarders.
 8. Semi rigid joint filler.
 9. Joint-filler strips.
 10. Repair materials.
- D. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.
- E. Field quality-control reports.
- F. Minutes of preinstallation conference.
- G. Furnish transit-mix delivery slips to Owner's Representative.

1.06 QUALITY ASSURANCE

- A. Comply with Referenced Standards specified in Division 01 Section "References" in addition to ACI 301.
- B. Perform testing under the provisions of Division 01 Section "Quality Requirements" and the "FIELD QUALITY CONTROL" Article of Part 3 listed in this specification.
- C. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.

- D. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.
 - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- E. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C1077 and ASTM E329 for testing indicated.
 - 1. The contractor shall provide an adequately sized, insulated curing box to house concrete cylinders at the discretion of the Architect, for the 48-hour period between concrete pour and sample collection pick-up by the Testing Laboratory (ASTM C31/C31M). As directed by the Architect, the contractor shall cure additional cylinders in the same fashion as the in-place concrete.
 - 2. Curing box shall be located away from the main construction area and shall be blocked up off the ground.
 - 3. A log sheet shall be provided in a waterproof sheet protector to log in the placement and removal of the concrete test samples by the testing laboratory.
 - 4. Minimum information to be logged for each pour date shall include: date of pour, date of pick-up, weather conditions at the time of pour, testing
- F. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer. To further insure consistency, coloration, finish and quality; all aggregates, cement, water and other ingredients shall each be secured from the same source for the duration of the project.
 - 1. The batching plant and raw materials may be subject to inspections and test performed by the Architect.
- G. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D1.4M, "Structural Welding Code - Reinforcing Steel."
- H. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
 - 1. ACI 301, "Specifications for Structural Concrete", Sections 1 through 5.
 - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials".
 - 3. ACI 304R - "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete".
- I. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.
- J. Preinstallation Conference: Conduct conference at Project site.
 - 1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
 - a. Contractor's superintendent.
 - b. Independent testing agency responsible for concrete design mixtures.
 - c. Ready-mix concrete manufacturer.
 - d. Concrete subcontractor.
 - 2. Review special inspection and testing and inspecting agency procedures for field quality control, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semi rigid joint fillers, forms and form

removal limitations, shoring and reshoring procedures, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage. Avoid damaging coatings on steel reinforcement.
- B. Store cement off the ground in a dry, weatherproof, adequately ventilated structure with provisions to prevent the absorption of water.
- C. Transport dry concrete batches from the central plant to the site in approved truck mixers conforming to the requirements of the Truck Mixer Manufacturer's Agitating Standards. Each truck shall contain a plate stating the capacity, drum speeds and be provided with a revolution counter.
- D. Packaged material shall be delivered and stored in the original packages until ready for use. Packages or materials showing evidence of water or other damage shall be rejected.
- E. Protect all materials from freezing.

1.08 COORDINATION

- A. Coordinate work under provisions of Division 01 Specification of this Project Manual.
- B. The Contractor shall provide at least five (5) working days advance notice prior to formwork closure to the Architect.
- C. Coordinate work of other Sections in forming and setting openings, slots, recesses, chases, sleeves, bolts, anchors, and other inserts.
- D. Notify Architect a minimum of three (3) working days prior to commencement concrete pours.

1.09 REGULATORY REQUIREMENTS

- A. Conform to ACI 304R and all applicable codes for placement of concrete and related work.

1.10 ENVIRONMENTAL REQUIREMENTS

- A. Do not place concrete when the ambient temperature is below 40 deg. F. or when the concrete temperature exceeds 85 deg. F. Under certain circumstances, the Engineer may approve the placement of concrete under the above conditions, provided that the procedures of ACI 305R and ACI 306R are strictly adhered to.
- B. Do not place concrete when the conditions may adversely affect the placing, curing or finishing of concrete, or its strength.
- C. Comply with the requirements contained in Section 016500 - PRODUCT DELIVERY, STORAGE AND HANDLING.

PART 2 - PRODUCTS

2.01 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
 - 1. Plywood, metal, or other approved panel materials.
 - 2. Steel forms: Minimum 16 gage thick, stiffened to support weight of concrete with minimum deflection.
 - 3. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
 - a. Douglas Fir Species, solid one side grade and sound
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum unless indicated otherwise on the drawings.
- D. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal. Patterns and sizes as shown on the drawings.

2.02 STEEL REINFORCEMENT

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 60 percent.
- B. Reinforcing Bars: ASTM A615/A615M, Grade 60, deformed.
- C. Galvanized Reinforcing Bars: ASTM A615/A615M, Grade 60; ASTM A706/A706M, deformed bars; ASTM A767/A767M, Class II zinc coated after fabrication and bending.
- D. Steel Bar Mats: ASTM A184/A184M, fabricated from ASTM A615/A615M, Grade 60 ; ASTM A706/A706M, deformed bars, assembled with clips.
- E. Deformed-Steel Wire: ASTM A 496.
- F. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.

2.03 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A615/A615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 - 1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
 - 2. Provide load bearing pad on bottom to prevent vapor barrier puncture.

- C. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
 2. Provide load bearing pad on bottom to prevent vapor barrier puncture.

2.04 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
1. Portland Cement: ASTM C150/C150M, Type IA, gray. Supplement with the following:
 - a. Fly Ash: ASTM C618, Class F or C.
 - b. Ground Granulated Blast-Furnace Slag: ASTM C989/C989M, Grade 100 or 120.
 2. Silica Fume: ASTM C1240, amorphous silica.
 3. Normal-Weight Aggregates: ASTM C33/C33M, No. 57 or 67 crushed stone coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.
 - a. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
 - b. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
 4. Lightweight Aggregate: ASTM C330/C330M, 3/4 inch, nominal maximum aggregate size.
 5. Water: ASTM C94/C94M, clean and not detrimental to concrete.

2.05 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C260/C260M.
- B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
 2. Retarding Admixture: ASTM C494/C494M, Type B.
 3. Water-Reducing and Retarding Admixture: ASTM C494/C494M, Type D.
 4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C494/C494M, Type G.
 6. Plasticizing and Retarding Admixture: ASTM C 1017, Type II.

2.06 VAPOR RETARDERS

- A. Sheet Vapor Retarder: ASTM E1745, Class C or polyethylene sheet, ASTM D4397 not less than 10 mils thick. Include manufacturer's recommended adhesive or pressure-sensitive tape.
1. Products: Subject to compliance with requirements, provide the following:
 - a. Carlisle Coatings & Waterproofing, Inc.; Blackline 400
 - b. Grace Construction Products, W. R. Grace & Co.; Florprufe 120
 - c. Insulation Solutions, Inc.; Viper VaporCheck 10.
 - d. Meadows, W. R., Inc.; Perminator 10 mil.
 - e. Reef Industries, Inc.; Griffolyn 10 mil Green.
 - f. Stego Industries, LLC; Stego Wrap 10 mil Class A.
 - g. Or approved equal.

- B. Fine-Graded Granular Material: Clean mixture of crushed stone, crushed gravel, and manufactured or natural sand; ASTM D448, Size 10, with 100 percent passing a 3/8-inch sieve, 10 to 30 percent passing a No. 100 sieve, and at least 5 percent passing No. 200 sieve; complying with deleterious substance limits of ASTM C33/C33M for fine aggregates.

2.07 FLOOR AND SLAB TREATMENTS

- A. Slip-Resistive Emery Aggregate Finish: Factory-graded, packaged, rustproof, non-glazing, abrasive, crushed emery aggregate containing not less than 50 percent aluminum oxide and not less than 20 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials with 100 percent passing No. 4 sieve.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dayton Superior Corporation; Emery Tuff Non-Slip
 - b. Lambert Corporation; EMAG-20
 - c. L&M Construction Chemicals, Inc.; Grip It
 - d. Metalcrete Industries; Metco Anti-Skid Aggregate

2.08 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 8 oz. /sq. yd. when dry.
- B. Moisture-Retaining Cover: ASTM C171, polyethylene film or white burlap-polyethylene sheet weighing approximately 8 oz. / sq. yd. bonded to prevent separation during use.
- C. Membrane curing compound: Moisture Retention complying with ASTM C309. Products: EUCOCURE VOX by Euclid Chemical Company or equal.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C309, Type 1, Class B, dissipating.
 - 1. Products: Eucocure VOX as manufactured by Euclid Chemical Company or approved equal.

2.09 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D1751, 1/2" asphalt-saturated cellulosic fiber.
- B. Bonding Agent: ASTM C1059/C1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- C. Epoxy Bonding Adhesive: three-component, solvent-free, moisture tolerant, epoxy modified cementitious product.
 - 1. Product: Armatec 110 EpoCem as manufactured by Sika Corporation or specifically approved equal.
 - 2. Types I and II, non-load bearing Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
- D. Non-Shrink Grout: Premixed compound, free of chlorides, with non-metallic aggregate, cement water reducing and plasticizing agents; capable of minimum compressive strength of 2400 psi

at 48 hours and 7000 psi at 28 days. Grout shall be suitable for contact with potable water. For equipment bases and pipe supports, use non-shrink grout by Master Builders, Embeco 636, Unisorb V-1 or equal.

- E. Reglets: Fabricate reglets of galvanized-steel sheet not less than 26 gauge material; in the longest lengths possible with alignment splines for joints; secure to formwork; Type CO as manufactured by Fry Reglet or approved equal. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

2.10 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
 - 1. Cement Binder: ASTM C150/C150M, Portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
 - 4. Compressive Strength: Not less than 4000 psi at 28 days when tested according to ASTM C109/C109M.

2.11 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
 - 1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than Portland cement in concrete as follows:
 - 1. Fly Ash: 25 percent.
 - 2. Combined Fly Ash and Pozzolan: 25 percent.
 - 3. Ground Granulated Blast-Furnace Slag: 50 percent.
 - 4. Combined Fly Ash or Pozzolan and Ground Granulated Blast-Furnace Slag: 50 percent Portland cement minimum, with fly ash or Pozzolan not exceeding 25 percent.
 - 5. Silica Fume: 10 percent.
 - 6. Combined Fly Ash, Pozzolans, and Silica Fume: 35 percent with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.
 - 7. Combined Fly Ash or Pozzolans, Ground Granulated Blast-Furnace Slag, and Silica Fume: 50 percent with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.
 - 8. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.
- C. Admixtures: Use admixtures according to manufacturer's written instructions.
 - 1. Use plasticizing admixture in concrete, as required, for placement and workability.
 - 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.

2.12 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Proportion normal-weight concrete mixture as follows:
 1. Minimum Compressive Strength: Pier, Mat and Spread Footings; foundation walls, slab on grade and slab on metal deck: 4000 psi at 28 days.
 2. Maximum Water-Cementitious Materials Ratio: 0.50 for all concrete building elements.
 3. Slump Limits (Conventional Mix):
 - a. Slabs: 3 inches plus or minus one inch.
 - b. Piers, Foundation Walls and Footings: 4 inches plus or minus one inch.
 4. Slump Limits (Pump Mix):
 - a. Final slump (Slabs): 6 1/2 inches plus or minus one inch.
 - b. Final Slump (Foundation, walls and footings): 7 1/2 inches plus or minus one inch
 5. Air Content:
 - a. Piers, Mats and Spread Footings: 5.5 percent, plus or minus 1.0 percent. at the point of delivery.
 - b. Slabs: 3 percent, plus or minus 1.0 percent at point of delivery. Do not allow air content of trowel finished concrete floors to exceed 3 percent.
 6. Large Aggregates: 3/4" crushed stone; ASTM C33/C33M, No. 67.
 7. Use Admixtures only when approved by the Engineer.
 8. Mix Grout in accordance with the manufacturer's instructions and specifications.

2.13 FABRICATING REINFORCEMENT

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

2.14 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C94/C94M and ASTM C1116/C1116M, and furnish batch ticket information.
 1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.
- B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C94/C94M. Mix concrete materials in appropriate drum-type batch machine mixer.
 1. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
 2. For mixer capacity larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd.
 3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify lines, levels, and measurements before proceeding with formwork. Ensure that dimensions agree with the plans.
- B. Inspect the formwork and reinforcing that it has been properly set and secured and that all items to be embedded, built-in or pass through concrete are at their proper locations and elevations.
- C. The General Construction Contractor shall verify that all other prime contractors have installed concrete inserts, sleeves, and embedded elements of the project, such as conduit, and their work has been totally completed and inspected by the Architect.
- D. Ensure that all points of contact with new grout are free from oil, grease and scale.

3.02 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117
- C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
 - 1. Class A, 1/8 inch for smooth-formed finished surfaces.
 - 2. Class B, 1/4 inch for rough-formed finished surfaces.
 - a. Hand trim sides and bottom of earth forms and remove loose soil to the satisfaction of the Architect.
 - b. Remove water from forms and excavations and divert water flow to avoid washing over, under or through freshly placed concrete.
- D. Construct forms tight enough to prevent loss of concrete mortar. Align form joints.
- E. Do not apply form release agent where concrete surfaces are to receive special finishes or applied coatings that may be affected by the agent.
- F. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
 - 1. Install keyways, reglets, recesses, and the like, for easy removal.
 - 2. Do not use rust-stained steel form-facing material.
- G. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- H. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

- I. Chamfer: Provide 3/4" inch chamfer on all exterior horizontal and vertical corners and edges of permanently exposed concrete.
- J. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- K. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- L. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- M. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement. Do not apply form release agent where concrete surfaces are to receive special finishes or applied coatings that may be affected by the agent.
- N. Where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack with non-metallic/ non-shrink grout.
- O. Prepare previously placed concrete by cleaning with steel brush and apply a Bonding Agent in accordance with the manufacturer's specifications and instructions.

3.03 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
 - 2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
 - 3. Install dovetail anchor slots in concrete structures as indicated.
 - 4. Ensure that all inserts and embedded items are not disturbed during concrete placement.

3.04 REMOVING AND REUSING FORMS

- A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained.
 - 1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
 - 2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.05 SHORES AND RESHORES

- A. Comply with ACI 318 and ACI 301 for design, installation, and removal of shoring and reshoring.
 - 1. Do not remove shoring or reshoring until measurement of slab tolerances is complete.
- B. In multistory construction, extend shoring or reshoring over a sufficient number of stories to distribute loads in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members without sufficient steel reinforcement.
- C. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

3.06 VAPOR RETARDERS

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E1643 and manufacturer's written instructions.
 - 1. Lap joints 6 inches and seal with manufacturers recommended tape.
- B. Granular Course: Cover vapor retarder with fine-graded granular material, moisten, and compact with mechanical equipment to elevation tolerances of plus 0 inch or minus 3/4 inch.

3.07 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
 - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars. Use reinforcing splices at minimum of locations and only at locations of minimum stress. Review locations of splices with Architect. Splice locations shall be approved during shop drawing review phase. Rebar splice overlap shall be the minimum length as per ACI 318.
 - 1. Weld reinforcing bars according to AWS D1.4/D1.4M, where indicated.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.
- F. Take necessary measures to ensure that reinforcement is not disturbed during the placement of concrete.

3.08 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
 - 2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
 - 3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
 - 4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
 - 5. Space vertical joints in walls as indicated or at 20' o.c. maximum. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
 - 6. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Contraction / Control Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
 - 1. Sawn Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 3/16"-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
 - 1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
 - 2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Section 079200 - JOINT SEALANTS are indicated.
 - 3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
- E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.
- F. Ensure joint fillers and devices are not disturbed during placement of concrete.
- G. Install all joint fillers and devices in accordance with the manufacturer's instructions and specifications for floor and wall finish.
- H. Install joint device anchors. Maintain correct position to allow joint cover flush with floor and wall finish.
- I. Install joint covers in one-piece length when adjacent construction activity is complete.

- J. Apply sealants in joint devices in accordance with the manufacturer's specifications and instructions.

3.09 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.
- C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
 - 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
 - 2. Place concrete with the aid of mechanical vibrators which are capable of transmitting to the concrete not less than 3,000 impulses per minute. Maintain at least three (3) vibrators in good working condition, ready for use when concrete placement begins in any one area.
 - 3. Do not interrupt successive placement. Do not permit cold joints to occur.
- D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
 - 1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
 - 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
 - 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
 - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 - 2. Maintain reinforcement in position on chairs during concrete placement.
 - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 - 4. Slope surfaces uniformly to drains where required.
 - 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- F. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 - 1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.

2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- G. Hot-Weather Placement: Comply with ACI 301 and ACI 305R and as follows:
1. Maintain concrete temperature below 95 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.
 3. Maintain records of concrete placement. Record date, locations, quantity, air temperature and test samples taken.
 4. In areas with floor drains, maintain floor elevations at walls; pitch surfaces uniformly to the drains maintaining a 1% slope.
 5. Cure floor surfaces in accordance with ACI 308R.
 6. Apply curing compound in accordance with the manufacturer's specifications and instructions in two (2) coats with the second coat at right angles to the first.

3.10 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
1. Apply to concrete surfaces not exposed to public view.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
1. Apply to concrete surfaces exposed to public view.
- C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:
1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
- D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.11 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, re-straightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch 6 mm in one direction.

- C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Re-straighten, cut down high spots, and fill low spots. Repeat float passes and re-straightening until surface is left with a uniform, smooth, granular texture.
 - 1. Apply float finish to surfaces to receive trowel finish and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.
- D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and re-straighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
 - 1. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, and ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
 - 2. Finish surfaces to the following tolerances, according to ASTM E1155, for a randomly trafficked floor surface:
 - a. Specified overall values of flatness, F (F) 30; and of levelness, F (L) 20; with minimum local values of flatness, F (F) 24; and of levelness, F (L) 15; for suspended slabs.
 - 3. Finish and measure surface so gap at any point between concrete surface and an unlevelled, freestanding, 10-ft. long straightedge resting on two high spots and placed anywhere on the surface does not exceed 3/16 inch.
- E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.
 - 1. This surface shall be used for interior and exterior walking surfaces unless noted otherwise. Finish edges of exterior walkway flags with steel tooled radius edge.
 - 2. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.
- F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, equipment pads, and elsewhere as indicated.
 - 1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.
- G. Slip-Resistive Finish: Before final floating, apply slip-resistive finish where indicated and to concrete stair treads, platforms, and ramps. Apply according to manufacturer's written instructions and as follows:
 - 1. Uniformly spread 25 lb. /100 sq. ft. of dampened slip-resistive over surface in one or two applications. Tamp aggregate flush with surface, but do not force below surface.
 - 2. After broadcasting and tamping, apply float finish.
 - 3. After curing, lightly work surface with a steel wire brush or an abrasive stone and water to expose slip-resistive aluminum granules.

3.12 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. All exposed horizontal and vertical wall and slab corners shall have a $\frac{3}{4}$ " wide chamfered edge.
- D. Equipment Bases and Foundations:
 - 1. Coordinate sizes and locations of concrete bases with actual equipment provided.
 - 2. Construct concrete bases 6 inches high unless otherwise indicated; and extend base not less than 6 inches in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated or unless required for seismic anchor support.
 - 3. Minimum Compressive Strength: 4000 psi at 28 days.
 - 4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 12 inch centers around the full perimeter of concrete base.
 - 5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base, and anchor into structural concrete substrate.
 - 6. Prior to pouring concrete, place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 7. Cast anchor-bolt inserts into bases. Install anchor bolts to elevations required for proper attachment to supported equipment.
- E. Grout: Install grout in accordance with the manufacturer's specifications and instructions. Moisten concrete and grout surfaces and allow drying until damp. Remove all standing water. Pump or inject grout into tight spaces to ensure intimate contact with the existing grout. Cure grout with an appropriate membrane in accordance with the manufacturer's specifications and instructions.

3.13 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 and ACI 305R for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb./sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Cure concrete according to ACI 308R and ACI 308.1, by one or a combination of the following methods:
 - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.

- c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
 - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
 - c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.
 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
 - a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.
- F. Liquid sealer/hardener to be applied on exposed concrete cured with moisture retentive or absorptive covers. The following materials provide varying levels of protection, sealant and hardness. Review products for project appropriateness.
 1. Euclid: Euco Diamond Hard (Liquid Sealer and Hardener)
 2. L&M Construction Chemicals: Seal Hard (Liquid Sealer and Hardener)
 3. Curecrete Chemical Company: Ashford Formula (Liquid Sealer and Hardener)
 4. Midwest Floor Care: Structure Formula (Liquid Sealer and Hardener)
 5. Or approved equal.

3.14 JOINT FILLING

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

3.15 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Engineer. Remove and replace concrete that cannot be repaired and patched to Engineer's approval.
- B. Immediately remove all rust spots that have developed during the construction period as soon as directed by the Architect. Remove all rust spots that have formed by the use of temporary handrails.

3.16 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage a special inspector and/or qualified testing and inspecting agency to perform field tests and inspections and prepare test reports. Contractor is responsible to notify the Owners representative at least 72 hours prior to the scheduled work that requires inspection / testing. The presence of the Inspector engaged by the Owner does not relieve the contractor of Quality Control Requirements.
- B. Testing and Inspecting: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
- C. Inspections:
 - 1. Steel reinforcement placement.
 - 2. Headed bolts and studs.
 - 3. Steel reinforcement welding.
 - 4. Concrete placement, including conveying and depositing.
 - 5. Curing procedures and maintenance of curing temperature.
 - 6. Verification of concrete strength before removal of shores and forms from beams and slabs.
- D. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C172/C172M shall be performed according to the following requirements:
 - 1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
 - a. Frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 - b. One (1) additional test cylinder shall be taken during cold weather and be cured under the same conditions as the concrete it represents.
 - 2. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
 - 3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C173/C173M, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - 4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
 - 5. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - 6. Compression Test Specimens: ASTM C31/C31M.
 - a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
 - b. Cast and field cure two Insert number sets of two standard cylinder specimens for each composite sample.
 - 7. Compressive-Strength Tests: ASTM C39/C39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
 - a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.

- b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
 - 8. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
 - 9. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
 - 10. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7 and 28-day tests.
 - 11. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
 - 12. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Architect.
 - 13. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
 - 14. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.
- E. Measure floor and slab flatness and levelness according to ASTM E1155 within 72 hours of finishing.

END OF SECTION

PART 1 GENERAL

1.01 SUMMARY

- A. Related Documents:
 - 1. Drawings and general provisions of the Subcontract apply to this Section.
 - 2. Review these documents for coordination with additional requirements and information that apply to work under this Section.
- B. Section Includes:
 - 1. Grout for uses other than masonry.
 - 2. Pressure Grouting.
- C. Related Sections:
 - 1. Division 01 Section "General Requirements."

1.02 REFERENCES

- A. General:
 - 1. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
 - 2. Unless otherwise noted, the referenced standard edition is the current one at the time of commencement of the Work.
 - 3. Refer to Division 01 Section "General Requirements" for the list of applicable regulatory requirements.
- B. ASTM International:
 - 1. ASTM C33 Concrete Aggregates
 - 2. ASTM C40 Organic Impurities in Fine Aggregates for Concrete
 - 3. ASTM C88 Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
 - 4. ASTM C117 Material Finer Than 75µm Sieve in Mineral Aggregates by Washing
 - 5. ASTM C136 Sieve Analysis of Fine and Coarse Aggregates
 - 6. ASTM C150 Portland Cement
 - 7. ASTM C289 Potential Reactivity of Aggregates (Chemical Method)
 - 8. ASTM C494 Chemical Admixtures for Concrete
 - 9. ASTM C881 Epoxy-Resin-Base Bonding Systems for Concrete
 - 10. ASTM D2419 Sand Equivalent Value of Soils and Fine Aggregate
 - 11. ASTM E329 Inspection and Testing Agencies for Concrete, Steel, Bituminous Materials as Used in Construction

1.03 SUBMITTALS

- A. Submit under provisions of Section 013300 - SUBMITTALS.
- B. Manufacturer's data shall be provided for bonding compounds, dry pack , nonshrink, pressure grout, retardants, epoxy grout, and polymer concrete.
- C. Test reports, accompanied by a manufacturer's statement that previously tested material is of similar type, quality, and manufacture as that which is proposed for use on this projects, shall be submitted for:

1. Cement.
2. Aggregates.
3. Retardants.
4. Bonding compounds.
5. Epoxy resin.

- D. The subcontractor's testing laboratory shall provide evidence of the most recent inspection of its facilities by the Cement and Concrete Reference Laboratory of the National Bureau of Standards and evidence of correction of deficiencies noted in the inspection report before materials specified in this section are delivered to the job site.

1.04 QUALITY ASSURANCE

- A. Conformance with the specified requirements will be demonstrated testing performed by an independent testing laboratory retained by the Owner.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Cement: Portland cement shall be ASTM C150/C150M, Type II or Type V, containing less than 0.6 percent alkali.
- B. Aggregate:
1. General: Aggregate shall be non reactive and shall be washed before use. When sources of aggregate are changed, test reports shall be provided for the material from the new source prior to commencing grout work.
 2. Fine Aggregate: Fine aggregate shall be sand or crushed stone conforming to ASTM C33/C33M as modified herein. When tested in accordance with ASTM C136/C136M, gradation shall be such that 100 percent by weight passes a standard No. 8 sieve and not less than 45 percent by weight pass a standard No. 40 sieve. Variation from the specified gradation in individual tests will be accepted if the average of three consecutive tests is within the following variation:

Standard Sieve	Permissible variation in individual test
No. 30 or coarser	2 percent by weight
No. 50 or finer	0.5 percent by weight

- C. Admixtures:
1. Water Reducing Retarder: Water reducing retarder shall comply with ASTM C494/C494M, Type D and shall be Master Builders Pozzolith 300-R, Sika Corporation Plastiment or approved equal.
 2. Lubricant: Lubricant additive for cement pressure grouting shall be Intrusion Prepakt Intrusion Aid, Sika Intraplast N, or approved equal.
- D. Water:
1. Waste for washing aggregate, for mixing and for curing shall be potable, shall not contain more than 1000 mg/l of chlorides as Cl, nor more than 1300 mg/l of sulfates as SO₄, and shall not contain impurities which may change the setting time by more than 25 percent or a reduction of more than 5 percent of the compressive strength of the grout at 14 days when compared to the results for grout made with distilled water.

2.02 GROUT

- A. Drypack Grout:
 - 1. Drypack grout shall be one of the following:
 - a. a mixture of approximately one part cement, 1-1/2 parts sand, water reducing retarder and sufficient water to make a stiff workable mix.
 - b. W.R. Meadows Wedjroc Dry Pack.
 - c. Euclid Chemical Dry Pack.
 - d. or approved equal.
- B. Cement Grout:
 - 1. Cement grout shall be a mixture of one part cement, two parts sand proportioned by volume admixtures for pressure grouting and sufficient water to form a workable mix.
- C. Nonshrink Grout:
 - 1. Metallic aggregate nonshrink grout shall be one of the following:
 - a. Master Builders Embeco 636.
 - b. Burke Company Metallic Spec Grout.
 - c. Sonneborn Ferrolith G Redimix.
 - d. or approved equal.
 - 2. Nonmetallic aggregate nonshrink grout shall be one of the following:
 - a. U.S. Grout Five Star grout.
 - b. Master Builders Masterflow 713.
 - c. Burke Company Non-Ferrous, Non-Shrink Grout.
 - d. or approved equal.
- D. Epoxy Grout for Crack Repair and Dowel Anchorage:
 - 1. Except for applications involving pressure grouting or crack injection, epoxy shall be a high modulus, moisture insensitive, two component, 100 percent solids, thermosetting modified polyamide epoxy compound. The material shall conform to ASTM C881/C881M, Type I, Grade 3 such as Sika Corporation Sikadur Hi-Mod series, Adhesive Technology Corporation Solidbond 200, or approved equal which is capable of not sagging in horizontal or overhead anchoring applications.
 - 2. Epoxy for applications involving pressure grouting or crack injection, shall be a high modulus, moisture insensitive, two component, injection grade, 100 percent solids blend of epoxy resin compounds. The material shall conform to ASTM C881/C881M, Type I, Grade 1 such as Sika Corporation Sikadur 52, Adhesive Technology Corporation SLV 300 series, or equal which is capable of achieving complete penetration of hairline and larger cracks.
- E. Polymer Concrete for Resurfacing and Patching:
 - 1. Polymer concrete shall consist of a liquid binder and dry aggregate mixed together to make a flowable mortar. The liquid binder shall be a chemical and oil resistant, stress relieved, low modulus, moisture insensitive, two component epoxy resin compound. The binder material shall conform to ASTM C881/C881M, Type 3, Grade 1 such as Sika Corporation Sikadur Lo-Mod series, Adhesive Technology Corporation 400 series, or equal with a consistency similar to light weight oil for proper mixing with the aggregate. The aggregate shall be oven dry, kept in sealed packages until the time of mixing and be of size and consistency compatible with recommendations of the manufacturer of the liquid binder for the intended application.
- F. Adhesive Resin for Dowel Anchorage:

1. ICC approved, structural epoxy; prepackaged in cartridges for manually or pneumatically operated caulk gun and automatically mixed at nozzle. Subject to compliance with current ICC evaluation report provide one of the following: HIT RE500-SD Adhesive Anchoring System, Hilti, Inc. (ICC ESR-2322), HIT-HY 150 MAX-SD Adhesive Anchoring System, Hilti, Inc. (ICC ESR-3013), SET-XP Adhesive Anchoring Systems, Simpson Strong-Tie Co. (ICC ESR-2508).

2.03 PRESSURE GROUTING EQUIPMENT

- A. Pressure grouting equipment shall include a mixer and holdover agitator tanks designed to place grout at pressures up to 50 psi (0.345 MPa). Gauges indicating grouting pressure shall be provided and the mixer shall be equipped with a meter capable of indicating to within 1/10 cubic foot (0.003 m³) the volume of grout placed.

PART 3 EXECUTION

3.01 GENERAL

- A. Bonding compounds for use with grout is specified in Section 033000 - CAST-IN PLACE CONCRETE. Primer, if required for polymer concrete, is to be provided and installed per the manufacturer's recommendations.

3.02 DRYPACK GROUT

- A. Drypack grout is to be used for built-up surfaces, setting miscellaneous metal items and minor repairs.
- B. Surfaces required to be built-up with drypack grout are to be roughened by brushing, cleaned and coated with the bonding compound before application of grout. The grout is to be applied to the required thickness and cured in accordance with Section 033000 - CAST-IN PLACE CONCRETE.

3.03 CEMENT GROUT

- A. Cement grout is to be used for filling nonbearing portions of equipment pads and pressure grouting.
- B. Except for the specialized requirements for pressure grouting, grout is to be mixed and placed in the same manner as cast-in-place concrete. Grout is to be mixed for at least one minute and diluted grout is to be agitated until placed.

3.04 NONSHRINK GROUT

- A. Nonshrink, nonmetallic aggregate grout is to be used under equipment, bearing plates and column base plates. Nonshrink, metallic aggregate grout is to be used under rotating equipment where high strength and fatigue are of concern, to grout anchor bolts and to grout reinforcing steel. Grout is to be placed and cured in accordance with the manufacturer's recommendations.
- B. Holes required for grouting shall be blown clean with compressed air and are to be free of dust or standing water. Horizontal holes for grouting are to be drilled at a slight downward angle and with the inserted dowel or bolt bent to match.

3.05 EPOXY GROUT

- A. Epoxy grout shall be used for repairing cracks by pressure grouting or gravity, repairing structural concrete and may be used for setting dowels or bolts in holes. Concrete is to be primed in accordance with the grout manufacturer's recommendations.
- B. The use of epoxy grout must comply with the following restrictions:
 - 1. Limited to areas where exposure, on an intermittent or continuous basis, to acid, chlorine gas or to machine or diesel oils, is extremely unlikely.
 - 2. Limited to applications where exposure to fire or to concrete temperatures above the product heat deflection temperature or 120 deg F (40 deg C)(whichever is less) is extremely unlikely. Overhead applications are not allowed.
 - 3. Holes for the anchors shall be drilled (not cored), shall be blown clean with compressed air and shall be free of dust or standing water.
 - 4. The anchor type, size and embedment depth shall be as shown on the drawings and the anchor must be installed in accordance with the manufacturer's recommendations.
 - 5. The anchor must not be loaded until after the full curing period has elapsed.

3.06 PRESSURE GROUTING

- A. Prior to grouting, cracks and holes to be grouted shall be washed clean. Washing is not required for grouting soil voids. Once started, grouting shall be continuous until completed. In case of a mechanical failure or other stoppage of the work, the grout equipment shall be washed out sufficiently to ensure that fresh only grout is pumped when the work is restarted.

3.07 FIELD QUALITY CONTROL

- A. The Testing Laboratory will:
 - 1. Special Inspect installation of anchors in accordance with applicable ICC Evaluation Report, where special inspection is indicated on Contract Documents or where Subcontractor's design engineer has used ICC anchor capacities that require Special Inspection.
 - 2. Subcontractor will reimburse Owner for cost of Special Inspection, where anchors are sized by Subcontractor's design engineer using ICC Special Inspection values.
 - 3. Develop and utilize an effective method of field marking anchor and dowel test locations and results.
- B. Testing of grout mixes for conformance to manufacturer's specified strength: The Owner's independent testing laboratory shall take four test samples of each day's grout mix and test grout mix samples at 7 and 28 days. Test reports shall be submitted to the Owner / Architect for review under the provisions of Division 01 Section "General Requirements."
- C. Test 25 percent of reinforcing steel dowels installed with adhesive resin on a given day in tension using pullout procedure. Test to 80% of specified yield strength of the dowel or 150% of the ICC rated static capacity whichever is the lesser with special inspection. Dowels specifically noted on the drawings as "No test required" do not require tension testing.
- D. If the failure rate of dowels exceeds 10 percent, testing will be increased to 100 percent of that day's installation of similar anchors or dowels. Testing will be reduced to 25 percent of that day's installation when the failure rate is reduced to 10 percent or less. Failed dowels will be replaced at no additional cost to the Owner . Subcontractor will reimburse Owner for cost of

GROUTING
Irvington Union Free School District
Main Street School Renovations
Main Street School
SED No.: 66-04-02-02-0-001-016

H2M

additional testing. The testing agency will produce daily reports of all testing activities: copies of daily reports will be submitted to the Owner / Architect in a timely manner.

END OF SECTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Structural steel.
 - 2. Grout.
 - 3. Base Plates

1.03 DEFINITIONS

- A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."
- B. Heavy Sections: Rolled and built-up sections as follows:
 - 1. Shapes included in ASTM A6/A6M with flanges thicker than 1-1/2 inches (38 mm).
 - 2. Welded built-up members with plates thicker than 2 inches (50 mm).
 - 3. Column base plates thicker than 2 inches (50 mm).

1.04 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 anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

1.05 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.06 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show fabrication of structural-steel components.
 - 1. Shop drawings and required calculations shall bear the seal and signature of a registered Professional Engineer licensed in the state in which the project is located. Structural steel shop drawings will not be reviewed without said seal and signature.
 - 2. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
 - 3. Include embedment Drawings.
 - 4. Indicate profiles, sizes, spacing and locations of structural members, openings, attachments, fasteners, connections, cambers, holes and other pertinent data. Include locations of structural members, openings, attachments and loads.

5. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
 6. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.
 7. For structural steel connections indicated to comply with design loads, include structural design data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Delegated-Design Submittal: For structural-steel connections indicated to comply with design loads, include analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.07 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For installer / fabricator.
- B. Welding certificates: Submit certificates certifying that welders employed in the work have met AWS qualifications within in the previous 12 months.
- C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- D. Mill test reports for structural steel, including chemical and physical properties. Indicate structural strength, destructive and non-destructive test analysis.
- E. Product Test Reports: For the following:
 1. Bolts, nuts, and washers including mechanical properties and chemical analysis.
 2. Direct-tension indicators.
 3. Tension-control, high-strength, bolt-nut-washer assemblies.
 4. Shear stud connectors.
 5. Shop primers.
 6. Non-shrink grout.

1.08 QUALITY ASSURANCE

- A. Fabricator shall have a minimum of five (5) years documented experience with performing the work of this section.
- B. Installer Qualifications: A qualified installer specializing in performing the work of this section with a minimum of three (3) years of documented experience.
- C. Delegated Connection Designer: Connections not fully detailed on the contract drawings shall be designed under the direct supervision of a professional structural engineer experienced in the design of this work and licensed in the state in which the work is located. The shop drawings shall bear the seal and signature of same professional engineer.
- D. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 1. Welders and welding operators performing work on bottom-flange, demand-critical welds shall pass the supplemental welder qualification testing, as required by AWS D1.8/D1.8M. FCAW-S and FCAW-G shall be considered separate processes for welding personnel qualification.

2. Welders who are welding structural members fabricated in the shop or in the field, in the five boroughs must have a NYCDOB issued welder licence.
- E. Comply with applicable provisions of the following specifications and documents:
 1. AISC Code of Standard Practice for Steel Buildings and Bridges - AISC 303.
 2. AISC Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings - AISC 360.
 3. RCSC's "Specification for Structural Joints Using ASTM A325 or ASTM A490 Bolts."

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store and handle products to/at the site under the supervision of Division 01 of this Project Manual.
- B. Schedule deliveries of materials to the site at intervals which will ensure uninterrupted progress of the work.
- C. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
 1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.
- D. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
 1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
 2. Clean and experience. who bolts and nuts that become dry or rusty before use.
 3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F1852 fasteners and for retesting fasteners after lubrication.

1.10 COORDINATION

- A. Coordinate the work under Division 01 specification of this Project Manual.
- B. Coordinate the selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturer's recommendations to ensure that shop primers and topcoats are compatible with one another.
- C. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions and directions for installation.
- D. Coordinate the work of this section with utility installations and all other adjacent work.
- E. Coordinate the work of this section such that general progress of the Work is not interrupted.

1.11 FIELD MEASUREMENTS

- A. Verify that field measurements are as shown on the plans and approved shop drawings.
- B. The contractor is responsible for the proper location and elevations of the work.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Connections: Provide details of simple shear connections required by the Contract Documents to be selected or completed by structural-steel fabricator, including comprehensive engineering analysis by a qualified professional engineer, to withstand loads indicated and comply with other information and restrictions indicated where beam end reactions are not shown on drawings. Connection designer shall design shear connections to resist the reaction resulting from the maximum allowable uniform load of the beam found in the AISC Specification being applied along its full length.
 - 1. Select and complete connections using AISC 360.

2.02 STRUCTURAL-STEEL MATERIALS

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. W-Shapes: ASTM A 992/A 992M.
- C. Channels, Angles, M-Shapes: ASTM A 36/A 36M.
- D. Plate and Bar: ASTM A 36/A 36M.
- E. Cold-Formed Hollow Structural Sections: ASTM A500/A500M, Grade C, seamless structural tubing.
- F. Steel Pipe: ASTM A53/A53M, Type E or Type S, Grade B.
 - 1. Weight Class: as indicated on the contract documents.
 - 2. Finish: Black except where indicated to be galvanized.
- G. Welding Electrodes: Comply with AWS requirements.

2.03 BOLTS, CONNECTORS, AND ANCHORS

- A. Zinc-Coated High-Strength Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A 325 (ASTM A 325M), Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH (ASTM A 563M, Class 10S) heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers.
 - 1. Finish: Hot-dip zinc coating.
 - 2. Direct-Tension Indicators: ASTM F959/F959M, Type 325 (ASTM F 959M, Type 8.8), compressible-washer type with mechanically deposited zinc coating finish.
- B. High-Strength Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade C, heavy-hex carbon-steel nuts; and ASTM F436, Type 1, hardened carbon-steel washers; all with plain finish.
- C. High-Strength Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A490 (A 490M), Type 1, heavy-hex steel structural bolts or tension-control, bolt-nut-washer assemblies with splined ends; ASTM A563, Grade DH, (ASTM A563M, Class 10S) heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers with plain finish.

1. Direct-Tension Indicators: ASTM F959, Type 490 (ASTM F 959M, Type 10.9), compressible-washer type with plain finish.
- D. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F1852, Type 1, round head assemblies consisting of steel structural bolts with splined ends, heavy-hex carbon-steel nuts, and hardened carbon-steel washers.
 1. Finish: Plain.
- E. Shear Connectors: ASTM A108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1/D1.1M, Type B.
- F. Anchor Bolts: ASTM A307, Grade C for non-moment resisting anchor rods. ASTM F1554, 36 and 55 ksi yield strength for moment resisting anchor rods.
 1. Nuts: ASTM A563 heavy-hex carbon steel.
 2. Plate Washers: ASTM A36/A36M carbon steel.
 3. Washers: ASTM F436/F436M, Type 1, hardened carbon steel.
 4. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C.
- G. Threaded Rods: ASTM A 36/A 36M.
 1. Nuts: ASTM A563 ASTM A563M heavy-hex carbon steel.
 2. Washers: ASTM F 436 (ASTM F 436M), Type 1, hardened carbon steel.
 3. Finish: Plain.
- H. Eye Bolts and Nuts: Made from cold-finished carbon steel bars, ASTM A108, Grade 1030.
- I. Sleeve Nuts: Made from cold-finished carbon steel bars, ASTM A108, Grade 1018.

2.04 PRIMER

- A. Primer: Comply with Division 09
- B. Primer: SSPC-Paint 15, Type I, red oxide.
- C. Ensure primer is compatible with required topcoat.
- D. Galvanizing Repair Paint: ASTM A 780/A 780M.

2.05 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.
- B. Grout shall consist of a premixed compound with cement, water reducing and plasticizing additives capable of developing a minimum compressive strength of 7000 psi at 28 days.

2.06 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," and to AISC 360.
 1. Camber structural-steel members where indicated.
 2. Fabricate beams with rolling camber up.

3. Identify high-strength structural steel according to ASTM A6/A6M and maintain markings until structural steel has been erected.
 4. Mark and match-mark materials for field assembly.
 5. All wide flange structural steel members shall be fabricated in accordance with ASTM A992/A992M. All miscellaneous steel members including channels, angles, S, HP, and M shapes shall be fabricated in accordance with ASTM A36/A36M.
 6. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
 7. All shop connections shall be welded or high strength bolted.
 8. Bearing surfaces shall be planed true to provide full bearing over the entire surface.
 9. Continuously seal joined members by intermittent welds and plastic filler. Grind welds smooth where exposed or where interference with other building materials is encountered.
 10. Splicing is not permitted unless indicated on the Contract Documents or accepted on the final approved Shop Drawings.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.
- C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces. Mechanically thermal cut bolt holes shall not be permitted unless prior approval by the Architect is obtained in writing.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 2, "Hand Tool Cleaning." or SSPC-SP 3, "Power Tool Cleaning." unless a more stringent cleaning method is required for selected primers and / or other coatings.
- F. Shop prime non-exposed steel members after fabrication in accordance with SSPC- PA. Do not prime surfaces that will be fireproofed, field welded or are in contact with concrete or high strength bolts.
- G. Paint exposed structural steel members in accordance with the applicable Division 09 Specification section.
- H. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.
1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning unless approved by the Architect in writing.
 2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
 3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.07 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM F3125/F3125M, Grade A325 or Grade A490 Bolts" for type of bolt and type of joint specified.
1. Joint Type: Snug tightened unless otherwise shown on the contract documents or required by the connection designer.

- B. Weld Connections: Comply with AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
 - 1. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

2.08 SHOP PRIMING

- A. Shop prime steel surfaces except the following:
 - 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches (50 mm).
 - 2. Surfaces to be field welded.
 - 3. Surfaces of high-strength bolted, slip-critical connections.
 - 4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
 - 5. Galvanized surfaces.
- B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:
 - 1. SSPC-SP 2, "Hand Tool Cleaning."
 - 2. SSSPC-SP 3, "Power Tool Cleaning."
- C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
 - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
 - 2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

2.09 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A123/A123M.
 - 1. Fill vent and drain holes that are exposed in the finished Work unless they function as weep holes, by plugging with zinc solder and filing off smooth.
 - 2. Galvanize lintels, shelf angles and welded door frames attached to structural-steel frame and located in exterior walls.

2.10 SOURCE QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform shop tests and inspections.
 - 1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
- B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.
 - 1. Inspection and Tests will not relieve the contractor of responsibility for providing materials, fabrication and erection procedures in compliance with the specified requirements. The contractor shall verify that all materials meet or exceed the requirements specified in these

specifications, Contract drawings and related references. Materials not in compliance with the specified requirements will be rejected and required to be removed from the site.

- C. Bolted Connections: Inspect and test shop-bolted connections according to RCSC's "Specification for Structural Joints Using ASTM F3125/F3125M , Grade A325 or Grade A490 Bolts."
- D. Welded Connections: Visually inspect shop-welded connections according to AWS D1.1/D1.1M type required for materials being welded and the following inspection procedures, at testing agency's option:
 - 1. Liquid Penetrant Inspection: ASTM E165/E165M.
 - 2. Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
 - 3. Ultrasonic Inspection: ASTM E164.
 - 4. Radiographic Inspection: ASTM E94.
- E. In addition to visual inspection, test and inspect shop-welded shear connectors according to requirements in AWS D1.1/D1.1M for stud welding and as follows:
 - 1. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
 - 2. Conduct tests according to requirements in AWS D1.1/D1.1M on additional shear connectors if weld fracture occurs on shear connectors already tested.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other drawings for compliance with requirements.
 - 1. Prepare a certified survey of existing conditions. Include bearing surfaces, anchor rods, bearing plates, and other drawings showing dimensions, locations, angles, and elevations.
- B. Proceed with installation only after unsatisfactory conditions have been corrected. Commencement of installation will indicate that the erector accepts the conditions which exist.

3.02 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.
 - 1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.
 - 2. Clean bearing surfaces and other surfaces which will be in permanent contact with the work.

3.03 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.

- B. Proceed with the installation only after unsatisfactory conditions have been corrected. Commencement of installation will indicate that the erector accepts the conditions which exist.
- C. Allow for erection loads and for sufficient temporary bracing to maintain structure safe, plumb and in true alignment until completion of erection and installation of permanent bracing.
- D. Coordinate placement of anchors in concrete or masonry construction for securing bearing plates.
- E. Erect all components in accordance with the approved shop drawings.
- F. Field weld components and shear studs as indicated on approved shop drawings and in accordance with AWS D1.1/D1.1M.
- G. Do not field cut or alter structural members without written approval of the Engineer.
- H. Bearing Plates and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
 - 1. Set plates for structural members on wedges, shims, or setting nuts as required.
 - 2. Weld plate washers to top of baseplate.
 - 3. Snug-tighten Pretension anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
 - 4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
 - 5. Coordinate placement of anchors in concrete or masonry construction for securing base plates.
- I. Maintain erection tolerances of structural steel within AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."
- J. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 - 1. Level and plumb individual members of structure.
 - 2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.
- K. Splice members only where indicated.
- L. Do not use thermal cutting during erection unless approved by Architect. Finish thermally cut sections within smoothness limits in AWS D1.1/D1.1M.
- M. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.
- N. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

- O. Erect all components in accordance with approved shop drawings. After erection, prime welds, abrasions and surfaces not shop primed or galvanized as required, except surfaces to be in contact with concrete.
- P. Field weld components and shear studs as indicated on the approved shop drawings and in accordance with AWS D1.1/D1.1M.

3.04 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM F3125/F3125M, Grade A325 or Grade A490 Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Snug tightened Pretensioned unless specifically identified as pretensioned or slip-critical on the contract documents or calculations by the Delegated Connection designer.
- B. Weld Connections: Comply with AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
 - 1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
 - 2. Remove backing bars or runoff tabs where indicated, back gouge, and grind steel smooth.
 - 3. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," for mill material.
 - 4. Connections and abrasions shall be cleaned, prepared and finished in the same manner and with the same materials used in shop finishing.

3.05 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
 - 1. Verify structural-steel materials and inspect steel frame joint details.
 - 2. Verify weld materials and inspect welds.
 - 3. Verify connection materials and inspect high-strength bolted connections.
- B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- C. Bolted Connections: Inspect and test high strength bolted connections according to RCSC's "Specification for Structural Joints Using ASTM F3125/F3125M, Grade A325 or Grade A490 Bolts."
- D. Welded Connections: Visually inspect field welds according to AWS D1.1/D1.1M.
 - 1. In addition to visual inspection, test and inspect field welds according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
 - a. Liquid Penetrant Inspection: ASTM E165/E165M.
 - b. Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
 - c. Ultrasonic Inspection: ASTM E164.
 - d. Radiographic Inspection: ASTM E94.

- E. Post Installed Mechanical Anchors, Adhesive Anchors and Screw Anchors: Comply with 2020 New York State Building Code Table 1705.3.
 - 1. The special inspection shall include the verification of compliance with approved construction documents and standards established by the Commissioner pursuant to Section 28-113.2.2 of the Administrative Code.
- F. In addition to visual inspection, test and inspect field-welded shear connectors according to requirements in AWS D1.1/D1.1M for stud welding and as follows:
 - 1. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
 - 2. Conduct tests according to requirements in AWS D1.1/D1.1M on additional shear connectors if weld fracture occurs on shear connectors already tested.
- G. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

3.06 TOLERANCES

- A. All members shall be installed within AISC tolerances and as follows:
 - 1. Maximum variation from plumb: 1/4" (6mm) per story, non-cumulative.
 - 2. Maximum offset from true alignment: 1/4" (6mm).

3.07 REPAIRS AND PROTECTION

- A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A780/A780M.
- B. Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Clean and prepare surfaces by SSSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
- C. Touchup Painting: Cleaning and touchup painting are specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."
- D. Touchup Priming: Cleaning and touchup priming as specified in Division 9 "High-Performance Coatings" or compatible primer established at the fabricators shop to be compatible with the final finish.

3.08 ADJUSTING

- A. All misfits due to errors in location, fabrication, inaccuracies in the setting of anchor bolts or other items of attachment or support shall be immediately reported to the Engineer and corrected in a manner subject to the approval of the Engineer.
- B. Submit method of correction to the Architect under Division 01 Specification provisions.
- C. Proceed with corrective work only after receiving written approval from the Architect.
- D. All corrections shall be made at no additional cost to the Owner.

STRUCTURAL STEEL FRAMING
Irvington Union Free School District
Main Street School Renovations
Main Street School
SED No.: 66-04-02-02-0-001-016

H2M

END OF SECTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Abrasive metal nosings.
 - 2. Loose bearing, Lintels and leveling plates for applications where they are not specified in other Sections.
 - 3. Miscellaneous Steel Framing.
- 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.

1.03 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.

1.04 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Grout.
- B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for the following:
 - 1. Abrasive metal nosings.
 - 2. Loose steel lintels.

1.05 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For professional engineer.
- B. Welding certificates.

1.06 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code - Steel."

- B. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.07 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication and indicate measurements on the 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 with established dimensions.

PART 2 - PRODUCTS

2.01 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 A36/A36M.
- C. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.
 - 1. Size of Channels: or as indicated.
 - 2. Material: Galvanized steel, ASTM A653/A653M, commercial steel, Type B, with G90 coating; 0.108-inch nominal thickness.
- D. Aluminum Castings: ASTM B26/B26M, Alloy 443.0-F.

2.02 FASTENERS

- A. General: Unless otherwise indicated, provide Type 316 stainless-steel fasteners.
 - 1. Provide stainless-steel fasteners for fastening aluminum.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A; with hex nuts, ASTM A653/A653M; and, where indicated, flat washers.
- C. Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, ASTM A563; 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. Plain Washers: Round, ASME B18.22.1.
- E. 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 E488/E488M, conducted by a qualified independent testing agency.
- F. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A47/A47M malleable iron or ASTM

A27/A27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.

2.03 MISCELLANEOUS MATERIALS

- A. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.
- B. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- C. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.
- D. Non-shrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, non-gaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- E. 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 4000 psi.

2.04 FABRICATION, GENERAL

- A. Shop Assembly: Pre-assemble 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 unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form exposed work with accurate angles and surfaces and straight edges.
- D. 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.
- E. 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.
- F. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- G. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- H. 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.

2.05 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.
- C. Fabricate steel pipe columns for supporting wood frame construction from steel pipe with steel baseplates and top plates as indicated. Drill or punch baseplates and top plates for anchor and connection bolts and weld to pipe with fillet welds all around. Make welds the same size as pipe wall thickness unless otherwise indicated.
 - 1. Unless otherwise indicated, fabricate from Schedule 40 steel pipe.
 - 2. Unless otherwise indicated, provide 1/2-inch baseplates with four 5/8-inch anchor bolts and 1/4-inch top plates.
- D. Galvanize miscellaneous framing and supports where indicated.

2.06 ABRASIVE METAL NOSINGS

- A. Cast-Metal Units: Cast aluminum, with an integral-abrasive, as-cast finish consisting of aluminum oxide, silicon carbide, or a combination of both. Fabricate units in lengths necessary to accurately fit openings or conditions.
 - 1. Manufacturers Subject to compliance with requirements, provide products by one of the following:
 - a. Balco, Inc
 - b. Safe-T-Metal Company, Inc
 - c. Wooster Products Inc
 - 2. Nosings: Cross-hatched units, 4 inches wide with 1/4-inch lip, for casting into concrete.
 - 3. Nosings: Cross-hatched units, 1-1/2 by 1-1/2 inches, for casting into concrete.
 - 4. Treads: Cross-hatched units, full depth of tread with 3/4-by-3/4-inch nosing, for application over bent plate treads or existing stairs.
- B. Provide anchors for embedding units in concrete, either integral or applied to units, as standard with manufacturer.
- C. Drill for mechanical anchors and countersink. Locate holes not more than 4 inches (100 mm) from ends and not more than 12 inches (300 mm) o.c., evenly spaced between ends, unless otherwise indicated. Provide closer spacing if recommended by manufacturer.
- D. Apply bituminous paint to concealed surfaces of cast-metal units.

2.07 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
- B. Hot Dip Galvanize plates (2.0 oz. / sq. ft.).

2.08 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 loose steel lintels located in exterior walls - Hot Dip Galvanize (2.0 oz. / s.f.).

2.09 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 A153/A153M for steel and iron hardware and with ASTM A123/A123M and ASTM A653/A653M for other steel and iron products.
 - 1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
- B. 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 primers specified in Section 099113 - EXTERIOR PAINTING unless indicated otherwise.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- B. Examine materials upon arrival at site. Notify the carrier and manufacturer of any damage.

3.02 INSTALLATION, GENERAL

- A. Install all factory-fabricated items in accordance with the manufacturer's specifications and recommendations.
- B. 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.
- C. 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.

- D. 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.
- E. 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, and other connectors.
- F. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- G. 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.

3.03 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 securely to, and rigidly brace from, building structure.
- C. Install pipe columns on concrete footings with grouted baseplates. Position and grout column baseplates as specified in "Installing Bearing and Leveling Plates" Article.

3.04 INSTALLING NOSINGS, TREADS, AND THRESHOLDS

- A. Center nosings on tread widths unless otherwise indicated.
- B. For nosings embedded in concrete steps or curbs, align nosings flush with riser faces and level with tread surfaces.

3.05 INSTALLING BEARING AND LEVELING PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with non-shrink grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.06 PROTECTION

- A. Protect installed products until completion of project.

3.07 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 dry film thickness.
- B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 099113 "Exterior Painting."
- C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

END OF SECTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Treated Wood Members.
 - 2. Miscellaneous Framing and Sheathing.
 - 3. Plywood Subfloors.
 - 4. Fasteners.
 - 5. Structural Hold Downs, Connectors and Framing Accessories.
 - 6. Framing with timber.
 - 7. Framing with engineered wood products.
 - 8. Wood blocking, cants, and nailers.
 - 9. Wood furring and grounds.

1.03 REFERENCES:

- A. AWP - (American Wood Preservers Association) C1 - All Timber Products Preservative Treatment by Pressure Process.
- B. APA - American Plywood Association.
- C. AITC - American Institute of Timber Construction.
- D. US Department of Commerce (DOC):
 - 1. DOC PS 1 - Performance Standard for Structural Plywood.
 - 2. DOC PS 2 - Performance Standard for Wood-Based Structural Panels.
- E. International Code Council (ICC):
 - 1. ICC IBC - International Building Code

1.04 DEFINITIONS

- A. Exposed Framing: Framing not concealed by other construction.
- B. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.
- C. Timber: Lumber of 5 inches nominal or greater in least dimension.
- D. Lumber grading agencies, and the abbreviations used to reference them, include the following:
 - 1. NeLMA: Northeastern Lumber Manufacturers' Association.
 - 2. NLGA: National Lumber Grades Authority.
 - 3. SPIB: The Southern Pine Inspection Bureau.
 - 4. WCLIB: West Coast Lumber Inspection Bureau.
 - 5. WWPA: Western Wood Products Association.

1.05 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
 - 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
 - 3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
 - 4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
 - 5. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.06 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. Plywood.
 - 4. Engineered wood products.
 - 5. Shear panels.
 - 6. Power-driven fasteners.
 - 7. Powder-actuated fasteners.
 - 8. Expansion anchors.
 - 9. Metal framing anchors.

1.07 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.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Handle, Transport and Store Plywood Panels in accordance with the APA Storage and Handling recommendations.
- B. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

- C. Stack panels flat with a minimum of three, full panel width, 4 inch by 4 inch spacers per eight foot panel length beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.01 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" for the following:
 - 1. Dimension lumber framing.
 - 2. Timber.
 - 3. Laminated-veneer lumber.
 - 4. Parallel-strand lumber.
 - 5. Miscellaneous lumber.
- 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. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
 - 4. 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 15 percent for 2-inch nominal thickness or less, no limit for more than 2-inch nominal thickness unless otherwise indicated.
- D. Engineered Wood Products: Provide engineered wood products acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.
 - 1. Allowable Design Stresses: Provide engineered wood products with allowable design stresses, 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.
- E. Plywood: Conform to requirements and recommendations provided in DOC PS 1 - Voluntary Product Standard for Construction and Industrial Structural Plywood.

2.02 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWP A U1; UC2 (Interior Construction - Above Ground - Damp) for interior construction not in contact with the ground, Use Category UC3B

(Above Ground Exposed) for exterior construction not in contact with the ground, and UC4B (Ground Contact or Fresh Water - Heavy Duty) 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.
 2. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.
- 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.
1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece or omit marking and provide certificates of treatment compliance issued by inspection agency.
- D. Application: Treat items indicated on Drawings, and the following:
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 (460 mm) above the ground in crawlspaces or unexcavated areas.
 5. Wood floor plates that are installed over concrete slabs-on-grade.

2.03 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 E84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
1. 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 D2898. Use for exterior locations and where indicated.
 3. Design Value Adjustment Factors: Treated lumber shall be tested according ASTM D 5664 and design value adjustment factors shall be calculated according to ASTM D 6841.
- 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. Mark panels on surfaces that will not be exposed in the final construction.

1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.
- E. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.
- F. Application: Treat items indicated on Drawings, and the following:
 1. Concealed blocking.
 2. Framing for non-load-bearing exterior walls.
 3. Roof construction.

2.04 DIMENSION LUMBER FRAMING

- A. Non-Load-Bearing Interior Partitions: Construction or No. 2 grade.
 1. Application: Interior partitions not indicated as load-bearing.
 2. Species:
 - a. Hem-fir (north); NLGA.
 - b. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
 - c. Northern species; NLGA.
- B. Load-Bearing Partitions: No. 2 grade.
 1. Species:
 - a. Southern pine; SPIB.
 - b. Douglas fir-larch; WCLIB or WWPA.
 - c. Hem-fir; WCLIB or WWPA.
 - d. Douglas fir-larch (north); NLGA.
 - e. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
- C. Load-Bearing Partitions: Any species and grade with a modulus of elasticity of at least 1,600,000 psi and an extreme fiber stress in bending of at least for 2-inch nominal thickness and 12-inch nominal width for single-member use.
 1. Application: Exterior walls and interior load-bearing partitions.
- D. Ceiling Joists: Construction or No. 2 grade.
 1. Species:
 - a. Southern pine; SPIB.
 - b. Hem-fir; WCLIB or WWPA.
 - c. Douglas fir-south; WWPA.
 - d. Eastern softwoods; NeLMA.
- E. Joists, Rafters, and Other Framing Not Listed Above: No. 1 grade.
 1. Species:
 - a. Douglas fir-larch; WCLIB or WWPA.
 - b. Douglas fir-larch (north); NLGA.
 - c. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
- F. Joists, Rafters, and Other Framing Not Listed Above: Any species and grade with a modulus of elasticity of at least 1,500,000 psi (10 350 MPa) and an extreme fiber stress in bending of at least 1000 psi (6.9 MPa) for 2-inch nominal thickness and 12-inch nominal width for single-member use.

- G. Exposed Framing: Provide material hand-selected for uniformity of appearance and freedom from characteristics, on exposed surfaces and edges, that would impair finish appearance, including decay, honeycomb, knot-holes, shake, splits, torn grain, and wane.
1. Species and Grade: Southern pine; No. 1 grade; SPIB.
 2. Species and Grade: Douglas fir-south; No. 1 grade; WWPA.
 3. Species and Grade: Hem-fir; No. 1 grade; WCLIB or WWPA.

2.05 TIMBER FRAMING

- A. Provide timber framing complying with the following requirements, according to grading rules of grading agency indicated:
1. Species and Grade: Douglas fir-larch, Douglas fir-larch (north), or Douglas fir-south; No. 1 grade; NLGA, WCLIB, or WWPA.
 - a. Finish: Surfaced Four Sides (S4S)
 - b. Sizes: As indicated on the drawings.
 2. Species and Grade: Eastern hemlock, eastern hemlock-tamarack, or eastern hemlock-tamarack (north); No. 1 grade; NeLMA or NLGA.
 - a. Finish: Surfaced Four Sides (S4S)
 - b. Sizes: As indicated on the drawings.
 3. Species and Grade: Mixed oak; Select Structural grade; NeLMA.
 - a. Finish: Surfaced Four Sides (S4S)
 - b. Sizes: As indicated on the drawings.
 4. Species and Grade: Western Red Cedar; Mill Select
 - a. Finish: Surfaced Four Sides (S4S)
 - b. Size(s): as indicated on the drawings. Note: Actual sizes are less 1/4 inch for Rough Cut and less 1/2 inch for Dressed, in each direction.

2.06 PLYWOOD SUBFLOORS

- A. Plywood Subflooring: 3/4 Performance category APA Rated STURD-I-FLOOR, 24" o.c., Group 1, Exterior, 48 inch by 96 inch, B-C face grades, Tongue and Groove (T&G) edges.

2.07 CONSTRUCTION MOUNTING PANELS

- A. Communications and Electrical Room Mounting Boards: PS 1, APA rated A-D faced plywood or MDF; 3/4 inch thick; flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.

2.08 ENGINEERED WOOD PRODUCTS

- A. Source Limitations: Obtain each type of engineered wood product from single source from a single manufacturer.
- B. Laminated-Veneer Lumber: Structural composite lumber made from wood veneers with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D 5456 and manufactured with an exterior-type adhesive complying with ASTM D 2559.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Georgia-Pacific.
 - b. Louisiana-Pacific Corporation.

- c. Weyerhaeuser Company
 - d. Or approved equal.
 - 2. Extreme Fiber Stress in Bending, Edgewise: 2900 psi for 12-inch nominal depth members.
 - 3. Modulus of Elasticity, Edgewise: 1,900,000 psi .
- C. Parallel-Strand Lumber: Structural composite lumber made from wood strand elements with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D 5456 and manufactured with an exterior-type adhesive complying with ASTM D2559

2.09 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. Grounds.
- B. For items of dimension lumber size, provide Construction or No. 2 grade lumber and any of the following species:
 - 1. Hem-fir (north); NLGA.
 - 2. Mixed southern pine; SPIB.
 - 3. Hem-fir; WCLIB or WWPA.
 - 4. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
- C. For concealed boards, provide lumber with 15 percent maximum moisture content and any of the following species and grades:
 - 1. Spruce-pine-fir (south) or spruce-pine-fir; Construction or No. 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
 - 2. Eastern softwoods; No. 2 Common grade; NeLMA.
- D. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
- E. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
- F. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.10 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 A153/A153M or Type 304 stainless steel.
- B. Power-Driven Fasteners: NES NER-272.
- C. Wood Screws: ASME B16.1.

- D. Lag Bolts: ASME B18.2.1.
- E. Bolts: Steel bolts complying with ASTM A307, Grade A; with ASTM A563 hex nuts and, where indicated, flat washers.
- F. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry assemblies and equal to four times the load imposed when installed in concrete as determined by testing per ASTM E488/E488M conducted by a qualified independent testing and inspecting agency.
 - 1. Material: Stainless steel with bolts and nuts complying with ASTM F593 and ASTM F594, Alloy Group 1 or 2.

2.11 METAL FRAMING ANCHORS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - 1. Cleveland Steel Specialty Co.
 - 2. Simpson Strong-Tie Co., Inc.
 - 3. USP Structural Connectors.
- B. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those of products of manufacturers listed. 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. Provide products that have been approved by the ICC-Evaluation Service with an accompanying Evaluation Service Report (ESR) listing locations of allowable use.
- D. Joist Hangers: U-shaped joist hangers with 2-inch long seat and 1-1/4-inch wide nailing flanges at least 85 percent of joist depth.
 - 1. Thickness: 0.062 inch.
- E. I-Joist Hangers: U-shaped joist hangers with 2-inch long seat and 1-1/4-inch wide nailing flanges full depth of joist. Nailing flanges provide lateral support at joist top chord.
 - 1. Thickness: 0.062 inch.
- F. Top Flange Hangers: U-shaped joist hangers, full depth of joist, formed from metal strap with tabs bent to extend over and be fastened to supporting member.
 - 1. Strap Width: 1-1/2 inches.
 - 2. Thickness: 0.062 inch.
- G. Bridging: Rigid, V-section, nail-less type, 0.050 inch thick, length to suit joist size and spacing.
- H. Joist Ties: Flat straps, with holes for fasteners, for tying joists together over supports.
 - 1. Width: 1-1/4 inches.
 - 2. Thickness: 0.062 inch.
 - 3. Length: As indicated.

- I. Rafter Tie-Downs: Bent strap tie for fastening rafters or roof trusses to wall studs below, 1-1/2 inches wide by 0.050 inch thick. Tie fasteners to side of rafter or truss, face of top plates, and side of stud below.
- J. Rafter Tie-Downs (Hurricane or Seismic Ties): Bent strap tie for fastening rafters or roof trusses to wall studs below, 2-1/4 inches wide by 0.062 inch thick. Tie fits over top of rafter or truss and fastens to both sides of rafter or truss, face of top plates, and side of stud below.
- K. Floor-to-Floor Ties: Flat straps, with holes for fasteners, for tying upper floor wall studs to band joists and lower floor studs, 1-1/4 inches wide by 0.050 inch thick by 36 inches long.
- L. Hold-Downs: Brackets for bolting to wall studs and securing to foundation walls with anchor bolts or to other hold-downs with threaded rods and designed with first of two bolts placed seven bolt diameters from reinforced base.
 - 1. Bolt Diameter: 3/4 inch.
 - 2. Width: 3-3/16 inches.
 - 3. Body Thickness: 0.138 inch.
 - 4. Base Reinforcement Thickness: 0.108 inch.
- M. Wall Bracing: T-shaped bracing made for letting into studs in saw kerf, 1-1/8 inches (29 mm) wide by 9/16 inch deep by 0.034 inch thick with hemmed edges.
- N. Wall Bracing: Angle bracing made for letting into studs in saw kerf, 15/16 by 15/16 by 0.040 inch thick with hemmed edges.

2.12 MISCELLANEOUS MATERIALS

- A. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to suit width of sill members indicated.
- B. Adhesives for Gluing Furring to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.

PART 3 - EXECUTION

3.01 PREPARATION OF SURFACES

- A. Surfaces to receive new wood members shall be free of all dirt, debris, and loose materials. Exposed surfaces shall be mechanically scraped if necessary, to remove projections.
- B. Surfaces shall have no free water present in any form (rain, dew, frost, snow or ice).
- C. Contractor is responsible to inspect all exposed surfaces to see that conditions are satisfactory for installation of new work.

3.02 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. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb and in true alignment until completion of erection and installation of permanent bracing.
- D. Place horizontal members flat, crown side up.
- E. Construct load bearing framing and curb members full length without splices.
- F. Double members at all openings. Space short members over and under opening to member spacing.
- G. Bridge framing in excess of 8 feet span at midspan.
- H. Coordinate installation of adjacent construction.
- I. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.
- J. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels.
- K. Metal Framing Anchors: Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- L. Install sill sealer gasket to form continuous seal between sill plates and foundation walls.
- M. Do not splice structural members between supports unless otherwise indicated.
- N. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
 - 1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.
- O. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:
 - 1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
 - 2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96 inches o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal thickness.
 - 3. Fire block concealed spaces behind combustible cornices and exterior trim at not more than 20 feet o.c.
- P. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

- Q. 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 2304.10.1, "Fastening Schedule," in ICC's "International Building Code" and the 2020 Building Code of New York State".
 - 3. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.
- R. Warped wood members shall not be used unless they can be fastened adequately to permanently hold them in their required alignment.
- S. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced, and with adjacent rows staggered.
 - 1. Comply with approved fastener patterns where applicable. Before fastening, mark fastener locations, using a template made of sheet metal, plastic, or cardboard.
 - 2. Use finishing nails unless otherwise indicated. Countersink nail heads and fill holes with wood filler.
 - 3. Use common nails unless otherwise indicated. Drive nails snug but do not countersink nail heads.

3.03 WOOD GROUND, BLOCKING, AND NAILER INSTALLATION

- A. Install where indicated and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.
- C. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.
- D. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

3.04 WOOD FURRING INSTALLATION

- A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

3.05 WALL AND PARTITION FRAMING INSTALLATION

- A. General: Provide single bottom plate and double top plates using members of 2-inch nominal (38-mm actual) thickness whose widths equal that of studs, except single top plate may be used for non-load-bearing partitions and for load-bearing partitions where framing members bearing on partition are located directly over studs. Fasten plates to supporting construction unless otherwise indicated.
 - 1. For exterior walls, provide 2-by-6-inch nominal size wood studs spaced 24 inches o.c. unless otherwise indicated.

2. For interior partitions and walls, provide 2-by-4-inch nominal size wood studs spaced 16 inches o.c. unless otherwise indicated.
- B. Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Support headers on jamb studs.
 1. For non-load-bearing partitions, provide double-jamb studs and headers not less than 4-inch nominal depth for openings 48 inches and less in width, 6-inch nominal depth for openings 48 to 72 inches in width, 8-inch nominal depth for openings 72 to 120 inches in width, and not less than 10-inch nominal depth for openings 10 to 12 feet in width.
 2. For load-bearing walls, provide double-jamb studs for openings 60 inches and less in width, and triple-jamb studs for wider openings. Provide headers of depth indicated or, if not indicated, according to Table R602.7(1) or Table R602.7(2), as applicable, in ICC's International Residential Code for One- and Two-Family Dwellings.

3.06 FLOOR JOIST FRAMING INSTALLATION

- A. General: Install floor joists with crown edge up and support ends of each member with not less than 1-1/2 inches of bearing on wood or metal, or 3 inches on masonry. Attach floor joists as follows:
 1. Where supported on wood members, by toe nailing or by using metal framing anchors.
 2. Where framed into wood supporting members, by using wood ledgers as indicated or, if not indicated, by using metal joist hangers.
- B. Fire Cuts: At joists built into masonry, bevel cut ends 3 inches and do not embed more than 4 inches.
- C. Frame openings with headers and trimmers supported by metal joist hangers; double headers and trimmers where span of header exceeds 48 inches.
- D. Do not notch in middle third of joists; limit notches to one-sixth depth of joist, one-third at ends. Do not bore holes larger than 1/3 depth of joist; do not locate closer than 2 inches from top or bottom.
- E. Provide solid blocking of 2-inch nominal thickness by depth of joist at ends of joists unless nailed to header or band.
- F. Lap members framing from opposite sides of beams, girders, or partitions not less than 4 inches or securely tie opposing members together. Provide solid blocking of 2-inch nominal thickness by depth of joist over supports.
- G. Anchor members paralleling masonry with 1/4-by-1-1/4 inch metal strap anchors spaced not more than 96 inches o.c., extending over and fastening to three joists. Embed anchors at least 4 inches into grouted masonry with ends bent at right angles and extending 4 inches beyond bend.
- H. Provide solid blocking between joists under jamb studs for openings.
- I. Under non-load-bearing partitions, provide double joists separated by solid blocking equal to depth of studs above.
 1. Provide triple joists separated as above, under partitions receiving ceramic tile and similar heavy finishes or fixtures.
- J. Provide bridging of type indicated below, at intervals of 96 inches o.c., between joists.

1. Diagonal wood bridging formed from bevel-cut, 1-by-3-inch nominal size lumber, double-crossed and nailed at both ends to joists.
2. Steel bridging installed to comply with bridging manufacturer's written instructions.

3.07 CEILING JOIST AND RAFTER FRAMING INSTALLATION

- A. Ceiling Joists: Install ceiling joists with crown edge up and complying with requirements specified above for floor joists. Face nail to ends of parallel rafters.
 1. Where ceiling joists are at right angles to rafters, provide additional short joists parallel to rafters from wall plate to first joist; nail to ends of rafters and to top plate and nail to first joist or anchor with framing anchors or metal straps. Provide 1-by-8-inch nominal size or 2-by-4-inch nominal size stringers spaced 48 inches o.c. crosswise over main ceiling joists.
- B. Rafters: Notch to fit exterior wall plates and toe nail or use metal framing anchors. Double rafters to form headers and trimmers at openings in roof framing, if any, and support with metal hangers. Where rafters abut at ridge, place directly opposite each other and nail to ridge member or use metal ridge hangers.
 1. At valleys, provide double-valley rafters of size indicated or, if not indicated, of same thickness as regular rafters and 2 inches deeper. Bevel ends of jack rafters for full bearing against valley rafters.
 2. At hips, provide hip rafter of size indicated or, if not indicated, of same thickness as regular rafters and 2 inches deeper. Bevel ends of jack rafters for full bearing against hip rafter.
- C. Provide collar beams (ties) as indicated or, if not indicated, provide 1-by-6-inch nominal size boards between every third pair of rafters, but not more than 48 inches o.c. Locate below ridge member, at third point of rafter span. Cut ends to fit roof slope and nail to rafters.
- D. Provide special framing as indicated for eaves, overhangs, dormers, and similar conditions if any.

3.08 STAIR FRAMING INSTALLATION

- A. Provide stair framing members of size, space, and configuration indicated or, if not indicated, to comply with the following requirements:
 1. Size: 2-by-12-inch nominal size, minimum.
 2. Material: solid lumber.
 3. Notching: Notch rough carriages to receive treads, risers, and supports; leave at least 3-1/2 inches of effective depth.
 4. Spacing: At least three framing members for each 36-inch clear width of stair.
- B. Provide stair framing with no more than 3/16-inch variation between adjacent treads and risers and no more than 3/8-inch variation between largest and smallest treads and risers within each flight.

3.09 TOLERANCES

- A. Surface Flatness of Floor: 1/8 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.10 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.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Roof sheathing.
 - 2. Sheathing joint and penetration treatment.

1.02 REFERENCES

- A. American Society of Mechanical Engineers (ASME):
 - 1. ASME B18.6.1 - Wood Screws (Inch Series).
- B. ASTM International (ASTM):
 - 1. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
 - 2. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials
 - 3. ASTM E108 - Standard Test Methods for Fire Tests of Roof Coverings
 - 4. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials
 - 5. ASTM E2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
- C. US Department of Commerce (DOC):
 - 1. DOC PS 2 - Performance Standard for Wood-Based Structural Panels.
- D. International Code Council (ICC):
 - 1. ICC IBC - International Building Code.
- E. ICC Evaluation Service, Inc. (ICC-ES):
 - 1. AC38 - Acceptance Criteria for Weather Resistive Barriers
 - 2. ICC-ES AC116 - Acceptance Criteria for Nails and Spikes
 - 3. ICC-ES AC148 - Acceptance Criteria For Flexible Flashing Materials
- F. International Association of Plumbing and Mechanical Officials (IAPMO):

1.03 ACTION SUBMITTALS

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

1.04 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For following products, from ICC-ES:
 - 1. Preservative-treated plywood.
 - 2. Plywood Sheathing.
- B. Product Certifications: From manufacturer, indicating that sheathing products comply with ICC ES AC266 and ICC-ES AC310.

1.05 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

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that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Handle, Transport and Store Plywood Panels in accordance with the APA Storage and Handling recommendations.
- B. Stack panels flat with a minimum of three, full panel width, 4 inch by 4 inch spacers per eight foot panel length beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Water-Vapor Permeance, Facer: Minimum 12 perms (689 ng/Pa x s x sq. m), ASTM E96/E96M.
- B. Weather Exposure: Manufacturer warranty applies for maximum allowable exposure period of 180 days.

2.02 WOOD PANEL PRODUCTS

- A. Plywood: DOC PS 1 - Voluntary Product Standard for Construction and Industrial Structural Plywood.
- B. Oriented Strand Board: DOC PS 2, made with binder containing no added urea formaldehyde.
- C. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.
- D. Factory mark panels to indicate compliance with applicable standard.

2.03 PRESERVATIVE-TREATED PLYWOOD

- A. Preservative Treatment by Pressure Process: AWP A U1; 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.
- B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.
- C. Application: Treat items indicated on Drawings and plywood in contact with masonry or concrete or used with roofing, flashing, vapor barriers, and waterproofing.

2.04 ROOF SHEATHING

- A. Plywood Roof Sheathing: Exterior, Structural I sheathing.
 - 1. Span Rating: Not less than 24/0.

2. Nominal Thickness: Not less than 3/4 inch (19 mm).

2.05 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 1. For roof and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M or Type 304 stainless steel..
- B. Nails, Brads, and Staples: ASTM F1667, ICC AC116 and ICC AC201.
- C. Power-Driven Fasteners: ICC-ES-1539 or NES NER-272.
- D. Wood Screws: ASME B18.6.1.
- E. Screws for Fastening Wood Structural Panels to Cold-Formed Metal Framing: ASTM C954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.
 1. For wall and roof sheathing panels, provide screws with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B117.
- F. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B117.
 1. For steel framing less than 0.0329 inch (0.835 mm) thick, use screws that comply with ASTM C1002.
 2. For steel framing from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick, use screws that comply with ASTM C954.

2.06 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS

- A. Sealant for Glass-Mat Gypsum Sheathing: Elastomeric, medium-modulus, neutral-curing silicone joint sealant compatible with joint substrates formed by gypsum sheathing and other materials, recommended by sheathing manufacturer for application indicated and complying with requirements for elastomeric sealants specified in Section 079200 - JOINT SEALANTS.
- B. Sealant for Glass-Mat Gypsum Sheathing: Silicone emulsion sealant complying with ASTM C834, compatible with sheathing tape and sheathing and recommended by tape and sheathing manufacturers for use with glass-fiber sheathing tape and for covering exposed fasteners.
 1. Sheathing Tape: Self-adhering glass-fiber tape, minimum 2 inches (50 mm) wide, 10 by 10 or 10 by 20 threads/inch (390 by 390 or 390 by 780 threads/m), of type recommended by sheathing and tape manufacturers for use with silicone emulsion sealant in sealing joints in glass-mat gypsum sheathing and with a history of successful in-service use.
- C. Sheathing Tape for Foam-Plastic Sheathing: Pressure-sensitive plastic tape recommended by sheathing manufacturer for sealing joints and penetrations in sheathing.

2.07 MISCELLANEOUS MATERIALS

- A. Adhesives for Field Gluing Panels to Framing: Formulation complying with APA AFG-01 ASTM D 3498 that is approved for use with type of construction panel indicated by manufacturers of both adhesives and panels.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
 - 1. NES NER-272 for power-driven fasteners.
 - 2. Table 2304.10.1, "Fastening Schedule," in ICC's "International Building Code" and the 2020 Building Code of New York State".
- D. Use common wire nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.
- E. Coordinate wall and sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- G. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

END OF SECTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Plastic-laminate-faced architectural cabinets.
 - 2. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-faced architectural cabinets unless concealed within other construction before cabinet installation.

1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product, including panel products high-pressure decorative laminate adhesive for bonding plastic laminate.
 - 1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.
- B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
 - 1. Show details full size.
 - 2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
 - 3. Show locations and sizes of cutouts and holes for electrical switches and outlets and other items installed in architectural plastic-laminate cabinets.
 - 4. Apply AWI Quality Certification Program label to Shop Drawings.
- C. Samples for Initial Selection:
 - 1. Plastic laminates.
 - 2. Wood edge banding profiles.

1.04 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer fabricator.
- B. Product Certificates: For each type of product.
 - 1. Composite wood and agrifiber products.
 - 2. Thermoset decorative panels.
 - 3. High-pressure decorative laminate (HPL).
 - 4. Adhesives.
- C. Woodwork Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

1.05 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance. Shop is a certified participant in AWI's Quality Certification Program.

- B. Installer Qualifications: Fabricator of products.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver cabinets until painting and similar operations that could damage woodwork have been completed in installation areas. If cabinets must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.07 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during the remainder of the construction period.
- C. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed, and indicate measurements on Shop Drawings.
- D. Established Dimensions: Where cabinets are indicated to fit to other construction, establish dimensions for areas where cabinets are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.08 COORDINATION

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

PART 2 - PRODUCTS

2.01 PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of architectural plastic-laminate cabinets indicated for construction, finishes, installation, and other requirements.
 - 1. Provide labels from AWI certification program indicating that woodwork, including installation, complies with requirements of grades specified.
 - 2. The Contract Documents contain selections chosen from options in the quality standard and additional requirements beyond those of the quality standard. Comply with those selections and requirements in addition to the quality standard.
- B. Grade: Custom

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- C. Fabricators: Subject to compliance with requirements, available fabricators offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Tobin Woodworking, Inc., 155-B Allen Boulevard, Farmingdale, N.Y. 11735 (631) 249-1614.
 - 2. MTD Corporation, 41 Otis Street, W. Babylon, N.Y. 11704 (631) 491.3905
www.mtdwoodwork.com.
 - 3. M & D Millwork, LLC, 178 New Highway, Amityville, N.Y. 11701 (631) 608.4444
www.mdmillwork.com.
 - 4. North Shore Custom Woodworking, 16 Clifford Place, East Norwich, N.Y. 11732 (516) 946.9166 www.northshorecustomwoodworking.com.
 - 5. Lifetime Design Group, 162 E. Industry Court, Deer Park, N.Y. 11729 (631) 242.1162
www.lifetimedesigncorp.com.
 - 6. Handcraft Cabinetry Inc., 230 Ferris Avenue, White Plains, N.Y. 10603 (914) 681-9437
mike@handcraftcabinetry.com.
- D. Regional Materials: Plastic-laminate cabinets shall be manufactured within 500 miles (800 km) of Project site.
- E. Type of Construction: Flush Overlay
- F. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by woodwork quality standard.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Formica Corporation
 - b. Wilsonart International; Div. of Premark International, Inc.
 - c. Or approved equal.
- G. Laminate Cladding for Exposed Surfaces:
 - 1. Horizontal Surfaces: Grade HGL.
 - 2. Vertical Surfaces: Grade HGS.
 - 3. Edges: Grade HGS.
 - 4. Pattern Direction: As indicated.
- H. Materials for Semi-exposed Surfaces:
 - 1. Surfaces Other Than Drawer Bodies: High-pressure decorative laminate, NEMA LD 3, Grade VGS.
 - a. Edges of Plastic-Laminate Shelves: PVC edge banding, 0.12 inch (3 mm) thick, matching laminate in color, pattern, and finish.
 - b. For semi-exposed backs of panels with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, NEMA LD 3, Grade VGS.
- I. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, NEMA LD 3, Grade BKL.
- J. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
 - 1. As selected by Architect from laminate manufacturer's full range in the following categories:
 - a. Wood grains, matte finish.

- b. Patterns, matte finish.

2.02 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.
 - 1. Wood Moisture Content: 5 to 10 percent.
- B. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.
 - 1. Softwood Plywood: DOC PS 1.

2.03 CABINET HARDWARE AND ACCESSORIES

- A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets except for items specified in Section 087100 "Door Hardware" and as indicated on the drawings.
- B. Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with shelf rests, B04081.
- C. Shelf Rests: BHMA A156.9, B04013; metal.
- D. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
 - 1. Satin Chromium Plated: BHMA 626 for brass or bronze base; BHMA 652 for steel base.
- E. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.04 MISCELLANEOUS MATERIALS

- A. Adhesives: Do not use adhesives that contain urea formaldehyde.
- B. Adhesive for Bonding Plastic Laminate: Unpigmented contact cement.
 - 1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.05 FABRICATION

- A. Fabricate cabinets to dimensions, profiles, and details indicated.
- B. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
 - 1. Notify Architect seven days in advance of the dates and times woodwork fabrication will be complete.
 - 2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements before disassembling for shipment.

- C. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Before installation, condition cabinets to average prevailing humidity conditions in installation areas.
- B. Before installing cabinets, examine shop-fabricated work for completion and complete work as required.

3.02 INSTALLATION

- A. Grade: Install cabinets to comply with same grade as item to be installed.
- B. Assemble cabinets and complete fabrication at Project site to the extent that it was not completed in the shop.
- C. Install cabinets level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm).
- D. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E. Cabinets: Install without distortion so 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 installation of hardware and accessory items as indicated.
 - 1. Install cabinets with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) sag, bow, or other variation from a straight line.
 - 2. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches (400 mm) o.c. with No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish.

3.03 ADJUSTING AND CLEANING

- A. Repair damaged and defective cabinets, 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 cabinets on exposed and semi-exposed surfaces.

END OF SECTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Asphalt shingles.
 - 2. Underlayment.
 - 3. Roof Deck Protection.
 - 4. Ridge Vents.
 - 5. Accessories.
 - 6. Metal Flashing and Trim.

1.03 DEFINITION

- A. Roofing Terminology: See ASTM D1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definitions of terms related to roofing work in this Section.

1.04 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type of asphalt shingle ridge vent and exposed valley lining indicated.
 - 1. Include similar Samples of trim and accessories involving color selection.

1.05 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for asphalt shingles.
- C. Research/Evaluation Reports: For each type of asphalt shingle required, from the ICC.
- D. Warranties: Sample of special warranties.

1.06 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of asphalt shingle to include in maintenance manuals.

1.07 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. Asphalt Shingles: 100 sq. ft. (9.3 sq. m) of each type, in unbroken bundles.

1.08 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 ridge and hip cap shingles ridge vents felt or composite underlayment and self-adhering sheet underlayment from single source from single manufacturer.
- C. Fire-Resistance Characteristics: Where indicated, provide asphalt shingles and related roofing materials identical to those of assemblies tested for fire resistance per test method below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing agency.
 - 1. Exterior Fire-Test Exposure: Class A; ASTM E108 or UL 790, for application and roof slopes indicated.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Store roofing materials in a dry, well-ventilated, weathertight location according to asphalt shingle manufacturer's written instructions. Store underlayment rolls on end on pallets or other raised surfaces. Do not double stack rolls.
 - 1. Handle, store, and place roofing materials in a manner to avoid significant or permanent damage to roof deck or structural supporting members.
- B. Protect unused underlayment from weather, sunlight, and moisture when left overnight or when roofing work is not in progress.

1.10 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install asphalt shingles until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
 - 1. Install self-adhering sheet underlayment within the range of ambient and substrate temperatures recommended by manufacturer.

1.11 WARRANTY

- A. Special Warranty: Standard form in which manufacturer agrees to repair or replace asphalt shingles that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Manufacturing defects.
 - b. Structural failures including failure of asphalt shingles to self-seal after a reasonable time.
 - 2. Material Warranty Period: 40 years from date of Substantial Completion.
 - 3. Wind-Speed Warranty Period: Asphalt shingles will resist blow-off or damage caused by wind speeds up to 130 mph (58 m/s) .
 - 4. Algae-Discoloration Warranty Period: Asphalt shingles will not discolor 15 years from date of Substantial Completion.
 - 5. Workmanship Warranty Period: 12 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 GLASS-FIBER-REINFORCED ASPHALT SHINGLES

- A. Laminated-Strip Asphalt Shingles: ASTM D3462/D3462M, laminated, multi-ply overlay construction, glass-fiber reinforced, mineral-granule surfaced, and self-sealing. UI 790 Class A rated with UI 997 Wind resistance Label; ASTM D 7158, Class H (150 mph); ASTM D3161/D3161M, Class F (150 mph), Type 1; ASTM D 3018, Type 1; AAC438 compliant. Shingle packaging shall bear the label: ASTM D3161/D3161M, Class F (150 mph).
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - a. GAF Materials Corporation. "Timberline HDZ Lifetime High definition Shingles" CS-Cool Series.
 - b. CertainTeed Corporation "Landmark PRO"
 - c. Or approved equal.
 - 2. Butt Edge: Crenelated cut.
 - 3. Strip Size: Manufacturer's standard.
 - 4. Algae Resistance: Granules treated to resist algae discoloration.
 - 5. Color and Blends: As selected by Architect from manufacturer's full range.
- B. Hip and Ridge Shingles: Manufacturer's standard units to match asphalt shingles.

2.02 UNDERLAYMENT MATERIALS

- A. Premium, water repellant, breather type non-asphaltic roof deck protection: UV stabilized polypropylene construction. Meets or exceeds ASTM D226/D226M, ASTM D226 and D4869. GAF "Deck-Armor" TM, "DiamondDeck" or similar as required for approved manufacturer's warranty.

2.03 LEAK BARRIER

- A. Self-Adhering Sheet Underlayment, Polyethylene Faced: ASTM D1970/D1970M, minimum of 40-mil thick, slip-resisting, polyethylene-film-reinforced top surface laminated to SBS-modified asphalt adhesive, with release paper backing; cold applied.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Grace, W. R. & Co.: "Ice and Water Shield".
 - b. GAF Materials Corporation: "StormGuard".
 - c. Carlisle Coatings & Waterproofing, Inc.

2.04 ACCESSORIES

- A. Asphalt Roofing Cement: ASTM D4586/D4586M, Type II, asbestos free.
- B. Roofing Nails: ASTM F1667; aluminum, stainless-steel, copper, or hot-dip galvanized-steel wire shingle nails, minimum 0.120-inch diameter, smooth shank, sharp-pointed, with a minimum 3/8-inch diameter flat head and of sufficient length to penetrate 3/4 inch into solid wood decking or extend at least 1/8 inch through plywood sheathing.
 - 1. Where nails are in contact with metal flashing, use nails made from same metal as flashing.

- C. Felt Underlayment Nails: Aluminum, stainless-steel, or hot-dip galvanized-steel wire with low-profile capped heads or disc caps, 1-inch minimum diameter.
- D. Algae-Mold-Moss Termination Roofing Strip Material: Copper-Cat® Algae Terminator manufactured from double sided 99.9% pure grade copper. Install on each side of ridge shingles using copper nails and overlaps and sealant as per manufacturer's instructions. Fifty-year Limited Warranty. Manufacturer: Copper-Cat; 1748 Traditional Drive, Suite B, Walled Lake, ME 48390; www.coppercat.com; tel.: 866.526.2228.
- E. Metal Accessory Paint: GAF Shingle-Match™ Accessory Paint to blend items such as Plumbing Vent Pipes, Exhaust fans, Flashings, Roof ventilators, etc. to match more closely to the installed Asphalt Shingle Roof color. Available in 12 oz. spray cans. Color(s) shall be: As selected by the Architect from the manufacturers full color offering.

2.05 METAL FLASHING AND TRIM

- A. General: Comply with requirements in Section 076200 - SHEET METAL FLASHING AND TRIM.
 - 1. Sheet Metal: Copper 16-oz. / sq. ft. copper sheet, complying with ASTM B370.
 - 2. Sheet Metal: 0.032-inch aluminum sheet, complying with ASTM B209.
 - 3. Sheet Metal: 24 gauge hot-dip galvanized steel sheet, complying with ASTM A653/A653M, G90/Z275.
- B. Fabricate sheet metal flashing and trim to comply with recommendations in the SMACNA "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of the item.
 - 1. Apron Flashings: Fabricate with lower flange a minimum of 5 inches over and 4 inches beyond each side of downslope asphalt shingles and 6 inches up the vertical surface.
 - 2. Step Flashings: Fabricate with a headlap of 2 inches and a minimum extension of 5 inches over the underlying asphalt shingle and up the vertical surface.
 - 3. Cricket and Backer Flashings: Fabricate with concealed flange extending a minimum of 24 inches beneath upslope asphalt shingles and 6 inches beyond each side of chimney and 6 inches above the roof plane.
 - 4. Open-Valley Flashings: Fabricate in lengths not exceeding 10 feet with 1-inch high, inverted-V profile at center of valley and equal flange widths of 12 inches.
 - 5. Drip Edges: Fabricate in lengths not exceeding 10 feet with 2-inch roof-deck flange and 1-1/2-inch fascia flange with 3/8-inch drip at lower edge.
- C. Vent Pipe Flashings: ASTM B370, 16 oz. / sq. ft., Provide 3" deep shop fabricated copper cap sized to slip over and turn down into pipe, solder to flashing sleeve with skirt at slope of roof, and extending at least 6 inches (152 mm) from pipe onto roof.
- D. Exterior acrylic rust resistant aerosol roof accessory paint. Each can is available in a wide variety of colors to compliment the roof. Shingle-Match™ Roof Accessory Paint by GAF® or approved equal.

PART 3 - EXECUTION

3.01 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.

1. Examine roof sheathing to verify that sheathing joints are supported by framing and blocking or metal clips and that installation is within flatness tolerances.
 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and completely anchored; and that provision has been made for flashings and penetrations through asphalt shingles.
- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 UNDERLAYMENT INSTALLATION

- A. General: Comply with underlayment manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.
- B. Self-Adhering Sheet Underlayment: Install, wrinkle free, on roof deck. Comply with low-temperature installation restrictions of underlayment manufacturer if applicable. Install at locations indicated below, lapped in direction to shed water. Lap sides not less than 3-1/2 inches. Lap ends not less than 6 inches staggered 24 inches between courses. Roll laps with roller. Cover underlayment within seven days.
1. Eaves: Extend from edges of eaves 36 inches beyond interior face of exterior wall.
 2. Rakes: Extend from edges of rake 36 inches beyond interior face of exterior wall.
 3. Valleys: Extend from lowest to highest point 18 inches on each side.
 4. Hips: Extend 18 inches on each side.
 5. Ridges: Extend 36 inches on each side without obstructing continuous ridge vent slot.
 6. Sidewalls: Extend beyond sidewall 18 inches, and return vertically against sidewall not less than 6 inches.
 7. Dormers, Chimneys, Skylights, and Other Roof-Penetrating Elements: Extend beyond penetrating element 18 inches, and return vertically against penetrating element not less than 4 inches.
 8. Roof Slope Transitions: Extend 18 inches on each roof slope.
- C. Concealed, Valley Lining: Comply with NRCA's recommendations. Install a 36-inch wide felt underlayment centered in valley. Fasten to roof deck with roofing nails.
1. Lap roof-deck felt underlayment over valley felt underlayment at least 6 inches.
 2. Install a 36-inch wide strip of granular-surfaced valley lining centered in valley, with granular-surface face up. Lap ends of strips at least 12 inches in direction to shed water, and seal with asphalt roofing cement. Fasten to roof deck with roofing nails.

3.03 METAL FLASHING INSTALLATION

- A. General: Install metal flashings and other sheet metal to comply with requirements in Section 076200 - SHEET METAL FLASHING AND TRIM.
1. Install metal flashings according to recommendations in ARMA's "Residential Asphalt Roofing Manual" and asphalt shingle recommendations in NRCA's "The NRCA Roofing and Waterproofing Manual."
- B. Apron Flashings: Extend lower flange over and beyond each side of downslope asphalt shingles and up the vertical surface.
- C. Step Flashings: Install with a headlap of 2 inches and extend over the underlying asphalt shingle and up the vertical surface. Fasten to roof deck only.

- D. Cricket Flashings: Install against the roof-penetrating element extending concealed flange beneath upslope asphalt shingles and beyond each side.
- E. Rake Drip Edges: Install rake drip edge flashings over underlayment and fasten to roof deck.
- F. Eave Drip Edges: Install eave drip edge flashings below underlayment and fasten to roof sheathing.

3.04 ASPHALT SHINGLE INSTALLATION

- A. General: Install asphalt shingles according to manufacturer's written instructions, recommendations in ARMA's "Residential Asphalt Roofing Manual," and asphalt shingle recommendations in NRCA's "The NRCA Roofing and Waterproofing Manual". In High Wind locations, installations shall comply with FEMA High Wind roof application criteria.
- B. Install starter strip along lowest roof edge, consisting of an asphalt shingle strip at least 7 inches wide with self-sealing strip face up at roof edge as recommended by the manufacturer. Provide manufacturer's required starter, hip and ridge accessory shingles required to meet specified warranty requirements.
 - 1. Extend asphalt shingles 3/4 inch over fascia at eaves and rakes.
 - 2. Cement shingles to underlayment and each other in a 4 inch width of asphalt plastic roof cement.
 - 3. Install starter strip along rake edge.
 - 4. Nail approximately 1-1/2 - 3 inches above the butt edge of the shingles.
 - 5. Rake starter course should overlap eave edge starter strip at least 3 inch.
- C. Install asphalt shingles by single-strip column or racking method, maintaining uniform exposure. Install full-length first course followed by cut second course, repeating alternating pattern in succeeding courses or as recommended by the manufacturer to achieve random roof texture.
- D. Placement of nails varies based on the type of shingle specified. Consult the application instructions for the specified shingle for details.
- E. Fasten asphalt shingle strips with a minimum of six roofing nails located according to manufacturer's written instructions and FEMA requirements.
 - 1. Where roof slope exceeds 20:12, seal asphalt shingles with asphalt roofing cement spots after fastening with additional roofing nails.
 - 2. Where roof slope is less than 4:12, seal asphalt shingles with asphalt roofing cement spots.
 - 3. When ambient temperature during installation is below 50 deg F, seal asphalt shingles with asphalt roofing cement spots.
 - 4. Nails must be driven flush with the shingle surface. Do not overdrive or under drive the nails.
- F. Valley Installations:
 - 1. Closed cut valleys:
 - a. Run the first course of shingles from the higher roof slope across the valley at least 12 inches.
 - b. Run succeeding courses of shingles from the lower roof slope across the valley at least 12 inches and nail not closer than 6 inches to center of valley.
 - c. Run shingles from the upper roof slope into the valley and trim 2 inches from the center line.

- G. Ridge and Hip Cap Shingles: Provide manufacturer's required ridge and hip shingles required to meet warranty conditions. Maintain same exposure of cap shingles as roofing shingle exposure. Lap cap shingles at ridges to shed water away from direction of prevailing winds. Fasten with roofing nails of sufficient length to penetrate sheathing.
 - 1. Fasten ridge cap asphalt shingles to cover ridge vent without obstructing airflow.
- H. Penetrations
 - 1. All Penetrations are to be flashed according to GAF®, ARMA and NRCA application instructions and construction details.

3.05 PROTECTION

- A. Protect installed products from foot traffic until completion of the project.
- B. Any roof areas that are not completed by the end of the workday are to be protected from moisture and contaminants.

END OF SECTION

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PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Ethylene-propylene-diene-monomer (EPDM) roofing system.
 - 2. Cover Board.
 - 3. Vapor retarder.
 - 4. Walkway Systems.

1.03 DEFINITIONS

- A. Roofing Terminology: Definitions in ASTM D1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" apply to work of this Section.

1.04 SUBSTITUTIONS / OR EQUALS

- A. Substitutions or Equals for the roofing material manufacturer and items listed in this specification shall be submitted in conformance with Division 1 and as otherwise modified by the following:
 - 1. A proposed Substitution/or Equal submission package must be submitted to the Architect no later than ten (10) business days prior to the bid date. Otherwise, any Substitution/or Equal other than the manufacturer specified will not be considered.
 - 2. Submittal to Architect shall include:
 - a. Identification of Project - Project Name;
 - b. Name of Submitting Bidder;
 - c. Telephone and Email address of Submitting Bidder;
 - d. Manufacturer's Name of Proposed or Equal/Substitution;
 - e. Model, line or material type;
 - f. Equivalent line by line item comparison for each item listed in the materials section of this specification, including each of the optional accessories. Note: Each proposed item must have proposed manufacturer and model/product numbers.
 - g. Addresses of two locations within 30 miles of the proposed site, where the proposed Substitution/or Equal manufacturer has installed their similar roofing product and name and telephone number of a contact person to be able to arrange a site visit.
 - h. A copy of the final signed warranty signed and issued by the manufacturer for the two projects provided.
 - 3. Partial and/or Failure to follow any of the procedures outlined in Division 01 or above may subject the entire submission for rejection.
 - 4. Incomplete submissions may not be reviewed.
 - 5. Substitution/ or Equals if found acceptable will be approved via addenda, which will be issued to all bidder's.
 - 6. In order to include an approved Substitution/or Equal in the bid, the bidder must acknowledge on the bidders bid form that the bidder intends to provide the approved Substitution/or Equal and the bidder shall also list the name of the approved Substitution/or Equal manufacturer as well on the bidders bid form. Failure of the bidder to express their

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intent to use the approved Substitution/or Equal as part of the bid will exclude the bidder from being able to utilize another Manufacturer from the one specified.

7. If a bidder uses a Substitution/or Equal, the bidder will take responsibility to pay for the re-engineering and coordination of all other items that are to be provided that have been defined in the Contract Documents as additional items to the roofing system, including but not limited to all deck preparation/modifications, additional flashings or modification to existing roof drains.

1.05 PREINSTALLATION MEETINGS

- A. Preinstallation Roofing Conference: Conduct conference at Project site.
 1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 4. Review the use and staging of hoisting equipment required for the project including safety , OSHA regulations pertaining to operation and use of this equipment.
 5. Review Contractor's (and their Subcontractor's) responsibility to comply with OSHA regulations, requirements for provision and implementation of safety equipment and regulations. Additionally, Contractor shall keep on-site at all times a minimum of three complete additional safety units (i.e.: harnesses, rigging gear, hardhats, safety vests, etc.) for use by site visitors requiring access to the work.
 6. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
 7. Review structural loading limitations of roof deck during and after roofing.
 8. Review the location of any fresh-air intakes for the building with the building owner which may have to be covered or re-directed to maintain intakes during roofing operations.
 9. Review base flashings, special roofing details, roof drainage, roof penetrations; raising and/or replacement of equipment curbs, disconnection and re-connection of mechanical roof mounted equipment; and condition of other construction that affects roofing system.
 10. Review governing regulations and requirements for insurance and certificates if applicable.
 11. Review temporary protection requirements including but not limited to safety lines, roof barriers, walkway protections as required by OSHA during and after roofing installations.
 12. Review roof installation observations during construction; notifications and repair procedures after roofing installation with the manufacturer's field representative.
 13. Asbestos abatement work coordination.
 14. Debris removal procedures and requirements.

1.06 ACTION SUBMITTALS

- A. Submittals shall be made in accordance with Section 013300 - SUBMITTALS.
- B. Product Data: For each type of product.
- C. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work, including:

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1. Base flashings and membrane terminations including laps, seam layout, direction of laps and flashing details.
 2. Tapered insulation, including slopes.
 3. Roof plan showing orientation of steel roof deck and orientation of roofing and fastening spacing's and patterns for mechanically fastened roofing.
 4. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
- D. Samples for Verification: For the following products:
1. Membrane roofing, of color required, 12 inch x 12 inch.
 2. Insulation Board - 12" x 12" sample.
 3. Cover Board - 12 inch x 12 inch.
 4. Walkway pads or rolls, of color required.
- E. Manufacturers complete installation Instructions.
- F. MSDS Sheets for all materials.

1.07 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and manufacturer.
- B. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
1. Submit evidence of complying with performance requirements.
- C. Product Test Reports: For components of roofing system, tests performed by manufacturer and witnessed by a qualified testing agency.
- D. Research/Evaluation Reports: For components of roofing system, from ICC-ES.
- E. Sample Warranties: For manufacturer's special warranties.

1.08 CLOSEOUT SUBMITTALS

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

1.09 QUALITY ASSURANCE

- A. Perform work in accordance with NRCA Roofing and Waterproofing Manual and manufacturer's instructions.
- B. Single Source Responsibility: Roofing system materials and components shall be supplied and warranted by membrane manufacturer for specified roofing system and specified membrane manufacturer's warranty and shall be in compliance with specified regulatory requirements.
- C. Regulatory Requirements for Roof Assembly:
1. Comply with Factory Mutual System Approval Guide to provide FMRC-Approved roof assembly meeting Class 1A-120 (FM 4470) requirements for fire resistance and wind uplift in accordance with FM Loss Prevention Data Sheets FM DS 1-28 and FM DS 1-29.
 2. Underwriters Laboratories, Inc. (UL): Class A Fire Hazard Classification
 3. Conform to applicable code(s) for roof assembly fire hazard requirements.

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4. Conform to loading requirements indicated in ASCE 7 for applicable building location, exposure and use.
5. Factory Mutual (FM) 1A-120 Compliance/Roof Assembly.

D. Qualifications.

1. Manufacturer: Company specializing in manufacturing the products specified in this section with 10 years documented experience.
2. Applicator: Company specializing in performing the work of this section with 5 years documented experience. Installer shall be a qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.10 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. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
 2. All curable materials must be stored between 60° F and 80°F.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.
- E. Protect adjacent materials and surfaces against damage from roofing work. Do not store materials on previously completed roofing.

1.11 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.12 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.
 1. Special warranty includes membrane roofing, base flashings, roof insulation, fasteners, cover boards, substrate board, roofing accessories, edge materials, copings, and other components of roofing system.
 2. Warranty Period: 20 years from date of Substantial Completion with no dollar limitation (NDL) on the cost or quantity of repairs. Pro-rated roofing warranties will not be accepted.

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3. The warranty shall include coverage for wind speed with peak gusts of 120 mph measured at 30 feet above ground level. Certification is required with bid submittal indicating the manufacturer has reviewed and agreed to such wind coverage.
4. Warranty shall also provide coverage for roof leakage caused by hail up to and including 2 inch in diameter.
5. Materials and Workmanship for the following items shall be included in the manufacturer's warranty:
 - a. Membranes.
 - b. Flashings, including metal flashings and accessories supplied by roofing membrane manufacturer.
 - c. Insulation.
 - d. Fasteners and adhesives.
 - e. Accessories.
 - f. Roof Edge and coping systems.
6. The warranty deliverables shall include the following:
 - a. Original of the warranty with original signature of a roofing manufacturer's company official authorized to sign the warranty.
 - b. An additional three copies of the signed warranty noted above.
 - c. Record set of as-built roofing drawings.
 - d. Final Roof Inspection Report by the manufacturer's authorized Field Representative.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Source Limitations: Obtain components including roof insulation for roofing system from manufacturer approved by membrane roofing manufacturer.

2.02 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roofing and base flashings shall remain watertight.
 1. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G154, or ASTM G155.
 2. Impact Resistance: Roofing system shall resist impact damage when tested according to ASTM D 3746 or ASTM D 4272.
- B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.
- C. Roofing System Design: Tested by a qualified testing agency to resist the following uplift pressures:
 1. Corner Uplift Pressure: 180lbf/sq. ft.
 2. Perimeter Uplift Pressure: 120lbf/sq. ft.
 3. Field-of-Roof Uplift Pressure: 90lbf/sq. ft.
- D. Energy Star Listing: Roofing system shall be listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for low -slope roof products.

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- E. Energy Performance: Roofing system shall have an initial solar reflectance index of not less than 0.70 and an emissivity of not less than 0.75 when tested according to CRRC-1.
- F. Exterior Fire-Test Exposure: ASTM E108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- G. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated. Identify products with appropriate markings of applicable testing agency.

2.03 EPDM ROOFING

- A. EPDM: ASTM D4637/D4637M, Type II, scrim or fabric internally reinforced, uniform, flexible EPDM sheet.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - a. Firestone Building Products Company, LLC.: Ecowhite Platinum EPDM PT
 - b. Carlisle SynTec Incorporated.
 - c. Johns Manville.
 - d. Versico Incorporated.
 - 3. Thickness: 60 mils, nominal.
 - 4. Exposed Face Color: Black.

2.04 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing.
 - 1. Adhesives and sealants that are not on the exterior side of weather barrier shall comply with the following limits for VOC content:

a. Plastic Foam Adhesives:	50 g/L.
b. Gypsum Board and Panel Adhesives:	50 g/L.
c. Multipurpose Construction Adhesives:	70 g/L.
d. Fiberglass Adhesives:	80 g/L.
e. Single-Ply Roof Membrane Adhesives:	250 g/L.
f. Single-Ply Roof Membrane Sealants:	450 g/L.
g. Non-membrane Roof Sealants:	300 g/L.
h. Sealant Primers for Nonporous Substrates:	250 g/L.
i. Sealant Primers for Porous Substrates:	775 g/L.
j. Other Adhesives and Sealants:	250 g/L.
- B. Protection Sheet: Epichlorohydrin or neoprene non reinforced flexible sheet, 55- to 60-mil- (1.4- to 1.5-mm-) thick, recommended by EPDM manufacturer for resistance to hydrocarbons, non-aromatic solvents, grease, and oil.
- C. Bonding Adhesive, splice cleaners, splice cement and splice tape: Manufacturer's standard.
- D. Seaming Material: Manufacturer's standard, synthetic-rubber polymer primer and 6 inch (75-mm-) wide minimum, butyl splice tape with release film.

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- E. Lap Sealant: Manufacturer's standard, single-component sealant, colored to match membrane roofing.
- F. Molded Pipe Flashings inside and outside corner flashing: as recommended by membrane manufacturer.
- G. Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.
- H. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.
- I. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, molded pipe boot flashings, preformed inside and outside corner sheet flashings, reinforced EPDM securement strips, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.
 - 1. Provide white flashing accessories for white EPDM membrane roofing.
- J. Walkway Pads: Protective surfacing for roof traffic shall be non-slip textured, pressure-sensitive walkway pads (with Factory-Applied Tape on the underside of the walkway) adhered to the membrane surface in conjunction with primer. Color to match roofing.
- K. Roof edge and coping system materials: Material shall be as specified herein or in Section(s) 077100 - Roof Specialties - Copings and 077100.13 - Roof Specialties - Flashing; Coping Covers, Scuppers, Flashings and Roof edge systems shall be included in the Roofing manufacturer's 20 year Total System NDL Warranty. Kynar finish for all metal components shall be as selected by Architect. Provide complete system with concealed cover plate, extenders, Factory-fabricated corners, end caps and fasteners.

2.05 SUBSTRATE BOARDS / THERMAL BARRIER

- A. Substrate Board / Thermal Barrier: ASTM C1278/C1278M, cellulosic-fiber-reinforced, water-resistant gypsum substrate, 5/8 inch (16 mm) thick.
 - 1. Products: Subject to compliance with requirements, provide the following:
 - a. Georgia-Pacific; DensDeck Prime Roof Board.
 - b. USG Corporation; Securock Gypsum-Fiber Roof Board.
 - c. Or approved equal.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM 4470, designed for fastening substrate panel to roof deck.

2.06 ROOF INSULATION

- A. General: Preformed roof insulation boards manufactured or approved by EPDM roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated. Minimum LTTR of 30 required.
- B. Polyisocyanurate Board Insulation: ASTM C1289, Type II, Class 1, Grade 3, felt or glass-fiber mat facer on both major surfaces.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - a. Firestone Building Products; Tapered ISO 95+ TM GL Insulation.

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- b. Carlisle Syntec Systems: InsulBase Polyisocyanurate insulation.
 - c. Or approved equal.
- C. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated or at least twice the slope of the tapered insulation in the field of the roof areas.

2.07 INSULATION ACCESSORIES

- A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with roofing.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer.
- C. Flexible FAST Adhesive: Sure-Seal FAST 100 or 100 LV Adhesive: A low rise two-component spray-applied or extruded bead applied, to approved insulations to compatible substrates (concrete, cellular lightweight insulating concrete, gypsum, cementitious wood fiber, wood or steel) or sooth or gravel surfaced BUR, modified bitumen or cap sheets.
- D. Cover Board: ASTM C1278/C1278M, cellulosic-fiber reinforced, water-resistant gypsum substrate, 5/8 inch.
 - 1. Products: Subject to compliance with requirements, provide the following:
 - a. Georgia-Pacific; DensDeck Prime Roof Board.
 - b. USG Corporation; Securock Gypsum-Fiber Roof Board.
 - c. Securshield HD Plus Coverboard.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work:
 - 1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
 - 2. Verify that perimeter wood blocking, curbs, and nailers are securely anchored to roof deck at roof perimeters, penetrations and terminations in accordance with Factory Mutual 1-49 requirements and that nailers match thicknesses of insulation .
 - 3. Steel Decks: Verify that surface plane flatness and fastening of steel roof deck complies with manufacturer's requirements.
 - 4. Concrete Decks:
 - a. Verify that minimum concrete drying period recommended by roofing system 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.
 - c. Verify that concrete-curing compounds that will impair adhesion of roofing components to roof deck have been removed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

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3.02 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

3.03 ROOFING INSTALLATION, GENERAL

- A. Install roofing system according to roofing system manufacturer's written instructions.
- B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.04 SUBSTRATE BOARD / THERMAL BARRIER INSTALLATION

- A. Install substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.
 - 1. Fasten substrate board to top flanges of steel deck to resist uplift pressure at corners, perimeter, and field of roof according to roofing system manufacturers' written instructions.

3.05 VAPOR-RETARDER INSTALLATION

- A. Self-Adhering-Sheet Vapor Retarder: Prime substrate if required by manufacturer. Install self-adhering-sheet vapor retarder over area to receive vapor retarder, side and end lapping each sheet a minimum of 3-1/2 inches and 6 inches, respectively. Seal laps by rolling.
- B. Completely seal vapor retarder at terminations, obstructions, and penetrations to prevent air movement into roofing system.

3.06 INSULATION INSTALLATION

- A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with roofing system and insulation manufacturer's written instructions for installing roof insulation.
- C. Install tapered insulation under area of roofing to conform to slopes indicated. Form crickets and saddles as indicated on approved roof installation shop drawings.
- D. Install insulation under area of roofing to achieve required LTTR of 30 minimum. Install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.
- E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

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- F. 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 with insulation.
- G. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
- H. Mechanically Fastened Insulation: Install insulation to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
- I. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.
- J. 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 in each direction. Loosely butt cover boards together and fasten to roof deck.
 - 1. Fasten cover boards according to requirements in FM Global's "RoofNav" for specified Windstorm Resistance Classification.
 - 2. Fasten cover boards to resist uplift pressure at corners, perimeter, and field of roof.

3.07 ADHERED MEMBRANE ROOFING INSTALLATION

- A. Adhere roofing over area to receive roofing according to membrane roofing system manufacturer's written instructions. Unroll membrane roofing and allow to relax before installing.
- B. Start installation of roofing in presence of roofing system manufacturer's technical personnel.
- C. Accurately align roofing, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- D. Bonding Adhesive: Apply to substrate and underside of roofing at rate required by manufacturer, and allow to partially dry before installing roofing. Do not apply to splice area of roofing.
- E. In addition to adhering, mechanically fasten roofing securely at terminations, penetrations, and perimeters.
- F. Apply roofing with side laps shingled with slope of roof deck where possible.
- G. Tape Seam Installation: Clean and prime both faces of splice areas, apply splice tape, and firmly roll side and end laps of overlapping roofing according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of roofing terminations.
- H. Repair tears, voids, and lapped seams in roofing that do not comply with requirements.
- I. Spread sealant or mastic bed over deck-drain flange at roof drains, and securely seal membrane roofing in place with clamping ring.
- J. Adhere protection sheet over membrane roofing at locations indicated.

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3.08 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components, and to furnish reports to Architect.
- B. Manufacturer's Field Services: The manufacturer's authorized Field Representative and Roofing Quality Control Inspector shall provide the following:
 - 1. Attend and conduct Pre-installation Meeting.
 - 2. Perform preparatory, initial, follow-up and final inspections for roof insulation and roofing system.
 - 3. Prepare and submit inspection reports for each inspection made.
- C. Upon completion of the installation the manufacturer's authorized Field Representative shall conduct an on-site inspection in the presence of the Architect/Engineer to insure that the installation has been installed in accordance with the manufacturer's specifications.
- D. Flood Testing: Flood test each roofing area for leaks, according to recommendations in ASTM D 5957, after completing roofing and flashing but before overlying construction is placed. Install temporary containment assemblies, plug or dam drains, and flood with potable water.
 - 1. Flood to an average depth of 2-1/2 inches with a minimum depth of 1 inch and not exceeding a depth of 4 inches. Maintain 2 inches of clearance from top of base flashing.
 - 2. Flood each area for 24 hours.
 - 3. After flood testing, repair leaks, repeat flood tests, and make further repairs until roofing and flashing installations are watertight.
- E. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.
- F. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.
- G. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.09 PROTECTING AND CLEANING

- A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates, and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

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END OF SECTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Gravel stops.
 - 2. Drip edges.
 - 3. Base and Counter flashing.

1.03 COORDINATION

- A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.
- B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.04 REFERENCES:

- A. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- B. ASTM B32 - Standard Specification for Solder Metal; 2008 (Reapproved 2014).
- C. ASTM B370 - Standard Specification for Copper Sheet and Strip for Building Construction; 2012.
- D. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.05 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. Detail fabrication and installation layouts, details. Distinguish between shop- and field-assembled work.
 - 2. Include identification of material, thickness, weight, and finish for each item and location in Project.
 - 3. Include details for forming, including profiles, shapes, seams, and dimensions.
 - 4. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
 - 5. Include details of termination points and assemblies.
 - 6. Include details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction from fixed points.
 - 7. Include details of roof-penetration flashing.
 - 8. Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.

9. Include details of special conditions.
10. Include details of through wall scuppers including section details, dimensions of scupper openings and height above finished roof surface, edge sealing details, interface and sealing with roof membrane system, counterflashing and exposed exterior fascia conditions.
11. Include details of connections to adjoining work.

C. Samples for Verification: For each type of exposed finish.

1.06 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For fabricator.
- B. Product Certificates: For each type of coping, scupper, roof edge and flashing required to complete the roofing system. All sheet metal shall be SPRI ES-1 tested and FM approved for this project.
- C. Product Test Reports: For each product, for tests performed by a qualified testing agency.

1.07 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.
- B. For copings and roof edge flashings that are SPRI ES-1 tested and FM Approvals approved, shop shall be listed as able to fabricate required details as tested and approved.
- C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
- D. Perform work in accordance with SMACNA (ASMM), CDA A4050, and approved manufacturers requirements and standard details, except as otherwise indicated.

1.08 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.

1.09 WARRANTY

- A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 years from date of Substantial Completion.

- B. Metal Copings, Gravel Stops, scuppers, roof edges, counterflashing, and other components incorporated or in contact with the Roofing System shall be pre-approved by and made integral to the 20-year Total Roofing System warranty specified in Division 07. Shop drawings and components shall be reviewed and approved by the Roofing manufacturer prior to submittal to the architect for approval. Submit a letter signed by a current representative of the manufacturer on Roofing manufacturer letterhead, attesting to this approval and warranty acceptability. Submit this certification letter as part of the Shop Drawing submittals for this section.

PART 2 - PRODUCTS

2.01 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" SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated or required by the approved roofing manufacturer responsible for providing the Total System Warranty for the roof system.
- C. Sheet Metal Standard for Copper: Comply with CDA's "Copper in Architecture Handbook." Conform to dimensions and profiles shown unless more stringent requirements are indicated.
- D. FM Approvals Listing: Manufacture and install copings, roof edge flashings that are listed in FM Approvals' "RoofNav" and approved for windstorm classification, Class 1-180 Identify materials with name of fabricator and design approved by FM Approvals.
- E. SPRI Wind Design Standard: Manufacture and install Metal Copings, Gravel Stops, Scuppers, Roof edges, Counterflashing, and other components of roof metal work tested according to SPRI ES-1 and capable of resisting the required design pressure.
- F. Recycled Content of Copper-Sheet Flashing and Trim: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 40 percent.
- G. 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. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. Temperature Change: 120 deg F, ambient; 180 deg F, material

2.02 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, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; with smooth, flat surface.
1. Thickness: 0.040 inch minimum or as indicated on the drawings.

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. Modified Silicone Polyester Coating: Pigmented Organic Coating System, AAMA 2603; baked enamel finish system.
 - c. Color: as selected by the Architect from the manufacturer's full range of color offerings.
3. Anodized Finishes:
 - a. Clear Anodized Finish: AAMA 611 AA-M12C22A41 Class I clear anodic coating not less than 0.7 mils (0.018 mm) thick.
 - b. Color Anodized Finish: AAMA 611 AA-M12C22A42/44 Class I integrally or electrolytically colored anodic coating not less than 0.7 mils (0.018 mm) thick.
4. Color: as selected by the Architect from the manufacturer's full range of color offerings.
5. 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.

2.03 UNDERLAYMENT MATERIALS

- A. Self-Adhering, High-Temperature Sheet: Minimum 30 mils 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. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Grace Construction Products, a unit of W. R. Grace & Co.-Conn; Grace Ice and Water Shield HT.
 - b. Henry Company; Blueskin PE200 HT.
 2. Thermal Stability: ASTM D1970/D1970M; stable after testing at 240 deg F or higher.
 3. Low-Temperature Flexibility: ASTM D1970/D1970M; passes after testing at minus 20 deg F or lower.
- B. Slip Sheet: Rosin-sized building paper, 3 lb/100 sq. ft. minimum.

2.04 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, 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 Copper Sheet: Copper, hardware bronze or passivated Series 300 stainless steel.
- 3. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
- C. Solder:
 - 1. For Copper: ASTM B32, with maximum lead content of 0.2 percent.
- 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 wide and 1/8 inch thick.
- E. Elastomeric Sealant: ASTM C920, elastomeric polyurethane silicone polymer sealant; 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.

2.05 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 on slope and location lines indicated on Drawings and within 1/8-inch 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 deep, filled with butyl sealant concealed within joints.
- D. Sealant Joints: Where movable, nonexpansion-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, non-corrosive metal.
- F. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard and by FM Global Property Loss Prevention Data Sheet 1-49 for application, but not less than thickness of metal being secured.

- G. Seams: Fabricate non-moving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.

2.06 ROOF-DRAINAGE SHEET METAL FABRICATIONS

- A. Hanging Gutters: Fabricate to cross section required, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 96-inch long sections. Furnish flat-stock gutter brackets and flat-stock 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, gutter bead reinforcing bars, and gutter accessories from same metal as gutters. Shop fabricate interior and exterior corners.
 - 1. Gutter Profile: Style A according to cited sheet metal standard and as detailed on the architectural drawings.
 - 2. Expansion Joints: Butt type with cover plate.
 - 3. Accessories: Continuous, removable leaf screen with sheet metal frame and hardware cloth screen.
 - 4. Gutters with Girth up to 15 Inches: Fabricate from the following materials:
 - a. Aluminum: 0.040 inch thick.
 - b. Galvanized Steel: 24 gauge with PVDF Powder coat in color as selected by the Architect unless noted otherwise.
 - c. Stainless Steel: 24 gauge
 - d. Copper: 16 ounce
 - 5. Gutters with Girth 16 to 20 Inches: Fabricate from the following materials:
 - a. Aluminum: 0.050 inch thick.
 - b. Galvanized Steel: 22 gauge with PVDF Powder coat in color as selected by the Architect unless noted otherwise.
 - c. Stainless Steel: 24 gauge
 - d. Copper: 20 ounce
- B. Built-in Gutters: Fabricate to cross section required, with riveted and soldered joints, complete with end pieces, outlet tubes, and other special accessories as required. Fabricate in minimum 96-inch long sections. Fabricate expansion joints and accessories from same metal as gutters unless otherwise indicated.
- C. 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: Fig 1-34B according to SMACNA's "Architectural Sheet Metal Manual-Third Edition"
 - 2. Manufactured Hanger Style: Fig 1-34B according to SMACNA's "Architectural Sheet Metal Manual- Third Edition" or as detailed on the drawings.
 - 3. Fabricate from the following materials:
 - a. Aluminum: 0.040 inch thick.
 - b. Galvanized Steel: 22 gauge with PVDF Powder coat in color as selected by the Architect unless noted otherwise.
 - c. Stainless Steel: 24 gauge
 - d. Copper: 20 ounce

- 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: 0.040 inch thick.
- E. Splash Pans: Fabricate to dimensions and shape required and from the following materials:
 - 1. Copper-Clad Stainless Steel: 0.0216 inches thick (0.8927 psf) .
- F. Scuppers: Fabricate sheet metal scuppers in width, height and depths required by the drawings or to match existing conditions, as applicable. Materials shall be 0.050 inch thick or 20 oz. Copper to match and provide compatibility with adjacent metals. Fabricate in accordance with SMACNA or CDA standards in accordance with the base metal required. Construct scupper pan in one formed piece with extended drip edge, roof extension plate and side flanges for interface with roofing. Provide separate counterflashing as required by details or field conditions in compatible and matching sheet metal. Weld / solder joints to produce a watertight installation.
 - 1. Provide certification of the scupper design / detailing by the approved roof manufacturer stating that the scupper installation shall be acceptable the manufacturer and be included in the warranty coverage specified for the roofing system.

2.07 STEEP-SLOPE ROOF SHEET METAL FABRICATIONS

- A. Apron, Step, Cricket, and Backer Flashing: Fabricate from the following materials:
 - 1. Copper: 16 oz./sq. ft..
 - 2. Aluminum: 0.040 inch thick. Finish color as selected by the Architect.
 - 3. Galvanized Steel: 22 gauge with PVDF Powder coat in color as selected by the Architect unless noted otherwise.
 - 4. Stainless Steel: 22 gauge
- B. Valley Flashing: Fabricate from the following materials:
 - 1. Copper: 20 oz./sq. ft.
 - 2. Aluminum: 0.050 inch thick. Finish color as selected by the Architect.
 - 3. Galvanized Steel: 22 gauge with PVDF Powder coat in color as selected by the Architect unless noted otherwise.
 - 4. Stainless Steel: 22 gauge
- C. Drip Edges: Fabricate from the following materials:
 - 1. Aluminum: 0.040 inch thick. Finish color as selected by the Architect.
 - 2. Copper: 20 oz./sq. ft.
 - 3. Galvanized Steel: 22 gauge with PVDF Powder coat in color as selected by the Architect unless noted otherwise.
- D. Eave, Rake Flashing: Fabricate from the following materials:
 - 1. Aluminum: 0.040 inch thick. Finish color as selected by the Architect.
 - 2. Copper: 16 oz./sq. ft.
 - 3. Galvanized Steel: 22 gauge with PVDF Powder coat in color as selected by the Architect unless noted otherwise.
 - 4. Stainless Steel: 22 gauge
- E. Counterflashing: Shop fabricate interior and exterior corners. Fabricate from the following materials:
 - 1. Copper: 16 oz./sq. ft..

2. Aluminum: 0.040 inch thick. Finish color as selected by the Architect.
 3. Galvanized Steel: 22 gauge with PVDF Powder coat in color as selected by the Architect unless noted otherwise.
 4. Stainless Steel: 22 gauge
- F. Flashing Receivers: Fabricate from the following materials:
1. Copper: 16 oz./sq. ft.
 2. Aluminum: 0.032 inch thick. Finish color as selected by the Architect.
 3. Galvanized Steel: 22 gauge with PVDF Powder coat in color as selected by the Architect unless noted otherwise.
 4. Stainless Steel: 22 gauge
- G. Roof-Penetration Flashing: Fabricate from the following materials:
1. Copper: 16 oz./sq. ft.
 2. Aluminum: 0.050 inch thick. Finish color as selected by the Architect.
 3. Galvanized Steel: 22 gauge with PVDF Powder coat in color as selected by the Architect unless noted otherwise.
 4. Stainless Steel: 22 gauge

2.08 WALL SHEET METAL FABRICATIONS

- A. Opening Flashings: Fabricate head, sill, jamb, and similar flashings to extend 6 inches beyond wall openings. Form head and sill flashing with 2-inch (50-mm-) high, end dams. Fabricate from the following materials:
1. Copper: 16 oz./sq. ft.
 2. Aluminum: 0.032 inch thick. Finish color as selected by the Architect
 3. Galvanized Steel: 22 gauge with PVDF Powder coat in color as selected by the Architect unless noted otherwise.
 4. Stainless Steel: 22 gauge

2.09 MISCELLANEOUS FLASHINGS - COORDINATED SHEET METAL FABRICATIONS

- A. Equipment Support Flashing: Fabricate from the following materials:
1. Stainless Steel: 0.018 (26 gauge) thick.
 2. Aluminum Sheet: 0.040 inch thick. Finish color as selected by the Architect.
- B. Overhead-Piping Safety Pans: Required where plumbing, sprinkler and/or heating piping containing liquid pass over or near electrical panels, electrical switches or other water sensitive equipment. Fabricate from the following materials:
1. Stainless Steel: 0.018 inch thick (26 gauge) thick.
 2. Pans shall be a minimum of 1-1/2" deep.
 3. Provide minimum one inch drain line for each four square feet of pan area.
 4. Pans and drain fittings shall be watertight.
 5. Suspend pans from structure above via chains or all thread and unistrut.

2.10 GENERAL FINISH REQUIREMENTS

- 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.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.
 - 1. Verify compliance with requirements for installation tolerances of substrates.
 - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
 - 3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 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 staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps and edges with roller. Cover underlayment within 14 days.
- B. Apply slip sheet, wrinkle free, over underlayment before installing sheet metal flashing and trim.

3.03 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 - 1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
 - 2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 - 3. Space cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
 - 4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
 - 5. Torch cutting of sheet metal flashing and trim is not permitted.
 - 6. 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 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 with no joints within 24 inches of corner or intersection.
- 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. 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 into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 deg F, 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.
 2. Prepare joints and apply sealants to comply with requirements in Section 079200 - JOINT SEALANTS.
- F. 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; however, reduce pre-tinning where pre-tinned surface would show in completed Work.
1. Do not solder aluminum sheet.
 2. Do not use torches for soldering.
 3. Heat surfaces to receive solder, and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
 4. Stainless-Steel Soldering: Tin edges of uncoated sheets, using solder for stainless steel and acid flux. Promptly remove acid flux residue from metal after tinning and soldering. Comply with solder manufacturer's recommended methods for cleaning and neutralization.

3.04 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.
- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for FM Approvals' listing for required windstorm classification.
- C. Copings: Anchor to resist uplift and outward forces according to recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for specified FM Approvals' listing for required windstorm classification.
- D. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches over base flashing. Install stainless-steel draw band and tighten.
- E. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend

counterflashing 4 inches over base flashing. Lap counterflashing joints minimum of 4 inches. Secure in waterproof manner by means of snap-in installation and sealant or lead wedges and sealant unless otherwise indicated.

- F. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.

3.05 WALL FLASHING INSTALLATION

- A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Through-Wall Flashing: Installation of through-wall flashing is specified in Division 04.
- C. Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 6 inches beyond wall openings.

3.06 MISCELLANEOUS FLASHING INSTALLATION

- A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.
- B. Overhead-Piping Safety Pans: Suspend pans from structure above, independent of other overhead items such as equipment, piping, and conduit, unless otherwise indicated on Contract Drawings. Slightly pitch pans towards pan drain location. Pipe and install drain line to plumbing waste or drainage system.

3.07 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.08 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.

SHEET METAL FLASHING AND TRIM
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END OF SECTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Reglets and counterflashing.
 - 2. Roof flashing.

1.03 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. FM Approvals' Listing: Manufacture and install roof flashing and counterflashing roof flashing and counterflashing that are listed in FM Approvals' "RoofNav" and approved for windstorm classification, Class 1-120. Identify materials with FM Approvals' markings.
- C. SPRI Wind Design Standard: Manufacture and install copings, scuppers, roof edges, flashings and other roof metal work tested according to SPRI ES-1 and capable of resisting the required design pressure:
- D. 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.

1.04 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. Include plans, elevations, expansion-joint locations, keyed details, and attachments to other work. Distinguish between plant- and field-assembled work. Include the following:
 - 1. Details for expansion and contraction; locations of expansion joints, including direction of expansion and contraction.
 - 2. Pattern of seams and layout of fasteners, cleats, clips, and other attachments.
 - 3. Details of termination points and assemblies, including fixed points.
 - 4. Details of special conditions.
- C. Samples for Verification: For reglets and counterflashing made from 12-inch (300-mm) lengths of full-size components including fasteners, cover joints, accessories, and attachments.

1.05 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for.

1.06 QUALITY ASSURANCE

- 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. 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. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.07 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.

PART 2 - PRODUCTS

2.01 EXPOSED METALS

- A. Aluminum Sheet: ASTM B209, alloy as standard with manufacturer for finish required, with temper to suit forming operations and performance required.
 - 1. Surface: Smooth, flat finish.
 - 2. Exposed Coil-Coated Finishes: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - a. Three-Coat Fluoropolymer: AAMA 2605. System consisting of primer, fluoropolymer color coat, and clear fluoropolymer topcoat, with both color coat and clear topcoat containing not less than 70 percent PVDF resin by weight.
 - b. Concealed Surface: Pretreat with manufacturer's standard white or light-colored 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).

2.02 CONCEALED METALS

- A. Aluminum Sheet: ASTM B209, alloy and temper recommended by manufacturer for type of use and structural performance indicated, mill finished.

2.03 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 316 stainless steel.
- C. Elastomeric Sealant: ASTM C920, elastomeric polyurethane polymer sealant of type, grade, class, and use classifications required by roofing-specialty manufacturer for each application.
- D. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.04 REGLETS AND COUNTERFLASHINGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 1. Metal-Era, Inc.
 2. MM Systems Corporation.
 3. Cheney Flashing Company.
 4. Hickman Company, W. P.
- C. Reglets: Manufactured units formed to provide secure interlocking of separate reglet and counterflashing pieces, from the following exposed metal:
 1. Formed Aluminum: 0.050 inch thick
 2. Corners: Factory mitered and continuously welded.
 3. Masonry Type, Embedded: Provide reglets with offset top flange for embedment in masonry mortar joint.
- D. Counterflashing: Manufactured units of heights to overlap top edges of base flashings by 4 inches and in lengths not exceeding 12 feet designed to snap into reglets and compress against base flashings with joints lapped, from the following exposed metal:
 1. Formed Aluminum: 0.040 inch thick.
- E. Accessories:
 1. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing lower edge.
- F. Aluminum Finish: Three-coat fluoropolymer.
 1. Color: As selected by Architect from manufacturer's full range.

2.05 GENERAL FINISH REQUIREMENTS

- 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.

PART 3 - EXECUTION

3.01 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 are in suitable condition for roofing 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.

3.02 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. Coat concealed side of uncoated aluminum roof specialties with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
- C. Expansion Provisions: Allow for thermal expansion of exposed roof specialties.
 - 1. Space movement joints at a maximum of 12 feet with no joints within 18 inches of corners or intersections unless otherwise shown on Drawings.
 - 2. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures.
- D. Fastener Sizes: Use fasteners of sizes that will penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- E. Seal joints with 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.

3.03 REGLET AND COUNTERFLASHING INSTALLATION

- A. General: Coordinate installation of reglets and counterflashing with installation of base flashings.

- B. Surface-Mounted Reglets: Install reglets to receive flashings where flashing without embedded reglets is indicated on Drawings. Install at height so that inserted counterflashing overlap 4 inches over top edge of base flashings.
- C. Counterflashing: Insert counterflashing into reglets or other indicated receivers; ensure that counterflashing overlap 4 inches over top edge of base flashings. Lap counterflashing joints a minimum of 4 inches and bed with elastomeric sealant. Fit counterflashing tightly to base flashings.

3.04 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 and 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

ROOF ACCESSORIES - HATCHES, SUPPORTS, CURBS

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PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Roof curbs.
 - 2. Equipment supports.
 - 3. Pipe supports.

1.03 PERFORMANCE REQUIREMENTS

- A. General Performance: Roof accessories 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.

1.04 ACTION SUBMITTALS

- A. Product Data: For each type of roof accessory indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For roof accessories. Include plans, elevations, keyed details, and attachments to other work. Indicate dimensions, loadings, and special conditions. Distinguish between plant- and field-assembled work.

1.05 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Roof plans, drawn to scale, and coordinating penetrations and roof-mounted items. Show the following:
 - 1. Size and location of roof accessories specified in this Section.
 - 2. Method of attaching roof accessories to roof or building structure.
 - 3. Other roof-mounted items including mechanical and electrical equipment, ductwork, piping, and conduit.
 - 4. Required clearances.
- B. Warranty: Sample of special warranty.

1.06 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For roof accessories to include in operation and maintenance manuals.

1.07 COORDINATION

- A. Coordinate layout and installation of roof accessories with roofing membrane and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.

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- B. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.

1.08 WARRANTY

- A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finishes or replace roof accessories that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 METAL MATERIALS

- A. Aluminum Sheet: ASTM B209, 0.063 inch thickness or as indicated, manufacturer's standard alloy for finish required, with temper to suit forming operations and performance required.
 - 1. Mill Finish: As manufactured.
 - 2. Factory Prime Coating: Where field painting is indicated, apply pretreatment and white or light-colored, factory-applied, baked-on epoxy primer coat, with a minimum dry film thickness of 0.2 mil.
 - 3. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
 - 4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester-backer finish consisting of prime coat and wash coat, with a minimum total dry film thickness of 0.5 mil.
- B. Stainless-Steel Sheet and Shapes: ASTM A240/A240M or ASTM A666, Type 304.
- C. Galvanized-Steel Tube: ASTM A500/A500M, round tube, hot-dip galvanized according to ASTM A123/A123M.

2.02 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. Polyisocyanurate Board Insulation: ASTM C1289, thickness as indicated.
- C. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.
- D. Underlayment:
 - 1. Felt: ASTM D226/D226M, Type II (No. 30), asphalt-saturated organic felt, non-perforated.
 - 2. Polyethylene Sheet: 6-mil thick polyethylene sheet complying with ASTM D4397.
 - 3. Slip Sheet: Building paper, 3-lb/100 sq. ft. minimum, rosin sized.

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- E. Fasteners: Roof accessory manufacturer's recommended fasteners suitable for application and metals being fastened. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners. Furnish the following unless otherwise indicated:
 - 1. Fasteners for Zinc-Coated or Aluminum-Zinc Alloy-Coated Steel: Series 300 stainless steel or hot-dip zinc-coated steel according to ASTM A153/A153M or ASTM F 2329.
 - 2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
 - 3. Fasteners for Copper Sheet: Copper, hardware bronze, or passivated Series 300 stainless steel.
 - 4. Fasteners for Stainless-Steel Sheet: Series 316 stainless steel.
- F. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, PVC, or silicone or a flat design of foam rubber, sponge neoprene, or cork.
- G. Elastomeric Sealant: ASTM C920, elastomeric polyurethane polymer sealant as recommended by roof accessory manufacturer for installation indicated; low modulus; of type, grade, class, and use classifications required to seal joints and remain watertight.
- H. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for expansion joints with limited movement.
- I. Asphalt Roofing Cement: ASTM D4586/D4586M, asbestos free, of consistency required for application.

2.03 ROOF CURBS

- A. Roof Curbs: Internally reinforced roof-curb units capable of supporting superimposed live and dead loads, including equipment loads and other construction indicated on Drawings; with welded or mechanically fastened and sealed corner joints, stepped integral metal cant raised the thickness of roof insulation, and integrally formed deck-mounting flange at perimeter bottom.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - a. Thybar Corporation
 - b. Greenheck Fan Corporation
 - c. Pate Company (The)
- B. Size: Coordinate dimensions with roughing-in information or Shop Drawings of equipment to be supported.
- C. Material: Aluminum sheet, 0.090 inch thick airtight and watertight welded corners.
 - 1. Insulation: 1 1/2 inch thick, 3 lb density rigid insulation.
 - 2. Height: 12 inch minimum above deck or as indicated.
 - 3. Curb Type: TC-2 (Cant - no shoulder)
- D. Construction:
 - 1. Liner: Same material as curb, of manufacturer's standard thickness and finish.
 - 2. Fabricate curbs to minimum height of 12 inches above roof elevation unless otherwise indicated.

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3. Top Surface: Level around perimeter with roof slope accommodated by sloping the deck-mounting flange. Contractor to field verify roof conditions prior to ordering curb.

2.04 EQUIPMENT SUPPORTS

- A. Equipment Supports: Internally reinforced metal equipment supports capable of supporting superimposed live and dead loads, including equipment loads and other construction indicated on Drawings; with welded or mechanically fastened and sealed corner joints, integral metal cant, and integrally formed deck-mounting flange at perimeter bottom.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - a. Thybar Corporation
 - b. Greenheck Fan Corporation
 - c. Milcor Inc.; Commercial Products Group of Hart & Cooley, Inc
 - d. Pate Company (The)
- B. Size: Coordinate dimensions with roughing-in information or Shop Drawings of equipment to be supported. Curb shall span a minimum of two structural supports and shall cantilever a maximum of 12 inches where necessary.
- C. Loads: Coordinate and verify load requirements with approved manufacturer's Product Data for each piece of equipment requiring support.
- D. Material: Aluminum sheet, 0.090 inch thick, airtight and watertight welded corners . Internally reinforced with bulkheads at 24 inches on center, 2 inch x 4 inch wood nailer with 18 gauge flashing cover.
 1. Insulation: 1 1/2 inch thick, 3 lb density rigid insulation.
 2. Height: 12 inch minimum above deck or as indicated.
 3. Curb Type: TEMS-3 (No Cant)
- E. Construction:
 1. Liner: Same material as equipment support, of manufacturer's standard thickness and finish.
 2. Fabricate equipment supports to minimum height of 12 inches unless otherwise indicated.
 3. Sloping Roofs: Where roof slope exceeds 1:48, fabricate each support with height to accommodate roof slope so that tops of supports are level with each other. Equip supports with water diverters or crickets on sides that obstruct water flow.
 4. Security Grille: Provide where indicated.

2.05 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

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PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
- B. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- C. Verify dimensions of roof openings for roof accessories.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. General: Install roof accessories according to manufacturer's written instructions.
 - 1. Install roof accessories level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil canning, buckling, or tool marks.
 - 2. Anchor roof accessories securely in place so they are capable of resisting indicated loads.
 - 3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of roof accessories and fit them to substrates.
 - 4. Install roof accessories to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals.
- 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. Coat concealed side of stainless-steel roof accessories with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
 - 2. Underlayment: Where installing roof accessories directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet, or install a course of polyethylene sheet.
 - 3. Bed flanges in thick coat of roofing cement where required by manufacturers of roof accessories for waterproof performance.
- C. Roof Curb Installation: Install each roof curb so top surface is level.
- D. Equipment Support Installation: Install equipment supports so top surfaces are level with each other.
- E. Pipe Support Installation: Install pipe supports so top surfaces are in contact with and provide equally distributed support along length of supported item.
- F. Seal joints with butyl sealant as required by roof accessory manufacturer.

3.03 REPAIR AND CLEANING

- A. Clean exposed surfaces according to manufacturer's written instructions.
- B. Clean off excess sealants.

ROOF ACCESSORIES - HATCHES, SUPPORTS, CURBS

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- C. Replace roof accessories that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Provide through penetration firestopping. The work of this section shall include, but not be limited to, the following:
 - 1. Provide firestopping at all openings in floors and fire rated walls and partitions to prevent the passage of fire, smoke or toxic gases and to maintain required fire ratings.
 - 2. Provide firestopping at all electrical, plumbing and electrical duct and pipe penetrations in floors, and fire-rated walls and partitions, to prevent the passage of fire, smoke or toxic gases.

1.02 QUALITY ASSURANCE

- A. Qualifications: The work of this section shall be performed by a qualified and experienced installer, acceptable to the Architect/Engineer. The term "installer", as used herein shall mean a firm of established reputation; which has been trained by the manufacturer in the proper installation of fire safing material and which is regularly engaged in, and maintains a regular force of workers skilled in the installation of fire safing material of the type specified.

1.03 REFERENCES

- A. Codes and Regulations: Comply with applicable regulations of governmental authorities having jurisdiction.
- B. ASTM E119, Method for Fire Tests of Building Construction and Materials.
- C. ASTM E814, Fire Tests of Through Penetration.
- D. U.L. 1479, Standards for Fire Tests of Through Penetration Firestops.
- E. Factory Mutual Systems.

1.04 SUBMITTALS

- A. Shop Drawings: Shop drawings shall indicate the locations and types of the various fire safing material to be used throughout the building, and material and methods of installation of damming for the various floor, wall and ceiling construction. Details of damming shall be large scale and shall indicate material and methods of installation.
- B. Product Data: Submit manufacturer's technical data and installation instructions.
- C. Test Reports: Submit copies of test reports, by an independent testing laboratory, indicating that the fire safing material complies with the specified requirements.

1.05 FIELD QUALITY CONTROL

- A. Section 014500 - Quality Control: field inspection and testing.
- B. Tests for thickness and density of applied material will be performed by an independent testing agency. Where test results are unsatisfactory in sample areas, additional tests in other areas may be made. Such further testing, if required, shall be by the same testing agency but shall be paid for by the installer.

- C. Independent Testing Agency will:
 - 1. Inspect the installed firestopping after application and curing for integrity, prior to its concealment.
 - 2. Ensure that actual thicknesses, densities, and bond strengths meet requirements for specified ratings.
 - 3. Re-inspect the installed firestopping for integrity of fire protection, after installation of subsequent work.
 - 4. Provide written certification to the Architect, indicating installation meets or exceeds requirements of contract documents.

1.06 WARRANTY

- A. Provide standard manufacturer's warranty on material composition and resistance to breakdown.

PART 2 - PRODUCTS

2.01 FIRE RESISTANT SILICONE FOAM

- A. Acceptable materials are DOW CORNING Silicone RTV Foam, Chase-Foam CTCPR-855 by CHASE TECHNOLOGY CORP., Pensil RTV 851 by GENERAL ELECTRIC, or approved equal.
- B. Foam sealant shall conform to the required fire rating in accordance with the requirements of ASTM E119, with a flamespread rating of 15 in accordance with ASTM E84. Foam sealant shall also conform to UL Standard 1479: "Standards for Fire Tests of Through Penetration Firestops".
- C. The foam sealant shall provide a fire resistance equal to the construction into which it is installed; in accordance with "Through Penetration Firestop Systems (XHEZ)" in the Underwriters Laboratories "Building Materials Directory".
- D. Dams: Provide dams as recommended by the manufacturer, as required for proper installation and for required fire rating.

2.02 MINERAL FIBER FIRE SAFING INSULATION

- A. Provide insulation as manufactured by USG INTERIORS, INC. Product "Thermafiber Safing", CAFCO INDUSTRIES LTD., FIBREX INC. or approved equal. Density shall be 4 pcf with thickness to suit condition.
- B. Provide 20 gauge minimum metal plate where required for fire safing support to comply with fire ratings.
- C. Do not use fibrous safing insulation unless it is in conjunction with a compatible smoke seal as specified herein.

2.03 MINERAL WOOL

- A. Loose mineral wool, rated noncombustible when tested according to ASTM E136, free of asbestos and glass fiber, and suitable for stuffing into metal deck flutes to an in place density of 6 to 12 pcf.

2.04 FIRESTOPPING SEALANT

- A. Provide a silicone firestop sealant classified for both flame and temperature ratings under ASTM E814.
- B. Acceptable materials are USG INTERIORS "Smoke Seal Compound", DOW CORNING "Firestop Sealant", BIO FIRESHIELD "Biotherm", 3M "Fire-Barrier Caulk", GENERAL ELECTRIC "RTV 7403" or approved equal.

2.05 FIRESTOPPING MORTAR

- A. Provide Portland cement/fly ash mortar with an air dried density of 50 to 55 pounds per cu.ft. Mortar shall be classified for both flame and temperature ratings under ASTM E814.
- B. Acceptable materials are BIO FIRESHIELD "Novasit K-10" or approved equal.

2.06 PREFORMED PIPE SEALS

- A. Provide preformed intumescent collars classified for both flame and temperature under ASTM E814.
- B. Acceptable materials are BIO FIRESHIELD "Firestop Collars", 3M "Wrap/Strip FS 195" or approved equal.

2.07 ACCESSORIES

- A. Provide anchorage assemblies complying with U.L. designs and other components and accessories as needed.

PART 3 - EXECUTION

3.01 DELIVERY AND STORAGE

- A. Deliver material and products in unopened packages and containers, clearly indicating name of manufacturer and U.L. labeling. Store and handle in strict compliance with manufacturer's instructions and recommendations. Protect from damage. Protect material from freezing or overheating in accordance with manufacturer's instructions.

3.02 INSPECTION

- A. Examine all surfaces to which the firestopping materials are to be applied, and notify the Architect/Engineer in writing of any conditions detrimental to the proper and expeditious installation of the work. Starting of work within an area shall be construed as acceptance of the conditions of that area.
- B. Thoroughly clean all surfaces to receive firestopping material to eliminate mill scale, dirt, grime, oil, grease, dust, loose rust or paint, and all other foreign material.
- C. Cleaning shall be accomplished just prior to application of firestopping material.

3.03 INSTALLATION (GENERAL)

- A. Material and equipment shall be as approved by the manufacturer. Application procedures shall be in strict accordance with the manufacturer's directions and specifications. Only experienced, skilled mechanics approved by the material manufacturer shall be allowed to place the material.
- B. Provide firestopping material at thicknesses as required to provide indicated ratings. Where not otherwise indicated, comply with U.L. standard designs. In multiple layer work, offset joints by at least 6 inches.
- C. Anchor firestopping using manufacturer's recommended system and in compliance with U.L. standard designs.
- D. Install firestopping without gaps and voids of any kind. Do not use damaged materials. Remove and replace nonfitting or disturbed work.

3.04 MINERAL SAFING INSULATION

- A. Use mineral safing insulation at top of fire-rated partitions at underside of metal deck to provide complete fire-rated seal.
- B. Mineral safing insulation must be used in conjunction with a sealant or foam firestop to ensure a continuous smoke seal.

3.05 FIRESTOPPING SEALANT

- A. Use firestopping sealant at narrow joints at fire-rated floor and wall penetrations, and at penetrations subject to vibration or movement. Typical penetrations requiring sealant are plumbing and HVAC piping, electric conduit and ductwork.
- B. Where openings are large enough, use mineral safing insulation in thicknesses required to dam the joint, and apply 1/2 inch minimum depth of sealant, or as required to achieve the rated assembly.

3.06 FOAM-IN-PLACE FIRESTOPPING

- A. Apply foam-in-place firestopping material in depths required to meet the fire ratings indicated or required by U.L. standards. Provide clips or other approved means to contain the foam-in-place material which will enable the foam to solidly fill the areas intended. Mixing and application shall be in strict accordance with the manufacturer's written instructions.
- B. Foam firestopping may be used in lieu of sealant or mortar material at the Contractor's option, provided details conform to manufacturer's recommendations for maintaining the integrity of the assembly in question.

3.07 FIRESTOPPING MORTAR

- A. Mortar may be used to firestop all large, nonmoving openings in fire-rated assemblies, including multiple openings in floor slabs.

- B. Mix mortar with clean water in accordance with the manufacturer's printed instructions. Wet all surfaces with water prior to application of mortar. Apply by hand or pump and vibrate in penetrations to prevent voids from forming.
- C. Do not apply mortar if ambient or substrate temperature is below 35°F during the 24 hour period before application.

3.08 PREFORMED PIPE SEALS

- A. Use preformed pipe seals for firestopping nonmetallic pipes or conduit penetrating rated assemblies. Preformed collars may be surface mounted or embedded in firestop mortar as space permits to seal PVC or ABS pipe penetrations. Size selection and installation shall be in strict accordance with manufacturer's written instructions.

3.09 FIELD QUALITY CONTROL

- A. Coordinate installation of firestopping work with other work to minimize cutting and removal of installed firestopping. As work of other trades is completed, review firestopping work and repair or replace work which has been damaged or removed. Inspections will be performed to verify compliance with requirements.

3.10 CLEANING AND PROTECTION

- A. Upon completion of the work, remove all unused materials from the site. Clean floors, walls and other adjacent surfaces that are stained, marred or otherwise damaged by this work. Leave all work and the adjacent areas in a clean condition.
- B. Protect all completed work from damage, by methods recommended by the manufacturer of installed material.

3.11 SYSTEMS AND APPLICATION SCHEDULE

A.	CONSTRUCTION CONDITION	UL DESIGNATION
B.	Metal Pipe or Conduit	220, 221, 223
	1. Through Round Opening	316, 400, 425
C.	Insulated Metal Pipe	301, 310, 402, 403
	1. Through Round Opening	
D.	Metal Pipes or Conduits	399
	1. Through Large Openings	
E.	Cables Through Opening	222, 224, 307, 425
F.	Nonmetallic (Plastic) Pipe	300
	1. or Conduit through Opening	
G.	Metal Pipe or Conduit	425
	1. Through Gypsum Board Wall	
H.	Nonmetallic (Plastic) Pipe	226, 227, 228, 312

1. or Conduit Through Gypsum
2. Board Wall

I.	Cables Through Gypsum	425
1.	Board Wall	
J.	Mixed Penetrating Items	218, 219
K.	1. Ductwork Insulated	301
	1. Through Gypsum Board Wall in	227, 313
	2. Sleeve Opening	
L.	1. Ductwork	218, 219
	1. 2 Hr Gypsum Wall	312

3.12 PROVIDE ADDITIONAL UL DESIGNATION AS REQUIRED TO ACHIEVE FIRESTOPPING RATINGS EQUAL TO OR GREATER THAN ASSEMBLY PENETRATION.

END OF SECTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Interior expansion control systems.
 - 2. Exterior wall expansion control systems.

1.03 ACTION SUBMITTALS

- A. Shop Drawings: For each expansion control system specified. Include plans, elevations, sections, details, splices, blockout requirement, attachments to other work, and line diagrams showing entire route of each expansion control system. Where expansion control systems change planes, provide isometric or clearly detailed drawing depicting how components interconnect.
- B. Samples: For each exposed expansion control system and for each color and texture specified, full width by 6 inches (152 mm) long in size.
- C. Product Schedule: Prepared by or under the supervision of the supplier. Include the following information in tabular form:
 - 1. Manufacturer and model number for each expansion control system.
 - 2. Expansion control system location cross-referenced to Drawings.
 - 3. Nominal joint width.
 - 4. Movement capability.
 - 5. Classification as thermal or seismic.
 - 6. Materials, colors, and finishes.
 - 7. Product options.

1.04 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each fire barrier provided as part of an expansion control system, for tests performed by a qualified testing agency.

PART 2 - PRODUCTS

2.01 SYSTEM DESCRIPTION

- A. General: Provide expansion control systems of design, basic profile, materials, and operation indicated. Provide units with capability to accommodate variations in adjacent surfaces.
 - 1. Furnish units in longest practicable lengths to minimize field splicing. Install with hairline mitered corners where expansion control systems change direction or abut other materials.
 - 2. Include factory-fabricated closure materials and transition pieces, T-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous expansion control systems.

- B. Coordination: Coordinate installation of exterior wall expansion control systems with roof expansion control systems to ensure that wall transitions are watertight. Roof expansion joint assemblies are specified elsewhere.

2.02 MATERIALS

- A. Aluminum: ASTM B221, Alloy 6005A-T61, 6063-T5, 6061-T5, 6105-T5 for extrusions; ASTM B209, Alloy 6061-T6, 3003-H14, 5005-H34 for sheet and plate.
 - 1. Apply manufacturer's standard protective coating on aluminum surfaces to be placed in contact with cementitious materials.
 - 1. Mill Finish: AA-M10 (Mechanical Finish: as fabricated, unspecified).
 - 2. 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.
 - 3. Class II, Color Anodic Finish: AA-M12C22A32/A34 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, integrally colored or electrolytically deposited color coating 0.010 mm or thicker) complying with AAMA 611. Color: As selected by the Architect from the manufacturer's full color offering.
 - 4. High-Performance Organic Finish (Two-Coat Fluoropolymer): AA-C12C40R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: conversion coating; Organic Coating: manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with AAMA 2604 and with coating and resin manufacturers' written instructions. AAMA 2604 and with coating and resin manufacturers' written instructions. Color: As selected by the Architect from the manufacturer's full color offering.
- B. Stainless Steel: ASTM A666, Type 304 for plates, sheet, and strips.
 - 1. Finish: No.4, directional satin.
 - a. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain 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. Brass: ASTM B36/B36M, UNS Alloy C26000 for half hard sheet and coil.
- D. Bronze: ASTM B455, Alloy C38500 for extrusions; Alloy C28000 Muntz Metal for plates.
- E. Elastomeric Seals: Preformed elastomeric membranes or extrusions to be installed in metal frames.
- F. Compression Seals: ASTM D2000; preformed rectangular elastomeric extrusions having internal baffle system and designed to function under compression.
- G. Fire Barriers: Any material or material combination, when fire tested after cycling, designated to resist the passage of flame and hot gases through a movement joint and to meet performance criteria for required rating period.
- H. Moisture Barrier: 7-ply laminate reinforced Polyethylene.

- I. Accessories: Manufacturer's standard anchors, clips, fasteners, set screws, spacers, and other accessories compatible with material in contact, as indicated or required for complete installations.

2.03 INTERIOR EXPANSION CONTROL SYSTEMS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated or a comparable product by one of the following:
 - 1. Construction Specialties, Inc.
 - 2. Balco, Inc.
 - 3. MM Systems Corporation.
- C. Source Limitations: Obtain expansion control systems from single source from single manufacturer.
- D. Floor-to-Floor :
 - 1. Basis-of-Design Product: Construction Specialties.
 - 2. Type: FLUSH THINLINE
 - 3. Model: GFT
 - 4. Design Criteria:
 - a. Nominal Joint Width: As indicated on Drawings.
 - b. Load Capacity:
 - 1) Uniform Load: 150 lb/sq. ft. (732 kg/sq. m) Insert load.
 - 2) Concentrated Load: 2000 lb (907 kg).
 - 3) Maximum Deflection: 0.5 inch (13 mm).
 - 5. Type: Cover plate.
 - a. Metal: Aluminum.
 - 1) Finish: Clear anodic, Class II.
- E. Floor-to-Wall :
 - 1. Basis-of-Design Product: Construction Specialties.
 - 2. Type: FLUSH THINLINE.
 - 3. Model: GFS-W
 - 4. Design Criteria:
 - a. Nominal Joint Width: 1 to 2 inch.
 - b. Type of Movement: Thermal.
 - 5. Type: Cover plate Elastomeric seal, recessed.
 - a. Metal: Aluminum.
 - 1) Finish: Clear anodic, Class II Manufacturer's standard.
 - b. Metal:
 - 1) Finish: Manufacturer's standard.
 - c. Seal Material: Manufacturer's standard.
 - 1) Color: As selected by Architect from manufacturer's full range.
- F. Wall-to-Wall:
 - 1. Basis-of-Design Product: Construction Specialties
 - 2. Type: FLUSH THINLINE.
 - 3. Model: FWF

4. Design Criteria:
 - a. Nominal Joint Width: As indicated on Drawings.
 - b. Type of Movement: Thermal.
 5. Type: Cover plate.
 - a. Metal: Aluminum.
 - 1) Finish: Clear anodic, Class II Manufacturer's standard.
- G. Wall Corner:
1. Basis-of-Design Product: Construction Specialties.
 2. Type: FLUSH THINLINE.
 3. Model: FWFC
 4. Design Criteria:
 - a. Nominal Joint Width: As indicated on Drawings.
 - b. Type of Movement: Thermal.
 5. Type: Cover plate.
 - a. Metal: Aluminum.
 - 1) Finish: Clear anodic, Class II Manufacturer's standard.
 - b. Seal Material: Manufacturer's standard.
 - 1) Color: As selected by Architect from manufacturer's full range.
- H. Wall-to-Ceiling:
1. Basis-of-Design Product: Construction Specialties.
 2. Type: FLUSH THINLINE.
 3. Model: FCFC
 4. Design Criteria:
 - a. Nominal Joint Width: As indicated on Drawings.
 - b. Type of Movement: Thermal.
 5. Type: Cover plate.
 - a. Metal: Aluminum.
 - 1) Finish: Clear anodic, Class II Manufacturer's standard.
 - b. Seal Material: Manufacturer's standard.
 - 1) Color: As selected by Architect from manufacturer's full range.

2.04 EXTERIOR WALL EXPANSION CONTROL SYSTEMS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
1. Construction Specialties, Inc. (Basis of Design)
 2. EMSEAL Corporation.
 3. MM Systems Corporation.
 4. Watson Bowman Acme Corp.; a BASF Construction Chemicals business.
- B. Wall-to-Wall:
1. Basis-of-Design Product: AFW-100X (1" joint).
 2. Design Criteria:
 - a. Nominal Joint Width: As indicated on Drawings.
 3. Type: Cover plate.
 - a. Metal: Aluminum.
 - 1) Finish: Clear Anodic, Class II.
 4. Type: Preformed cellular foam.
 - a. Foam Material: Manufacturer's standard.
 - 1) Color: As selected by Architect from manufacturer's full range.

- C. Wall Corner :
 - 1. Basis-of-Design Product: AFWC-100X (1" joint).
 - 2. Design Criteria:
 - a. Nominal Joint Width: As indicated on Drawings.
 - 3. Type: Cover plate.
 - a. Metal: Aluminum.
 - 1) Finish: Clear Anodic, Class II.
 - 4. Type: Preformed cellular foam.
 - a. Foam Material: Manufacturer's standard.
 - 1) Color: As selected by Architect from manufacturer's full range.

2.05 MATERIALS

- A. Aluminum: ASTM B221, Alloy 6063-T5 for extrusions; ASTM B209, Alloy 6061-T6 for sheet and plate.
 - 1. Apply manufacturer's standard protective coating on aluminum surfaces to be placed in contact with cementitious materials.
- B. Elastomeric Seals: ASTM E 1783; preformed elastomeric membranes or extrusions to be installed in metal frames.
- C. Cellular Foam Seals: Extruded, compressible foam designed to function under compression.
- D. Elastomeric Concrete: Modified epoxy or polyurethane extended into a prepackaged aggregate blend, specifically designed for bonding to concrete substrates.
- E. Fire Barriers: Any material or material combination, when fire tested after cycling, designated to resist the passage of flame and hot gases through a movement joint and to meet performance criteria for required fire-resistance rating.
- F. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.
- G. Accessories: Manufacturer's standard anchors, clips, fasteners, set screws, spacers, and other accessories compatible with material in contact, as indicated or required for complete installations.

2.06 GENERAL FINISH REQUIREMENTS

- 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.

2.07 ALUMINUM FINISH REQUIREMENTS

- 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

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine surfaces where expansion control systems will be installed for installation tolerances and other conditions affecting performance of work.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Prepare substrates according to expansion control system manufacturer's written instructions.
- B. Coordinate and furnish anchorages, setting drawings, and instructions for installing expansion control systems. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of expansion control systems.

3.03 INSTALLATION

- A. Comply with manufacturer's written instructions for storing, handling, and installing expansion control systems and materials unless more stringent requirements are indicated.
- B. Seals in Metal Frames: Install elastomeric seals and membranes in frames to comply with manufacturer's written instructions. Install with minimum number of end joints.
 - 1. Provide in continuous lengths for straight sections.
 - 2. Seal transitions according to manufacturer's written instructions. Vulcanize or heat-weld field-spliced joints as recommended by manufacturer.
 - 3. Installation: Mechanically lock seals into frames or adhere to frames with adhesive or pressure-sensitive tape as recommended by manufacturer.
- C. Foam Seals: Install with adhesive recommended by manufacturer.
- D. Terminate exposed ends of expansion control systems with field- or factory-fabricated termination devices.

3.04 PROTECTION

- A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.
- B. Protect the installation from damage by work of other Sections. Where necessary due to heavy construction traffic, remove and properly store cover plates or seals and install temporary

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protection over expansion control systems. Reinstall cover plates or seals prior to Substantial Completion of the Work.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Non-fire-rated hollow metal frames for non-hollow metal doors.
- B. Fire-rated hollow metal frames for non-hollow metal doors.
- C. Interior glazed borrowed lite frames.

1.02 RELATED REQUIREMENTS

- A. Section 081416 - Flush Wood Doors: Non-hollow metal door for hollow metal frames.
- B. Section 087100 - Door Hardware: Hardware, silencers, and weatherstripping.
- C. Section 088000 - Glazing: Glazed borrowed lites.
- D. Section 099123 - Interior Painting: Field painting.

1.03 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2011.
- C. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2014.
- D. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2011.
- E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
- F. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2018.
- G. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2018a.
- H. ASTM C476 - Standard Specification for Grout for Masonry; 2016.
- I. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2015a.
- J. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2016.
- K. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- L. ITS (DIR) - Directory of Listed Products; current edition.

- M. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.
- N. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.
- O. NAAMM HMMA 840 - Guide Specifications For Receipt, Storage and Installation of Hollow Metal Doors and Frames; 2007.
- P. NFPA 80 -Standard for Fire Doors and Other Opening Protectives; 2013
- Q. UL (DIR) - Online Certifications Directory; Current Edition.
- R. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; 2009

1.04 SUBMITTALS

- A. See Section 013300 - SUBMITTALS for submittal procedures.
- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced grade standard.
- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and identifying location of different finishes, if any.
- D. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.
- E. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store in accordance with applicable requirements and in compliance with standards and/or custom guidelines as indicated.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Hollow Metal Frames with Integral Casings:
 - 1. Ceco Door, an Assa Abloy Group company: www.assaabloydss.com.
 - 2. Republic Doors: www.republicdoor.com.
 - 3. Steelcraft, an Allegion brand: www.allegion.com/sle.
 - 4. Or approved equal.

2.02 PERFORMANCE REQUIREMENTS

- A. Refer to Door and Frame Schedule on the drawings for frame sizes, fire ratings, sound ratings, finishing, door hardware to be installed, and other variations, if any.
- B. Door Frame Type: Provide hollow metal door frames with integral casings.
- C. Steel used for fabrication of frames shall comply with one or more of the following requirements; Galvannealed steel conforming to ASTM A653/A653M, cold-rolled steel conforming to ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel conforming to ASTM A1011/A1011M, Commercial Steel (CS) Type B for each.
- D. Accessibility: Comply with ICC A117.1 and ADA Standards.
- E. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings. Style: Flush.
- F. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior frame that is also indicated as being sound-rated must comply with the requirements specified for exterior frames and for sound-rated frames; where two requirements conflict, comply with the most stringent.
- G. Hardware Preparations, Selections and Locations: Comply with BHMA A156.115, NAAMM HMMA 830 and NAAMM HMMA 831 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- H. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.
- I. Mullions for Pairs of Doors: Fixed, except where removable is indicated, with profile similar to jambs.
- J. Frames for Interior Glazing or Borrowed Lites: Construction and face dimensions to match door frames, and as indicated on drawings.
- K. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inch high (102 mm) to fill opening without cutting masonry units.

2.03 HOLLOW METAL DOOR FRAMES WITH INTEGRAL CASINGS

- A. Frame Finish: Factory primed and field finished.
- B. Interior Door Frames, Non-Fire Rated: Full profile/continuously welded type.
 - 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 3 - Extra Heavy-duty.
 - b. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Frame Metal Thickness: 16 gauge, 0.053 inch (1.3 mm), minimum.
- C. Fire-Rated Door Frames:
 - 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).

- a. Level 3 - Extra Heavy-duty.
 - b. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Frame Metal Thickness: 16 gauge, 0.053 inch (1.3 mm), minimum.
2. Fire Rating: As indicated on Door and Frame Schedule, tested in accordance with UL 10C or NFPA 252 ("positive pressure fire tests").
3. Provide units listed and labeled by ITS (DIR) or UL (DIR).
 - a. Attach fire rating label to each fire rated unit.

2.04 ACCESSORIES

- A. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions.
- B. Grout for Frames: Mortar grout complying with ASTM C476 with maximum slump of 4 inches (102 mm) as measured in accordance with ASTM C143/C143M for hand troweling in place; plaster grout and thinner pumpable grout are prohibited.
- C. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

2.05 FINISHES

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.
- B. Bituminous Coating: Asphalt emulsion or other high-build, water-resistant, resilient coating.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Verify that finished walls are in plane to ensure proper door alignment.

3.02 PREPARATION

- A. Coat inside of frames with bituminous coating to a thickness of 1/16 inch.

3.03 INSTALLATION

- A. Install frames in accordance with manufacturer's instructions and related requirements of specified frame standards or custom guidelines indicated.
- B. Install fire rated units in accordance with NFPA 80.
- C. Coordinate frame anchor placement with wall construction.
- D. Coordinate installation of glazing.
- E. Coordinate installation of hardware.

- F. Coordinate installation of electrical connections to electrical hardware items.

3.04 TOLERANCES

- A. Maximum Diagonal Distortion: 1/16 inch (1.6 mm) measured with straight edges, crossed corner to corner.

3.05 SCHEDULE

- A. Refer to Door and Frame Schedule on the drawings.

END OF SECTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Solid-core doors with wood-veneer faces.
 - 2. Factory finishing flush wood doors.
 - 3. Factory fitting flush wood doors to frames and factory machining for hardware.
 - 4. Louvers installed in flush wood doors.
 - 5. Light frames and glazing installed in wood doors.

1.03 ACTION SUBMITTALS

- A. Product Data: For each type of door. Include details of core and edge construction, louvers, and trim for openings. Include factory-finishing specifications.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:
 - 1. Dimensions and locations of blocking.
 - 2. Dimensions and locations of mortises and holes for hardware.
 - 3. Dimensions and locations of cutouts.
 - 4. Undercuts.
 - 5. Requirements for veneer matching.
 - 6. Doors to be factory finished and finish requirements.
 - 7. Fire-protection ratings for fire-rated doors.
- C. Samples for Verification:
 - 1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish.
 - 2. Louver blade and frame sections, 6 inches long, for each material and finish specified.
 - 3. Frames for light openings, 6 inches long, for each material, type, and finish required.

1.04 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For special warranty.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body and is a certified participant in AWI's Quality Certification Program.
- B. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body.
- C. Fire Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated,

based on testing at positive pressure according to NFPA 252 (neutral pressure at 40" above sill) or UL 10C.

1. Oversize Fire Rated Door Assemblies: For units exceeding sizes of tested assemblies provide manufacturer's construction label, indicating compliance to independent 3rd party certification agency's procedure, except for size.
 2. Temperature Rise Limit: Where required and at vertical exit enclosures (stairwell openings) and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire test exposure.
- D. Smoke Control Door Assemblies: Comply with NFPA 105.
1. Smoke "S" Label: Doors to bear "S" label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in cardboard cartons and wrap bundles of doors in plastic sheeting.
- C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.07 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during remainder of construction period.

1.08 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Warping (bow, cup, or twist) more than 1/4 inch in a 42 by 84-inch section.
 - b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3 inch span.
 2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
 3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 1. Eggers Industries
 2. Graham Wood Doors; an Assa Abloy Group company
 3. Marshfield - Algoma; a Masonite company
- B. Source Limitations: Obtain flush wood doors indicated to be blueprint matched with paneling from single manufacturer.

2.02 FLUSH WOOD DOORS, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with AWI's, AWMAC's, and WI's "Architectural Woodwork Standards WDMA I.S. 1A, "Architectural Wood Flush Doors."
 - 1. Provide AWI Quality Certification Labels indicating that doors comply with requirements of grades specified.
 - 2. Contract Documents contain selections chosen from options in quality standard and additional requirements beyond those of quality standard. Comply with those selections and requirements in addition to quality standard.
- B. ICC A117.1 - Accessible and Usable Buildings and Facilities.
- C. WDMA I.S. 1A Performance Grade: Heavy Duty and Extra Heavy Duty as specified.
- D. WDMA I.S. 1A Performance Grade:
 - 1. Heavy Duty unless otherwise indicated.
 - 2. Extra Heavy Duty: public toilets, janitor's closets and assembly spaces.
 - 3. Standard Duty: Closets (not including janitor's closets) .
- E. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
 - 1. Temperature-Rise Limit: Where indicated, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.
 - 2. Cores: Provide core specified or mineral core as needed to provide fire-protection rating indicated.
 - 3. Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.

2.03 VENEER-FACED DOORS FOR TRANSPARENT FINISH

- A. Interior Solid-Core Doors:
 - 1. Grade: Premium with Grade A faces.
 - 2. Species: White Oak.
 - 3. Cut: Rotary cut.
 - 4. Match between Veneer Leaves: Book match.
 - 5. Room Match: Provide door faces of compatible color and grain within each separate room or area of building.
 - 6. Exposed Vertical and Top Edges: Same species as faces - edge Type A.
 - 7. Core: Either glued wood stave or structural composite lumber.
 - 8. Construction: Five or seven plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering. Faces are bonded to core using a hot press.
 - 9. WDMA I.S. 1A1-A Performance Grade: Extra Heavy Duty.

2.04 LIGHT FRAMES AND LOUVERS

- A. Wood-Veneered Beads for Light Openings in Fire-Rated Doors: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces and approved for

use in doors of fire-protection rating indicated. Include concealed metal glazing clips where required for opening size and fire-protection rating indicated.

1. Anemostat Door Products; WoodPro Wood Veneer FR Metal Vision Frame with no visible fasteners, for 3/16" or 1/4" glazing, Species: White Oak, finish to match door face panels.
 2. or approved equal.
- B. Metal Vision Light Frames for Fire Rated Doors: 18 and 20 gauge cold rolled steel, Custom Color Baked Enamel finish, Type M4 as per WDMA I.S. 1A as manufactured by one of the following:
1. Anemostat Door Products; LoPro Metal Vision Frames for 1/4" or 5/16" glazing and StormPro-HR Hurricane Rated Metal Vision Frame.
 2. or approved equal.
- C. Metal Louvers:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Air Louvers, Inc
 - b. Anemostat; a Mestek company
 - c. or approved equal.
 2. Blade Type: Vision-proof, inverted V, L4 Chevron as per WDMA I.S. 1A.
 3. Metal and Finish: Hot-dip galvanized steel, 0.040 inch thick, with baked-enamel or powder-coated finish.

2.05 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
1. Comply with NFPA 80 requirements for fire-rated doors.
- B. 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, BHMA A156.115W, and hardware templates.
1. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.
- C. Openings: Factory cut and trim openings through doors.
1. Light Openings: Trim openings with moldings of material and profile indicated.
 2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 - GLAZING.
 3. Louvers: Factory install louvers in prepared openings.

2.06 FACTORY FINISHING

- A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.
- B. Factory finish doors that are indicated to receive transparent finish.
- C. Transparent Finish:

1. Grade: Premium.
2. Finish: AWI's, AWMAC's, and WI's "Architectural Woodwork Standards" System 10. UV Curable, Water Based.
3. Finish: WDMA TR-6/OP-6 (Extra Heavy-Duty) and TR-4/OP-4 (Heavy-Duty) catalyzed polyurethane.
4. Staining: As selected by Architect from manufacturer's full range.
5. Effect: Semi-filled finish, produced by applying an additional finish coat to partially fill the wood pores or as selected by the architect.
6. Sheen: Semi-gloss.

PART 3 - EXECUTION

3.01 EXAMINATION

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

3.02 INSTALLATION

- A. Hardware: For installation, see Section 087100 - DOOR HARDWARE.
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
 1. Install fire-rated doors according to NFPA 80.
- C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
 1. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold unless otherwise indicated.
- D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- E. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.03 ADJUSTING

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

FLUSH WOOD DOORS
Irvington Union Free School District
Main Street School Renovations
Main Street School
SED No.: 66-04-02-02-0-001-016

H2M

END OF SECTION

SECTION 08 71 00 – DOOR HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Mechanical and electrified door hardware for:
 - a. Swinging doors.
 - b. Sliding doors.
 - c. Gates.
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 - Underwriters Laboratories

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.

6. Templates: After final approval of hardware schedule, provide templates for doors, frames and other work specified to be factory or shop prepared for door hardware installation.

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. Factory order acknowledgement numbers (for warranty and service)
 - d. Name, address, and phone number of local representative for each manufacturer.
 - e. Parts list for each product.
 - f. Final approved hardware schedule edited to reflect conditions as installed.
 - g. Final keying schedule
 - h. Copies of floor plans with keying nomenclature
 - i. Copy of warranties including appropriate reference numbers for manufacturers to identify project.
 - j. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.

E. Inspection and Testing:

1. Submit a written report of the results of functional testing and inspection for fire door assemblies, in compliance with NFPA 80.
 - a. Written report to be provided to the Owner and be made available to the Authority Having Jurisdiction (AHJ).
 - b. Report to include the door number for each fire door assembly, door location, door and frame material, fire rating, and summary of deficiencies.
2. Submit a written report of the results of functional testing and inspection for required egress door assemblies, in compliance with NFPA 101.
 - a. Written report to be provided to the Owner and be made available to the Authority Having Jurisdiction (AHJ).
 - b. Report to include the door number for each required egress door assembly, door location, door and frame material, fire rating, and summary of deficiencies.

1.04 QUALITY ASSURANCE

A. Qualifications and Responsibilities:

1. Supplier: Recognized architectural hardware supplier with record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that provides certified Architectural Hardware Consultant

(AHC) or Door Hardware Consultant (DHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.

- a. Warehousing Facilities: In Project's vicinity.
 - b. Scheduling Responsibility: Preparation of door hardware and keying schedules.
 - c. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies like those indicated for this Project.
 - d. Coordination Responsibility: Assist in coordinating installation of electronic security hardware with Architect and electrical engineers and provide installation and technical data to Architect and other related subcontractors.
 - 1) Upon completion of electronic security hardware installation, inspect and verify that all components are working properly.
 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 Underwriters Laboratories, 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 L Series: 3 year
 - 2) Exit Devices
 - a) Von Duprin: 3 year
 - 3) Closers
 - a) LCN 4000 Series: 30 year
 - 4) Accessories
 - a) Ives Continuous Hinges: Lifetime

1.08 MAINTENANCE

- A. Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.
- B. Turn over unused materials to Owner for maintenance purposes.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Approval of 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.
- B. Approval of products from manufacturers indicated in "Acceptable Manufacturers" is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer's product.
- C. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.02 MATERIALS

- A. Fasteners
 - 1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
 - 2. Furnish screws for installation with each hardware item. Finish exposed (exposed under any condition) 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 for hardware units exposed when door is closed except when no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless thru-bolts are required to fasten hardware securely. Review door specification and advise Architect if thru bolts are required.
 - 4. Install hardware with fasteners provided by hardware manufacturer.
- 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.

2.03 HINGES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

- a. Ives 5BB series

B. Requirements:

1. Provide hinges conforming to ANSI/BHMA A156.1.
2. Provide five knuckle, ball bearing hinges.
3. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:
 - a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
 - b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high
4. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:
 - a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
5. 2 inches or thicker doors:
 - a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
6. Adjust hinge width for door, frame, and wall conditions to allow proper degree of opening.
7. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
8. 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 FLUSH BOLTS

A. Manufacturers:

1. Scheduled Manufacturer:

- a. Ives

B. Requirements:

1. Provide automatic, constant latching, and manual flush bolts with forged bronze or stainless-steel face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch (305 mm) steel or brass rods at doors up to 90 inches (2286 mm) in height. For doors over 90 inches (2286 mm) in height increase top rods by 6 inches (152 mm) for each additional 6 inches (152 mm) of door height. Provide dust-proof strikes at each bottom flush bolt.

2.05 MORTISE LOCKS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

- a. Schlage L9000 series

B. Requirements:

1. Provide mortise locks conforming to ANSI/BHMA A156.13 Series 1000, Grade 1, and UL Listed for 3-hour fire doors.
2. Indicators: Where specified, provide indicator window measuring a minimum 2-inch x 1/2 inch with 180-degree visibility. Provide messages color-coded with full text and/or symbols, as scheduled, for easy visibility.
3. Provide locks manufactured from heavy gauge steel, containing components of steel with a zinc dichromate plating for corrosion resistance.
4. Provide lock case that is multi-function and field reversible for handing without opening case. Cylinders: Refer to "KEYING" article, herein.
5. Provide locks with standard 2-3/4 inches (70 mm) backset with full 3/4 inch (19 mm) throw stainless steel mechanical anti-friction latchbolt. Provide deadbolt with full 1-inch (25 mm) throw, constructed of stainless steel.
6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
7. Provide electrified options as scheduled in the hardware sets. Where scheduled, provide switches and sensors integrated into the locks and latches. Provide motor based electrified locksets that comply with the following requirements:
 - a. Universal input voltage – single chassis accepts 12 or 24VDC to allow for changes in the field without changing lock chassis.
 - b. Fail Safe/Fail Secure – changing mode between electrically locked (fail safe) and electrically unlocked (fail secure) is field selectable without opening the lock case
 - c. Low maximum current draw – maximum 0.4 amps to allow for multiple locks on a single power supply.
 - d. Low holding current – maximum 0.01 amps to produce minimal heat, eliminate "hot levers" in electrically locked applications, and to provide reliable operation in wood doors that provide minimal ventilation and air flow.
 - e. Connections – provide quick-connect Molex system standard.

8. Lever Trim: Solid brass, bronze, or stainless steel, cast or forged in design specified, with wrought roses and external lever spring cages. Provide thru-bolted levers with 2-piece spindles.
 - a. Lever Design: 06A.

2.06 EXIT DEVICES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

- a. Von Duprin 98/35A series

B. Requirements:

1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide smooth touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.
4. Touchpad must extend a minimum of one half of door width. No plastic inserts are allowed in touchpads.
5. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrified requirements.
6. Provide exit devices with weather resistant components that can withstand harsh conditions of various climates and corrosive cleaners used in outdoor pool environments.
7. Provide flush end caps for exit devices.
8. Provide exit devices with manufacturer's approved strikes.
9. Provide exit devices cut to door width and height. Install exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
10. Mount mechanism case flush on face of doors or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
11. Provide cylinder or hex-key dogging as specified at non fire-rated openings.
12. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion, provide type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.
13. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.
14. Provide electrified options as scheduled.
15. Top latch mounting: double- or single-tab mount for steel doors, face mount for aluminum doors eliminating requirement of tabs, and double tab mount for wood doors.
16. Provide exit devices with optional trim designs to match other lever and pull designs used on the project.
17. Special Options:
 - a. Provide dogging indicators for visible indication of dogging status.

2.01 CYLINDERS

A. Manufacturer and Product:

1. Scheduled Manufacturer and Product: Schlage Specified.

B. Requirements:

1. Provide FSIC cores compliant with ANSI/BHMA A156.5; latest revision, Section 12, Grade 1; permanent cores; cylinder face finished to match lockset, manufacturer's series as indicated. Refer to "KEYING" article, herein.
2. Cores to be Schlage Primus.
3. Nickel silver bottom pins.
4. Replaceable Construction Cores.
 - a. Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
 - 1) 12 construction change (day) keys.
 - b. Owner or Owner's Representative will replace temporary construction cores with permanent cores.

2.02 KEY CONTROL SYSTEM

A. Manufacturers:

1. Scheduled Manufacturer:
 - a. Telkee

B. Requirements:

1. Provide key control system, including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by system manufacturer, with capacity for 150% of number of locks required for Project.
 - a. Provide complete cross index system set up by hardware supplier, and place keys on markers and hooks in cabinet as determined by final key schedule.
 - b. Provide hinged-panel type cabinet for wall mounting.

2.03 DOOR CLOSERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

- a. LCN 4010/4110 series

B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. Certify surface mounted mechanical closers to meet fifteen million (15,000,000) full load cycles. 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 11/16-inch (17 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. When closers are parallel arm mounted, provide closers which mount within 6-inch (152 mm) top rail without use of mounting plate so that closer is not visible through vision panel from pull side.
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/BHMA 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.

2.04 PROTECTION PLATES

A. Manufacturers:

1. Scheduled Manufacturer:

- a. Ives

B. Requirements:

1. Provide protection plates with a minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
2. Sizes plates 2 inches (51 mm) less width of door on single doors, pairs of doors with a mullion, and doors with edge guards. Size plates 1 inch (25 mm) less width of door on pairs without a mullion or edge guards.
3. At fire rated doors, provide protection plates over 16 inches high with UL label.

2.05 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

A. Manufacturers:

1. Scheduled Manufacturers:

- a. Glynn-Johnson

B. Requirements:

1. Provide overhead stop at any door where conditions do not allow for a wall stop or floor stop presents tripping hazard.
2. Provide friction type at doors without closer and positive type at doors with closer.

2.06 DOOR STOPS AND HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer:

- a. Ives

B. Provide door stops at each door leaf:

1. Provide wall stops wherever possible. Provide concave type where lockset has a push button of thumbturn.
2. Where a wall stop cannot be used, provide universal floor stops.
3. Where wall or floor stop cannot be used, provide overhead stop.
4. Provide roller bumper where doors open into each other and overhead stop cannot be used.

2.07 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

A. Manufacturers:

1. Scheduled Manufacturer:

- a. Zero International

B. Requirements:

1. Provide thresholds, weather-stripping, and gasketing systems as specified and per architectural details. Match finish of other items.
2. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
3. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.
4. Size thresholds 1/2 inch (13 mm) high by 5 inches (127 mm) wide by door width unless otherwise specified in the hardware sets or detailed in the drawings.
5. All surface applied seals shall be installed uninterrupted three side of the frame. Provide mounting brackets for the proper mounting of closers, overhead stops, and strikes.

2.08 SILENCERS

A. Manufacturers:

1. Scheduled Manufacturer:

- a. Ives

B. Requirements:

1. Provide "push-in" type silencers for hollow metal or wood frames.
2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
3. Omit where gasketing is specified.

2.09 FINISHES

A. Finish: BHMA 626/652 (US26D); except:

1. Hinges at Exterior Doors: BHMA 630 (US32D)
2. Aluminum Geared Continuous Hinges: BHMA 628 (US28)
3. Push Plates, Pulls, and Push Bars: BHMA 630 (US32D)
4. Protection Plates: BHMA 630 (US32D)
5. Overhead Stops and Holders: BHMA 630 (US32D)
6. Door Closers: Powder Coat to Match
7. Wall Stops: BHMA 630 (US32D)
8. Latch Protectors: BHMA 630 (US32D)
9. Weatherstripping: Clear Anodized Aluminum
10. Thresholds: Mill Finish Aluminum

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance. Verify doors, frames, and walls have been properly reinforced for hardware installation.
- B. 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 PREPARATION

- A. Where on-site modification of doors and frames is required:
 - 1. Carefully remove existing door hardware and components being reused. Clean, protect, tag, and store in accordance with storage and handling requirements specified herein.
 - 2. Field modify and prepare existing doors and frames for new hardware being installed.
 - 3. When modifications are exposed to view, use concealed fasteners, when possible.
 - 4. Prepare hardware locations and reinstall in accordance with installation requirements for new door hardware and with:
 - a. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.
 - b. Wood Doors: DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."
 - c. Doors in rated assemblies: NFPA 80 for restrictions on on-site door hardware preparation.

3.03 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 each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.
- C. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.

- D. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.
- E. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- F. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.
- G. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated.
- H. 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.
- I. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
- J. 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.
- K. Closer/Holders: Mount closer/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.
- L. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."
- M. 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.
- N. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- O. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- P. Door Bottoms and Sweeps: Apply to bottom of door, forming seal with threshold when door is closed.

3.04 FIELD QUALITY CONTROL

A. Inspection and Testing:

1. Provide functional testing and inspection of fire door assemblies by a qualified person in accordance with NFPA 80.
 - a. Schedule fire door assembly inspection within 90 days of Substantial Completion of the Project.
 - b. Submit a signed, written final report as specified in Paragraph 1.03.E.1.
 - c. Correct all deficiencies and schedule a reinspection of fire door assemblies noted as deficient on the inspection report.
 - d. Inspector to reinspect fire door assemblies after repairs are made.
2. Provide inspection of required egress door assemblies by a qualified person in accordance with NFPA 101.
 - a. Schedule egress door assembly inspection within 90 days of Substantial Completion of the Project for the required openings.
 - b. Submit a signed, written final report as specified in Paragraph 1.03.E.2.
 - c. Correct all deficiencies and schedule a reinspection of egress door assemblies noted as deficient on the inspection report.
 - d. Inspector to reinspect required egress door assemblies after repairs are made.

3.05 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.

3.06 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.








3.07 DOOR HARDWARE SCHEDULE

- A. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.
- B. Discrepancies, conflicting hardware, and missing items are to be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application.
- C. Hardware items are referenced in the following hardware schedule. Refer to the above specifications for special features, options, cylinders/keying, and other requirements.
- D. Hardware Sets:

Abbreviation	Name
GLY	Glynn-Johnson Corp
IVE	H.B. Ives
LCN	Lcn Commercial Division
SCH	Schlage Lock Company
VON	Von Duprin
ZER	Zero International Inc










61365 OPT0232428 Version 1
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		652	IVE
1	EA	OFFICE W/SIM RETRACT	L9056T 06A L583-363		626	SCH
1	EA	FSIC CORE	23-030 CKC		626	SCH
1	EA	OH STOP	100S		630	GLY
1	EA	SURFACE CLOSER	4111 EDA		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		626	IVE
1	EA	GASKETING	488SFBK (THREE SIDES OF THE FRAME)		BK	ZER

Hardware Group No. 02

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
8	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	EA	MANUAL FLUSH BOLT	FB358		626	IVE
1	EA	DUST PROOF STRIKE	DP2		626	IVE
1	EA	STOREROOM LOCK	L9080T 06A		626	SCH
1	EA	FSIC CORE	23-030 CKC		626	SCH
2	EA	OH STOP	100S		630	GLY
1	EA	SURFACE CLOSER	4111 EDA @ ACTIVE		689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS		626	IVE
2	EA	SILENCER	SR64		GRY	IVE

END OF SECTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 DEFINITIONS

- A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C1036.
- C. Interspace: Space between lites of an insulating-glass unit.
- D. Sealed Insulating Glass Unit Surface Designations:
 - 1. Surface #1 - Exterior surface of the outer glass lite
 - 2. Surface #2 - Interspace surface of the outer glass lite
 - 3. Surface #3 - Interspace surface of the inner glass lite
 - 4. Surface #4 - Interior surface of the inner glass lite or the interlayer surface of the first layer of laminated glass.
 - 5. Surface #5 - Interlayer surface of the second layer of laminated glass.
 - 6. Surface #6 - Interior surface of the second layer of laminated glass.

1.03 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Delegated Design: Design glass, including comprehensive engineering analysis according to ASTM E1300 by a qualified professional engineer, using the following design criteria:
 - 1. Design Wind Pressures: Determine design wind pressures applicable to Project according to ASCE/SEI 7, based on heights above grade indicated on Drawings.
 - a. Wind Design Data: As indicated on Drawings.
 - b. Basic Wind Speed: 120 mph.
 - c. Importance Factor: III.
 - 2. Design Snow Loads: As indicated on Drawings.
 - 3. Vertical Glazing: For glass surfaces sloped 15 degrees or less from vertical, design glass to resist design wind pressure based on glass type factors for short-duration load.
 - 4. Thickness of Patterned Glass: Base design of patterned glass on thickness at thinnest part of the glass.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
 - 1. Temperature Change: 120 deg F (49 deg C), ambient; 180 deg F (82 deg C), material surfaces.

1.04 ACTION SUBMITTALS

- A. Product Data: For each glass product and glazing material indicated.
- B. Glass Samples: For each type of the following products; 12 inches (300 mm) square.
 - 1. Tinted glass.
 - 2. Patterned glass.
 - 3. Coated glass.
 - 4. Fire-resistive glazing products.
 - 5. Insulating glass.
 - 6. Spandrel glass.
- C. Glazing Accessory Samples: For gaskets sealants and colored spacers, in 12-inch (300-mm) lengths. Install sealant Samples between two strips of material representative in color of the adjoining framing system.
- D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.
- E. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.05 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For installers manufacturers of insulating-glass units with sputter-coated, low-e coatings glass testing agency and sealant testing agency.
- B. Product Certificates: For glass and glazing products, from manufacturer.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for tinted glass coated glass insulating glass glazing sealants and glazing gaskets.
 - 1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.
- D. Warranties: Sample of special warranties.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.
- B. 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.
- C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C1021 to conduct the testing indicated.

- E. Source Limitations for Glass: Obtain tinted float glass coated float glass laminated glass and insulating glass from single source from single manufacturer for each glass type.
- F. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.
- G. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
 - 1. GANA Publications: GANA's "Laminated Glazing Reference Manual" and GANA's "Glazing Manual."
 - 2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- H. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- I. Fire-Protection-Rated Glazing Labeling: Permanently mark fire-protection-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, test standard, whether glazing is for use in fire doors or other openings, whether or not glazing passes hose-stream test, whether or not glazing has a temperature rise rating of 450 deg F (232 deg C), and the fire-resistance rating in minutes. Fire resistance rated assemblies must be tested in accordance with ASTM E119, Standard Test Methods for Fire Tests of Building Construction and Materials.
- J. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.
- K. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Install glazing in mockups specified in Section 084113 - Aluminum-Framed Entrances and Storefronts. and Section 084413 - Glazed Aluminum Curtain Walls, as applicable, to match glazing systems required for Project, including glazing methods.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with insulating-glass manufacturer's written recommendations for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.08 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).

1.09 WARRANTY

- A. 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.
- B. 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.
- C. 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

2.01 GLASS PRODUCTS, GENERAL

- A. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.
 - 1. Minimum Glass Thickness for Exterior Lites: Not less than 6.0 mm.
 - 2. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.
- B. Strength: Where float glass is indicated, provide annealed float glass, Kind HS heat-treated float glass, or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened glass is indicated, provide Kind HS\ heat-treated float glass or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.
- C. Windborne-Debris-Impact Resistance: Provide exterior glazing that passes enhanced-protection testing requirements in ASTM E1996 for Wind Zone 3 when tested according to ASTM E 1886. Test specimens shall be no smaller in width and length than glazing indicated for use on the Project and shall be installed in same manner as glazing indicated for use on the Project.
 - 1. Large-Missile Test: For all glazing, regardless of height above grade.

- D. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
1. For monolithic-glass lites, properties are based on units with lites 6.0 mm thick.
 2. For laminated-glass lites, properties are based on products of construction indicated.
 3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
 4. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F (W/sq. m x K).
 5. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
 6. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.02 GLASS PRODUCTS

- A. Heat-Treated Float Glass: ASTM C1048; Type I; Quality-Q3; Class I (clear) unless otherwise indicated; of kind and condition indicated.
1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
 2. For uncoated glass, comply with requirements for Condition A.
 3. For coated vision glass, comply with requirements for Condition C (other coated glass).
- B. Pyrolytic-Coated, Self-Cleaning, Low-Maintenance Glass: Clear float glass with a coating on first surface having both photocatalytic and hydrophilic properties that act to loosen dirt and to cause water to sheet evenly over the glass instead of beading.
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. Cardinal Glass Industries; LoE2 Plus
 - b. Pilkington North America; Activ
 - c. Vitro Architectural Glass Industries, Inc.; SunClean
- C. Tinted Float Glass: Class 2, complying with other requirements specified.
1. Basis-of-Design Product: Subject to compliance with requirements, provide glass by Vitro Architectural Glass or comparable product by one of the following:
 - a. EFCO.
 - b. Guardian Industries.
 2. Tint Color: As selected by the Architect.
- D. Spandrel Glass: ICD OPACI-COAT-300 Silicone Opacifier coating: ASTM C 1048, Kind FT, Condition B, Type I, Quality-Q3, and complying with other requirements specified.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Vitro Architectural Glass or comparable product by one of the following:
 2. Guardian Glass Products.
 3. Pilkington North America.
 4. Spandrel Coating Color: As selected by the Architect.
- E. Ceramic-Coated Spandrel Glass: ASTM C1048, Kind FT, Condition B, Type I, Quality-Q3, and complying with other requirements specified.
1. Basis-of-Design Product: Subject to compliance with requirements, provide PPG or comparable product by one of the following:
 2. Tint Color: Optigray

3. Ceramic Coating Color: Match.

2.03 LAMINATED GLASS

- A. Laminated Glass: ASTM C1172, 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. Construction: Laminate glass with polyvinyl butyral interlayer to comply with interlayer manufacturer's written recommendations.
 2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
 3. Interlayer Color: Clear unless otherwise indicated.
- B. Windborne-Debris-Impact-Resistant Laminated Glass: ASTM C1172, and complying with testing requirements in 16 CFR 1201 for Category II materials, with "Windborne-Debris-Impact Resistance" Paragraph in "Glass Products, General" Article, 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. Construction: Laminate glass with the following to comply with interlayer manufacturer's written recommendations:
 - a. Polyvinyl butyral interlayer.
 2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
 3. Interlayer Color: Clear unless otherwise indicated.
- C. Glass: Comply with applicable requirements in "Glass Products" Article as indicated by designations in "Laminated-Glass Types" Article.

2.04 INSULATING GLASS

- A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E2190, and complying with other requirements specified.
 1. Sealing System: Dual seal, with manufacturer's standard primary and secondary.
 2. Spacer: Manufacturer's standard spacer material and construction.
 3. Desiccant: Molecular sieve or silica gel, or blend of both.
- B. Glass: Comply with applicable requirements in "Glass Products" Article and in "Laminated Glass" Article as indicated by designations in "Insulating-Glass Types" Article and in "Insulating-Laminated-Glass Types" Article.

2.05 FIRE-PROTECTION-RATED GLAZING

- A. Fire-Protection-Rated Glazing, General: Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252 for door assemblies.
- B. Monolithic Ceramic Glazing: Clear, ceramic flat glass composed of glazing and fire-rated surface applied film, impact safety-rated glazing material, 3/16-inch (5-mm) nominal thickness.
 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. TGP; Firelite NT

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- b. Safti First; SuperLite C/P.
 - c. Schott North America, Inc.; Pyran
 - d. Vetrotech Saint-Gobain; SGG Keralite FR-R.
- C. Laminated Fire-Rated (20 to 180 minutes), High Impact Safety-Rated Ceramic Glass, Ultra-HD technology, 5/16 inch thickness meeting CPSC 16CFR1201 (Cat. I and II) and ANSI Z97.1 , withstands thermal shock. 5-year limited warranty. Surface Grade - Standard.
 - 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. TGP Firelite Plus
 - b. or approved equal
- D. Multi-laminate Fire-Rated (45 to 120 minutes), Impact Safety-Rated Fireglass multi-laminate glass with clear intumescent interlayers, interior and exterior use, meets CPSC 16CFR1201 (Cat. I and II) and ANSI Z97.1 and providing protection against radiant and conductive heat transfer as per ASTM E119 and UL 263, withstands thermal shock. 5-year limited warranty. .
 - 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. Pilkington Pyrostop: 45-200: 45 min., 3/4 inch thick, STC 40, U-Value - .86
 - b. or approved equal
- E. Fire-rated glazed assemblies requiring compliance to ASTM E119: Glazing shall be Pilkington PyroStop or approved equal. Glazing shall be Clear, laminated fully insulating fire and impact-resistant glass or as selected by the Architect.

2.06 GLAZING GASKETS

- A. Dense Compression Gaskets: Molded or extruded gaskets of profile and hardness required to maintain watertight seal, made from one of the following:
 - 1. Neoprene complying with ASTM C864.
 - 2. EPDM complying with ASTM C864.
 - 3. Silicone complying with ASTM C1115.
 - 4. Thermoplastic polyolefin rubber complying with ASTM C1115.
- B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned neoprene EPDM gaskets complying with ASTM C 509, Type II, black; of profile and hardness required to maintain watertight seal.
 - 1. Application: Use where soft compression gaskets will be compressed by inserting dense compression gaskets on opposite side of glazing or pressure applied by means of pressure-glazing stops on opposite side of glazing.

2.07 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. Sealants used inside the weatherproofing 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."
 4. 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 C920, 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; 795
 - b. GE Advanced Materials - Silicones; SilPruf LM SCS2700
 - c. Pecora Corporation; 890
 - d. Sika Corporation, Construction Products Division; SikaSil-C990
 - e. Tremco Incorporated; Spectrem 1
- C. 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.

2.08 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
1. AAMA 804.3 tape, where indicated.
 2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
 3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
 2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.09 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 for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

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- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- F. Cylindrical Glazing Sealant Backing: ASTM C1330, 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.

2.10 FABRICATION OF GLAZING UNITS

- 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.

2.11 MONOLITHIC-GLASS TYPES

- A. Glass Type MG-1: Clear fully tempered float glass.
 - 1. Thickness: 1/4 inch (6.0 mm).
 - 2. Provide safety glazing labeling.
- B. Glass Type MG-2: Polished wired glass.
 - 1. Thickness: 8.0 mm.
 - 2. Square (Baroque) wire pattern with applied 7 mil safety film.
 - 3. Weight: 3.0 lbs. / sq. ft.
 - 4. STC Rating: STC 28
 - 5. Manufacturer: SafliFirst "SuperI-W " or approved equal.
 - 6. CSPC 16 CFR 1201 Cat. I and II.

2.12 INTERIOR LAMINATED-GLASS TYPES

- A. Glass Type LG1: Clear laminated glass with two plies of fully tempered float glass with etched surface pattern.
 - 1. Thickness of Each Glass Ply: 3.0 mm.
 - 2. Interlayer Thickness: 0.090 inch (2.29 mm).
 - 3. Provide safety glazing labeling.
 - 4. Provide acid-etched banding as indicated on the drawings.
- B. Glass Type LG-2: Fire-rated laminated glass
 - 1. Thickness: 8.0 mm.
 - 2. Provide safety glazing label- CSPC 16 CFR 1201 Cat. I and II.
 - 3. Manufacturer: TGP Firelite Plus or approved equal.

2.13 EXTERIOR INSULATING GLASS TYPES

- A. Glass Type IG-1: Low-E coated, insulating glass.
 - 1. Overall Unit Thickness: 1 inch.
 - 2. Exterior Glass Lite: 1/4 inch tempered Solarban 60 Low-E (2) StarPhire glass.
 - 3. Interspace Content: Argon - 1/2 inch.
 - 4. Indoor Glass Lite: 1/4 inch tempered StarPhire glass.
 - 5. Visible Light Transmittance: 75 percent minimum.
 - 6. Winter Nighttime U-Factor: 0.24 maximum.
 - 7. Solar Heat Gain Coefficient: 0.41maximum.
- B. Glass Type IGL-2: Low-E coated, insulating glass.
 - 1. Overall Unit Thickness: 1 inch.
 - 2. Exterior Glass Lite: 1/4 inch tempered Optigray glass.
 - 3. Interspace Content: Argon - 1/2 inch.
 - 4. Indoor Glass Lite: 1/4 inch tempered Solarban 60 (3) StarPhire glass
 - 5. Visible Light Transmittance: 50 percent minimum.
 - 6. Winter Nighttime U-Factor: 0.24 maximum.
 - 7. Solar Heat Gain Coefficient: 0.35 maximum.
- C. Glass Type IG-3: Spandrel Glass - ICD OPACI-COAT-300 Silicone Opacifier coating, Low-E, insulating spandrel glass.
 - 1. Overall Unit Thickness: 1 inch.
 - 2. Thickness of Exterior Glass Lite: 1/4 inch fully tempered Solarban 60 (2) SolarGray glass.
 - 3. Interspace Content: Argon - 1/2 inch.
 - 4. Indoor Lite: 1/4 inch fully tempered Clear with ICD OPACI-COAT-300 Silicone Opacifier coating (4).
 - 5. Opacifier Color: ICD 3-4094 - Graylights or as selected by the Architect to match glazing system.
 - 6. Winter Nighttime U-Factor: 0.24 maximum.

2.14 EXTERIOR LAMINATED INSULATING GLASS TYPES

- A. Glass Type ILG-1: Low-e-coated, insulating glass.
 - 1. Overall Unit Thickness: 1.34 (with 0.090 PVB interlayer - 1/4" glass).
 - 2. Exterior Glass Lite: 1/4 inch fully tempered float glass, Solarban 60 Low-E(2) SolarGray
 - 3. Interspace Content: Argon - 1/2 inch.
 - 4. Indoor Glass Lite: 1/4 inch heat strengthened Clear - 0.090 inch Clear PVB - 1/4 inch heat strengthened Clear
 - 5. Visible Light Transmittance: 35 percent minimum.
 - 6. Winter Nighttime U-Factor: 0.24 maximum.
 - 7. Solar Heat Gain Coefficient: 0.25 maximum.
 - 8. Provide safety glazing labeling.
- B. Glass Type ILGL-2: Low-e coated, insulating glass.
 - 1. Overall Unit Thickness: 1.31 (with 0.060 PVB interlayer).
 - 2. Exterior Glass Lite: 1/8 inch Clear - 0.060 inch clear PVB -1/8 inch Clear.
 - 3. Outdoor Lite: Tinted fully tempered float glass.
 - 4. Interspace Content: Argon - 1/2 inch.
 - 5. Indoor Glass Lite: 1/4 fully tempered float glass, Solarban 60 Low E (5) on Clear glass.
 - 6. Visible Light Transmittance: 45 percent minimum.

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7. Winter Nighttime U-Factor: 0.24 maximum.
 8. Solar Heat Gain Coefficient: 0.34 maximum.
- C. Glass Type ILG-3: Spandrel Glass; Low-E, insulating spandrel glass.
1. Overall Unit Thickness: 1.31 (with 0.060 PVB interlayer).
 2. Exterior Glass Lite: 1/4 inch fully tempered float glass, Solarban 60 Low-E(2) SolarGray
 3. Interspace Content: Argon - 1/2 inch.
 4. Indoor Lite: 1/4 inch heat strengthened Clear with 0.060 clear PVB on 1/4 inch heat strengthened with Ceramic-Coated Spandrel Glass
 5. Ceramic Frit Color: Warm Gray
 6. Winter Nighttime U-Factor: 0.29 maximum.

PART 3 - EXECUTION

3.01 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. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- 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.

3.03 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.
- C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

- E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, 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.
- G. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).
 - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 - 2. Provide 1/8-inch (3-mm) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- J. Set glass lites with proper orientation so that coatings face exterior or interior as specified.
- K. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- L. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.04 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 necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing 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 right before each glazing unit is installed.
- F. Apply heel bead of elastomeric sealant.
- G. 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.

- H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.05 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks and press firmly against soft compression gasket 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. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

3.06 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings 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.

3.07 CLEANING AND PROTECTION

- A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove non-permanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing 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 buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.

- D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.
- E. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Sun control window films of the following types:
 - 1. Prestige sun control film.
 - 2. Ceramic sun control film.
 - 3. Night vision sun control film.
 - 4. Thinsulate window film
 - 5. Traditional series sun control film.
 - 6. Exterior series sun control film.
 - 7. Micro-replicated daylight redirecting film.
 - 8. All Season sun control film.

1.02 REFERENCES

- A. ASHRAE - American Society for Heating, Refrigeration, and Air Conditioning Engineers; Handbook of Fundamentals.
- B. ASTM International (ASTM):
 - 1. ASTM D882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting.
 - 2. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers -- Tension.
 - 3. ASTM D624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
 - 4. ASTM D1004 - Standard Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheeting.
 - 5. ASTM D 1044 - Standard Method of Test for Resistance of Transparent Plastics to Surface Abrasion (Taber Abrader Test).
 - 6. ASTM D2240 - Standard Method for Rubber Property - Durometer Hardness.
 - 7. ASTM D 2582 - Standard Test Method for Puncture-Propagation Tear Resistance of Plastic Film and Thin Sheeting.
 - 8. ASTM D 5895 - Standard Test Methods for Evaluating Drying or Curing During Film Formation of Organic Coatings Using Mechanical Recorders.
 - 9. ASTM D 4830 - Standard Test Methods for Characterizing Thermoplastic Fabrics Used in Roofing and Waterproofing.
 - 10. ASTM E84 - Standard Method of Test for Surface Burning Characteristics of Building Materials.
 - 11. ASTM E308 - Standard Recommended Practice for Spectrophotometry and Description of Color in CIE 1931 System.
 - 12. ASTM E903 - Standard Methods of Test for Solar Absorbance, Reflectance and Transmittance of Materials Using Integrating Spheres.
 - 13. ASTM E1886 - Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.
 - 14. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.
 - 15. ASTM F1642 - Standard Method of Test for Glazing and Glazing Systems Subject to Airblast Loadings
 - 16. ASTM F2912 - Standard Specification for Glazing and Glazing Systems Subject to Airblast Loadings.
 - 17. NFRC 100 / NFRC 200 - Standard Methods of Test for Solar Absorbance, Reflectance and Transmittance of Materials Using Integrating Spheres.

- C. Window 6.3 - A Computer Tool for Analyzing Window Thermal Performance; Lawrence Berkeley Laboratory.
- D. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.
- E. IES LM-83-12: IES Spatial Daylight Autonomy (sDA) and Annual Sunlight Exposure.
- F. Consumer Products Safety Commission 16 CFR, Part 1201 - Safety Standard for Architectural Glazing Materials.
- G. GSA TS01 - Standard Test for Glazing and Glazing Systems Subject to Airblast Loadings.
- H. ISO 16933, International Standard for Glass in Building: Explosion-resistant security glazing - Test and classification for arena air-blast testing.
- I. Underwriters Laboratories Inc. (UL): UL 972 - Burglary Resisting Glazing Material.

1.03 DEFINITIONS

- A. Light to Solar Gain Ratio: The ratio of visible light transmission to Solar Heat Gain Coefficient.

1.04 PERFORMANCE REQUIREMENTS

- A. Fire Performance: Surface burning characteristics when tested in accordance ASTM E84:
 - 1. Flame Spread: 25, maximum.
 - 2. Smoke Developed: 450, maximum.
- B. Abrasion Resistance: Film must have a surface coating that is resistant to abrasion such that, less than 5 percent increase of transmitted light haze will result in accordance with ASTM D 1044 using 50 cycles, 500 grams weight, and the CS10F Calbrase Wheel.

1.05 SUBMITTALS

- A. Submit under provisions of Section 013300 - SUBMITTALS.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Verification Samples: For each finish product specified, two samples representing actual product, color, and patterns.
- D. Performance Submittals: Provide laboratory data of emissivity and calculated window U-Factors for various outdoor temperatures based upon established calculation procedure defined by the ASHRAE Handbook of Fundamentals, Chapter 29, or Lawrence Berkeley Laboratory Window 5.2 Computer Program.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: All primary products specified in this section will be supplied by a single manufacturer with a minimum of ten (10) years experience.
 - 1. Provide documentation that the adhesive used on the specified films is a Pressure Sensitive Adhesive (PSA).

- B. Installer Qualifications: All products listed in this section are to be installed by a single installer with a minimum of five (5) years demonstrated experience in installing products of the same type and scope as specified.
1. Provide documentation that the installer is authorized by the Manufacturer to perform Work specified in this section.
 2. Provide a commercial building reference list of 5 properties where the installer has applied window film. This list will include the following information:
 - a. Name of building.
 - b. The name and telephone number of a management contact.
 - c. Type of glass.
 - d. Type of film and/or film attachment system.
 - e. Amount of film and/or film attachment system installed.
 - f. Date of completion.
 3. Provide a Glass Stress Analysis of the existing glass and proposed glass/film combination as recommended by the film Manufacturer.
 4. Provide an EFilm application analysis to determine available energy cost reduction and savings.
- C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
1. Finish areas designated by Architect.
 2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
 3. Refinish mock-up area as required to produce acceptable work.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Follow manufacturer's instructions for storing and handling.
- B. Store products in manufacturer's unopened packaging until ready for installation.

1.08 PROJECT 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. At project closeout, provide to Owner or Owners Representative an executed current copy of the manufacturer's standard limited warranty against manufacturing defect, outlining its terms, conditions, and exclusions from coverage.
- B. In order to validate warranty, installation must be performed by an Authorized 3M dealer and according to Manufacturer's installation instructions. Verification of Authorized 3M dealer can be confirmed by submission of active 3M dealer code number.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturer: 3M Commercial Solutions, which is located at: 3M Center Bldg. 220-12-E-04; St. Paul, MN 55144-1000; Toll Free Tel: 888-650-3497; Tel: 651-737-1081; Fax: 651 737 8241; Email: [request info \(tdjohnson3@mmm.com\).](mailto:request info (tdjohnson3@mmm.com).)

- B. Area authorized 3M Dealer: Layr: Tel: 888-888-8000; Email: info@layr.com; Web: www.layr.com
- C. Substitutions: Not permitted.

2.02 3M PRESTIGE SUN CONTROL FILM

- A. Physical Properties:
 - 1. Composition: Optically clear polyester film containing at least 220 layers and incorporating pressure sensitive adhesive on one side and an acrylic abrasion resistant coating on the other. nanotechnology represents a breakthrough in technology due to the enhanced heat, UV and IR rejection, without the presence of any metals. The film does not contain dyes.
 - 2. Uniformity: No noticeable pin holes, streaks, thin spots, scratches, banding or other optical defects.
 - 3. Variation in Total Transmission across the Width: Less than 2 percent over the average at any portion along the length.
 - 4. Thickness: Nominal 2.0 mils (0.1mm) with no evidence of coating voids.
 - 5. Identification: Labeled as to Manufacturer as listed in this Section.
- B. Performance, Prestige 50 - Lightly Tinted Film, nanotechnology, no metal and at least 220 plus layers applied to 1/4 Inch (6.4 mm) Thick Clear Glass:
 - 1. Visible Light Transmission (ASTM E 84): 50 percent.
 - 2. Visible Reflection - Exterior (NFRC 100/200): 8 percent.
 - 3. Visible Reflection - Interior (NFRC 100/200): 7 percent.
 - 4. Ultraviolet Rejected (NFRC 100/200): 99.9 percent.
 - 5. Infrared Energy Rejected (NFRC 100/200): 97 percent; as measured between 900-1000 nm.
 - 6. Light to Solar Gain Ratio: 1.1.
 - 7. Solar Heat Gain Coefficient at 90 Degrees (Normal Incidence) (NFRC 100/200): 0.44.
 - 8. Total Solar Energy Rejected (TSER) at 90 Degrees (Normal Incidence) (NFRC 100/200): 56 percent.
 - 9. Total Solar Energy Rejected (TSER) at 60 Degrees (NFRC 100/200): 63 percent.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Film Examination:
 - 1. If preparation of glass surfaces is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.
 - a. Glass surfaces receiving new film should first be examined to verify that they are free from defects and imperfections, which will affect the final appearance.
 - 2. Do not proceed with installation until glass surfaces have been properly prepared and deviations from manufacturer's recommended tolerances are corrected. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result under the project conditions.
 - 3. Commencement of installation constitutes acceptance of conditions.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

- C. Refer to Manufacturer's installation instructions for methods of preparation for Impact Protection Adhesive or Impact Protection Profile film attachment systems

3.03 INSTALLATION, GENERAL

- A. General: Install in accordance with manufacturer's instructions and the following.
 1. Cut film edges neatly and square at a uniform distance of 1/8 inch (3 mm) to 1/16 inch (1.5 mm) of window sealant.
 2. Spray the slip solution, composed of one capful of baby shampoo or dishwashing liquid to 1 gallon of water, on window glass and adhesive to facilitate proper positioning of film.
 3. Apply film to glass and lightly spray film with slip solution.
 4. Squeegee from top to bottom of window.
 5. Bump film edge with lint-free towel wrapped around edge of a 5-way tool.
 6. Upon completion of film application, allow 30 days for moisture from film installation to dry thoroughly, and to allow film to dry flat with no moisture dimples when viewed under normal viewing conditions.
 7. If completing an exterior application, check with the manufacturer as to whether edge sealing is required.
 - a. Daylight Redirection Film Installation:
 8. Install in accordance with manufacturer's instructions.
 - a. Film is intended for installation in clerestory windows, minimum 7 feet (2.13m) above finished floor space.
 - b. This film is directional - it has a top and a bottom. Identify and mark the top of the film.
 9. 1Pre-cut the film neatly and squarely to the proper height and width, approximately 1/4" (6 mm) shorter than the window opening prior to installation. Use a new blade tip after 3 to 4 cuts.
 10. 2Seal the left and right film edges with 3M 3950 Edge Sealer. Allow approximately 5-10 minutes for the edge sealer to dry.
 11. Spray the slip solution, composed of one capful of baby shampoo or dishwashing liquid to 1 gallon of water, on window glass and adhesive to facilitate proper positioning of film.
 12. 4Apply film to glass and spray film surface with slip solution. Squeegee from top to bottom of window with either horizontal or vertical strokes to ensure water is fully removed.
 13. Cut film edges neatly and squarely at a uniform distance of 1/8 inch (3 mm) from window sealant.
 14. Bump film edge with lint-free towel wrapped around edge of a 5-way tool, using a horizontal wiping motion.
 15. Upon completion of film application, allow 30 days for moisture from film installation to dry thoroughly, and to allow film to dry flat with no moisture dimples when viewed under normal viewing conditions

3.04 CLEANING AND PROTECTION

- A. Remove left over material and debris from Work area. Use necessary means to protect film before, during, and after installation.
- B. Touch-up, repair or replace damaged products before Substantial Completion.
- C. After application of film, wash film using common window cleaning solutions, including ammonia solutions, 30 days after application. Do not use abrasive type cleaning agents and bristle brushes to avoid scratching film. Use synthetic sponges or soft cloths.

END OF SECTION 088713

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Safety and security window film.
- B. Anti-graffiti window film.
- C. Film attachment systems.

1.02 REFERENCES

- A. ASHRAE - American Society for Heating, Refrigeration, and Air Conditioning Engineers; Handbook of Fundamentals.
- B. ASTM International (ASTM):
 - 1. ASTM D882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting.
 - 2. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension.
 - 3. ASTM D624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
 - 4. ASTM D1004 - Standard Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheeting.
 - 5. ASTM D1044 - Standard Method of Test for Resistance of Transparent Plastics to Surface Abrasion (Taber Abrader Test).
 - 6. ASTM D2240 - Standard Method for Rubber Property - Durometer Hardness.
 - 7. ASTM D2582 - Standard Test Method for Puncture-Propagation Tear Resistance of Plastic Film and Thin Sheeting.
 - 8. ASTM D5895 - Standard Test Methods for Evaluating Drying or Curing During Film Formation of Organic Coatings Using Mechanical Recorders.
 - 9. ASTM D4830 - Standard Test Methods for Characterizing Thermoplastic Fabrics Used in Roofing and Waterproofing.
 - 10. ASTM E84 - Standard Method of Test for Surface Burning Characteristics of Building Materials.
 - 11. ASTM E903 - Standard Methods of Test for Solar Absorbance, Reflectance and Transmittance of Materials Using Integrating Spheres.
 - 12. ASTM E1886 - Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.
 - 13. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.
 - 14. ASTM F1642 - Standard Method of Test for Glazing and Glazing Systems Subject to Airblast Loadings.
 - 15. ASTM F2912 - Standard Specification for Glazing and Glazing Systems Subject to Airblast Loadings.
- C. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.
- D. Consumer Products Safety Commission 16 CFR, Part 1201 - Safety Standard for Architectural Glazing Materials.
- E. GSA-TS01-2003 -- Standard Test for Glazing and Glazing Systems Subject to Airblast Loadings.

- F. ISO 16933, International Standard for Glass in Building: Explosion-resistant security glazing - Test and classification for arena air-blast testing.
- G. Underwriters Laboratories Inc. (UL): UL 972 - Burglary Resisting Glazing Material.

1.03 PERFORMANCE REQUIREMENTS

- A. Safety Glazing Impact Performance:
 - 1. 400 ft-lbs impact resistance, meeting ANSI Z97.1 (Class A, Unlimited) and 16 CFR 1201 (Category 2) impact requirements with film applied on 1/4 inch annealed glass.
- B. Blast Hazard Mitigation Performance:
 - 1. GSA Rating of "2" / ASTM F1642 "Minimal Hazard" with minimum blast load of 9 psi and 60 psi*msec, on 1 inch (25 mm) double pane glass and film attachment system.
- C. Impact Resistance and Pressure Cycling:
 - 1. ASTM E1996 / ASTM E1886: Small Missile "A", +/- 60 psf Design Pressure
- D. Tear Resistance:
 - 1. Minimum Graves Area Tear Strength of 1,000 lbs% as measured on coated film product, without liner, per ASTM D1004.
- E. Adhesion to Glass:
 - 1. Minimum 8 lbs/in peel strength per ASTM D3330 (Method A).
- F. Flammability: Surface burning characteristics when tested in accordance ASTM E 84, demonstrating film applied to glass rated Class A for Interior Use:
 - 1. Flame Spread Index: no greater than 25.
 - 2. Smoke Developed Index: no greater than 55.
- G. UV Light Rejection:
 - 1. Minimum of 99.9% UV light rejection (300 - 380 nm), per ASTM E903, as determined with film applied on 1/4 inch clear glass.

1.04 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
- B. Product Data: Manufacturer's current technical literature on each product to be used, including:
 - 1. Manufacturer's Data Sheets.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
 - 4. Installation methods.
- C. 3rd Party Test Report Submittal Requirements. Submit the following 3rd Party test reports indicating compliance with the test values listed in this section.
 - 1. Flammability Testing, ASTM E84.
 - 2. Film Properties Testing, ASTM D882.
 - 3. Abrasion Resistance Testing, ASTM D1044.
 - 4. Peel Strength Testing, ASTM D3330.
 - 5. Tear Resistance Testing, ASTM D1004.
 - 6. Puncture Strength Testing, ASTM D4830.
 - 7. Safety Glazing Impact Testing, ANSI Z97.1 and/or 16 CFR 1201.
 - 8. Burglary Resistance Glazing, UL 972
 - 9. Safety Glazing Impact Testing, ANSI Z97.1 and 16 CFR 1201.

10. Impact Resistance and Pressure Cycling, ASTM E1886 and ASTM E1996.
 11. Blast Hazard Mitigation Testing, ASTM F1642 / F2912 and/or GSA-TS01-2003.
- D. Other Product Submittals:
1. Manufacturer's summary of 3rd Party Blast Hazard Mitigation Testing, ASTM F1642 / F2912 and/or GSA-TS01-2003
 2. 3rd Party test reports from Forced Entry Resistance evaluations.
- E. Verification Samples: For each film specified, two samples representing actual film color and pattern.
- F. Performance Submittals: Provide laboratory data of emissivity and calculated window U-Factors for various outdoor temperatures based upon established calculation procedure defined by the ASHRAE Handbook of Fundamentals, Chapter 29, or Lawrence Berkeley Laboratory Window 5.2 Computer Program.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: All primary products specified in this section will be supplied by a single manufacturer with a minimum of ten years experience.
1. Provide documentation that the adhesive used on the specified film is a Pressure Sensitive Adhesive (PSA).
- B. Installer Qualifications: All products listed in this section are to be installed by a single installer with a minimum of five years demonstrated experience in installing products of the same type and scope as specified.
1. Provide documentation that the installer is authorized by the Manufacturer to perform Work specified in this section.
 2. Provide a commercial building reference list of 5 properties where the installer has applied window film. This list will include the following information:
 - a. Name of building.
 - b. The name and telephone number of a management contact.
 - c. Type of glass.
 - d. Type of film and/or film attachment system.
 - e. Amount of film and/or film attachment system installed.
 - f. Date of completion.
 3. Provide a Glass Stress Analysis of the existing glass and proposed glass/film combination as recommended by the film manufacturer.
 4. Provide an EFilm application analysis to determine available energy cost reduction and savings.
- C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
1. Finish areas designated by Architect.
 2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
 3. Refinish mock-up area as required to produce acceptable work.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Follow Manufacturer's instructions for storage and handling.
- B. Store products in manufacturer's unopened packaging until ready for installation.
- C. Store and dispose of any hazardous materials, and materials contaminated by hazardous materials, in accordance with requirements of local authorities having jurisdiction.

1.07 PROJECT 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 recommended limits.

1.08 WARRANTY

- A. At project closeout, provide to Owner's Representative an executed current copy of the manufacturer's standard limited warranty against manufacturing defect, outlining its terms, conditions, and exclusions from coverage.
- B. In order to validate warranty, installation must be performed by an Authorized 3M dealer. Verification of Authorized 3M dealer can be confirmed by submission of active 3M dealer code number.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturer: 3M Commercial Solutions, which is located at: 3M Center Bldg. 220-12-E-04; St. Paul, MN 55144-1000; Toll Free Tel: 888-650-3497; Tel: 651-737-1081; Fax: 651 737 8241; Email: [request info \(tdjohnson3@mmm.com\).](mailto:request info (tdjohnson3@mmm.com).)
- B. Area authorized 3M Dealer: Layr: Tel: 888-888-8000; Email: info@layr.com; Web: www.layr.com
- C. Requests for substitutions will be considered in accordance with provisions of Section 012500 - PRODUCT SUBSTITUTION PROCEDURES.

2.02 CLEAR MICROLAYERED SAFETY AND SECURITY WINDOW FILM

- A. 3M Scotchshield Ultra S600 Safety and Security Window Film. Optically clear microlayered polyester film, nominally 6 mils (0.006 inch) thick, with a durable acrylic abrasion resistant coating over one surface and a pressure sensitive adhesive on the other. The film is clear and does not contain dyed polyester. The adhesive is pressure-activated, not water-activated, and forms a physical bond, not chemical bond, to the glass. The film is microlayered with both plastic and ductile polyester layers for tear resistance.
 - 1. Physical / Mechanical Performance Properties (nominal):
 - a. Film Color: Clear.
 - b. Film Thickness (excluding coatings or adhesive liner): Nominal 6 mils
 - c. Tensile Strength (ASTM D882):
 - 1) Base Film: 32,000 psi (MD) / 32,000 psi (TD).
 - 2) Coated Film: 32,000 psi (MD) / 32,000 psi (TD).
 - d. Break Strength (ASTM D882):
 - 1) Base Film: 190 lb/in (MD) / 190 lb/in (TD).
 - 2) Coated Film: 210 lb/in (MD) / 210 lb/in (TD).
 - e. Percent Elongation at Break (ASTM D882):
 - 1) Base Film: 110 % (MD) / 100 % (TD).
 - 2) Coated Film: 136 % (MD) / 115 % (TD).
 - f. Yield Strength:
 - 1) Base Film: 12,000 psi (MD).
 - 2) Coated Film: 15,000 psi (MD).
 - g. Percent Elongation at Yield (ASTM D882):
 - 1) Base Film: 7% (MD).

- 2) Coated Film: 9% (MD).
 - h. Graves Tear Resistance (ASTM D1004):
 - 1) Maximum Force (lbs):
 - (a) Base Film: 28 (MD) / 28 (TD).
 - (b) Coated Film: 28 (MD) / 28 (TD).
 - 2) Maximum Extension (in):
 - (a) Base Film: 0.45 (MD) / 0.65 (TD).
 - (b) Coated Film: 0.55 (MD) / 0.55 (TD).
 - 3) Graves Area Tear Resistance (lbs%):
 - (a) Base Film: 900 (MD) / 1,200 (TD).
 - (b) Coated Film: 900 (MD) / 1,100 (TD).
 - i. Puncture Propagation Tear Resistance (ASTM D2582):
 - 1) Coated Film: 6 lbf (MD) / 7 lbf (TD).
 - j. Puncture Strength (ASTM D4830):
 - 1) Coated Film: 140 lbf.
 - 2. Uniformity: No noticeable pin holes, streaks, thin spots, scratches, banding or other optical defects.
 - 3. Variation in Total Transmission across the width: Less than 2 percent over the average at any portion along the length.
 - 4. Identification: Labeled as to Manufacturer as listed in this Section.
 - 5. Solar Performance Properties: Film applied to 1/4 inch (6 mm) thick clear glass.
 - a. Visible Light Transmission (ASTM E 903): 87 percent.
 - b. Ultraviolet Transmission (ASTM E 903): Less than 0.5 percent.
 - 6. Impact Resistance for Safety Glazing: Tested on 1/4 inch (6 mm) annealed glass.
 - a. Safety Rating (CPSC 16 CFR, Part 1201): Category II (400 ft.-lbs).
 - b. Safety Rating (ANSI Z97.1): Class A, Unlimited Size.
 - 7. Impact Resistance and Pressure Cycling: Film shall pass impact of Small Missile "A" and withstand subsequent pressure cycling (per ASTM E 1996 and ASTM E1886E 1886) at +/- 80 psf Design Pressure with use of 3M Impact Protection Adhesive. Film applied to 3/16 inch (4.8 mm) tempered glass.
 - 8. Blast Hazard Mitigation:
 - 9. Independent testing with results from high explosive arena blast or shock tube testing:
 - a. GSA Rating of "2" / ASTM F1642 "Minimal Hazard" with blast pressure of 7 psi and 44 psi*msec blast impulse, on 1/4 inch (6 mm) annealed single pane glass and 3M Impact Protection Profile Attachment system.
 - 10. Forced Entry Resistance: Product shall have been evaluated for time to resist complete body passage by a qualified 3rd Party test lab.
- B. 3M Scotchshield Ultra S800 Safety and Security Window Film. Optically clear microlayered polyester film, nominally 8 mils (0.008 inch) thick, with a durable acrylic abrasion resistant coating over one surface and a pressure sensitive adhesive on the other. The film is clear and does not contain dyed polyester. The adhesive is pressure-activated, not water-activated, and forms a physical bond, not chemical bond, to the glass. The film is microlayered with both plastic and ductile polyester layers for tear resistance.
- 1. Physical / Mechanical Performance Properties (nominal):
 - a. Film Color: Clear.
 - b. Film Thickness (excluding coatings or adhesive liner): Nominal 8 mils
 - c. Tensile Strength (ASTM D882):
 - 1) Base Film: 32,000 psi (MD) / 32,000 psi (TD).
 - 2) Coated Film: 32,000 psi (MD) / 32,000 psi (TD).
 - d. Break Strength (ASTM D882):
 - 1) Base Film: 250 lb/in (MD) / 250 lb/in (TD).
 - 2) Coated Film: 245 lb/in (MD) / 265 lb/in (TD).
 - e. Percent Elongation at Break (ASTM D882):
 - 1) Base Film: 115 % (MD) / 115 % (TD).

- 2) Coated Film: 132 % (MD) / 130 % (TD).
- f. Yield Strength:
 - 1) Base Film: 12,000 psi (MD).
 - 2) Coated Film: 15,000 psi (MD).
- g. Percent Elongation at Yield (ASTM D882):
 - 1) Base Film: 7% (MD).
 - 2) Coated Film: 9% (MD).
- h. Graves Tear Resistance (ASTM D1004):
 - 1) Maximum Force (lbs):
 - (a) Base Film: 40 (MD) / 40 (TD).
 - (b) Coated Film: 40 (MD) / 40 (TD).
 - 2) Maximum Extension (in):
 - (a) Base Film: 0.45 (MD) / 0.65 (TD).
 - (b) Coated Film: 0.50 (MD) / 0.57 (TD).
 - 3) Graves Area Tear Resistance (lbs%):
 - (a) Base Film: 1,100 (MD) / 1,300 (TD).
 - (b) Coated Film: 1,100 (MD) / 1,300 (TD).
- i. Puncture Propagation Tear Resistance (ASTM D2582):
 - 1) Coated Film: 9 lbf (MD) / 10 lbf (TD).
- j. Puncture Strength (ASTM D4830):
 - 1) Material Properties (as supplied).
 - 2) Coated Film: 185 lbf.
- 2. Uniformity: No noticeable pin holes, streaks, thin spots, scratches, banding or other optical defects.
- 3. Variation in Total Transmission across the width: Less than 2 percent over the average at any portion along the length.
- 4. Identification: Labeled as to Manufacturer as listed in this Section.
- 5. Solar Performance Properties: Film applied to 1/4 inch (6 mm) thick clear glass.
 - a. Visible Light Transmission (ASTM E 903): 87 percent.
 - b. Visible Reflection (ASTM E 903): Not more than 10 percent.
 - c. Ultraviolet Transmission (ASTM E 903): Less than 0.5 percent.
 - d. Solar Heat Gain Coefficient (ASTM E 903): 0.79
- 6. Impact Resistance for Safety Glazing: Tested on 1/4 inch (6 mm) annealed glass.
 - a. Safety Rating (CPSC 16 CFR, Part 1201): Category II (400 ft.-lbs).
 - b. Safety Rating (ANSI Z97.1): Class A, Unlimited Size.
- 7. Impact Resistance and Pressure Cycling: Film shall pass impact of Large Missile "C" and withstand subsequent pressure cycling (per ASTM E1996 and ASTM E1886) at +/- 75 psf Design Pressure with use of 3M Impact Protection Adhesive. Film applied to 1/4-inch tempered glass.
- 8. Blast Hazard Mitigation:
 - a. GSA Rating of "2" / ASTM F1642 "Minimal Hazard" with blast pressure of 7 psi and 44 psi*msec blast impulse, on 1/4 inch (6 mm) annealed single pane glass and 3M Impact Protection Profile Attachment system
- 9. Forced Entry Resistance: Product shall have been evaluated for time to resist complete body passage by a qualified 3rd Party test lab.

2.03 MICROLAYERED SAFETY AND SECURITY WINDOW FILM WITH SUN CONTROL

- A. 3M Scotchshield Ultra Prestige S70: Optically clear micro-layered polyester, laminated to an optically clear multi-layered polyester film containing at least 220 layers with a pressure sensitive adhesive on one side and durable acrylic abrasion resistant coating on the other side. The adhesive is pressure-activated, not water-activated, and forms a physical bond, not chemical bond, to the glass. Films contain no metals, but so contain infrared-absorbing carbon, metal oxide particles, or both.
 - 1. Physical / Mechanical Performance Properties:

- a. Film Color: Virtually clear with at least 220 layers.
 - b. Thickness: Nominal 8.0 mils
 - c. Tensile Strength (ASTM D 882): 24,000 psi (MD) / 26,000 psi (TD)
 - d. Break Strength (ASTM D 882): 200 lbs/in (MD) / 215 lbs/in (TD)
 - e. Percent Elongation at Break (ASTM D882): 104% (MD) / 118% (TD)
 - f. Yield Strength (ASTM D882): 16,000 psi (MD)
 - g. Percent Elongation at Yield (ASTM D882): 8% (MD)
 - h. Graves Tear Resistance (AASMTM D1004):
 - 1) Maximum Force: 35 lbs (MD) / 36 lbs (TD)
 - 2) Maximum Strain: 56% (MD) / 50% (TD)
 - 3) Graves Area Tear Resistance: 1,100 lbs% (MD) / 1,100 lbs% (TD)
 - i. Puncture Propagation Tear (ASTM D 2582): 10 lbf
 2. Solar Performance Properties: Film applied to 1/4 Inch thick clear glass.
 - a. Visible Light Transmission (ASTM E 903): 68 percent.
 - b. Visible Reflection (ASTM E 903): Not more than 10 percent.
 - c. Ultraviolet Transmission (ASTM E 903): Less than 0.5 percent.
 - d. Solar Heat Gain Coefficient (ASTM E 903): 0.51
 - e. Total Solar Energy Rejected: 50%
 3. Uniformity: No noticeable pin holes, streaks, thin spots, scratches, banding or other optical defects.
 4. Variation in Total Transmission across the Width: Less than 2 percent over the average at any portion along the length.
 5. Identification: Labeled as to Manufacturer as listed in this Section.
 6. Impact Resistance for Safety Glazing: Tested on 1/4 inch (6 mm) annealed glass.
 - a. Safety Rating (CPSC 16 CFR, Part 1201): Category II (400 ft.-lbs).
 7. Impact Resistance and Pressure Cycling:
 - a. Safety film component shall pass impact of Small Missile "A" and withstand subsequent pressure cycling (per ASTM E 1996 and E 1886) at +/- 80 psf Design Pressure with use of 3M Impact Protection Adhesive attachment system.
 8. Blast Hazard Mitigation: Independent testing with results from high explosive arena blast testing.
 - a. GSA Rating of "2" / ASTM F1642 "No Hazard" with minimum blast load of 6 psi and 45 psi*msec, on 1/4 inch (6 mm) single pane tempered glass and 3M Impact Protection Adhesive film attachment system.
 - b. GSA Rating of "2" / ASTM F1642 "No Hazard" with minimum blast load of 9 psi and 60 psi*msec, on 1 inch (25 mm) double pane tempered glass and 3M Impact Protection Adhesive film attachment system.
- B. 3M Scotchshield Ultra Prestige S50: Optically clear micro-layered polyester, laminated to an optically clear multi-layered polyester film containing at least 220 layers with a pressure sensitive adhesive on one side and durable acrylic abrasion resistant coating on the other side. The adhesive is pressure-activated, not water-activated, and forms a physical bond, not chemical bond, to the glass. Films contain no metals, but so contain infrared-absorbing carbon, metal oxide particles, or both.
1. Physical / Mechanical Performance Properties:
 - a. Film Color: Lightly tinted with at least 220 layers.
 - b. Thickness: Nominal 8.0 mils
 - c. Tensile Strength (ASTM D 882): 25,000 psi (MD) / 26,000 psi (TD)
 - d. Break Strength (ASTM D 882): 210 lbs/in (MD) / 220 lbs/in (TD)
 - e. Percent Elongation at Break (ASTM D882): 111% (MD) / 102% (TD)
 - f. Yield Strength (ASTM D882): 16,000 psi (MD)
 - g. Percent Elongation at Yield (ASTM D882): 8% (MD)
 - h. Graves Tear Resistance (ASTM D1004):
 - 1) Maximum Force: 36 lbs (MD) / 36 lbs (TD)
 - 2) Maximum Strain: 50% (MD) / 50% (TD)

- 3) Graves Area Tear Resistance: 1,100 lbs% (MD) / 1,100 lbs% (TD)
 - i. Puncture Propagation Tear (ASTM D 2582): 10 lbf
 2. Solar Performance Properties: Film applied to 1/4 Inch thick clear glass.
 - a. Visible Light Transmission (ASTM E 903): 48 percent.
 - b. Visible Reflection (ASTM E 903): Not more than 10 percent.
 - c. Ultraviolet Transmission (ASTM E 903): Less than 0.5 percent.
 - d. Solar Heat Gain Coefficient (ASTM E 903): 0.44
 - e. Total Solar Energy Rejected: 56%
 3. Uniformity: No noticeable pin holes, streaks, thin spots, scratches, banding or other optical defects.
 4. Variation in Total Transmission across the Width: Less than 2 percent over the average at any portion along the length.
 5. Identification: Labeled as to Manufacturer as listed in this Section.
 6. Impact Resistance for Safety Glazing: Tested on 1/4 inch (6 mm) annealed glass.
 - a. Safety Rating (CPSC 16 CFR, Part 1201): Category II (400 ft.-lbs).
 7. Impact Resistance and Pressure Cycling:
 - a. Safety film component shall pass impact of Small Missile "A" and withstand subsequent pressure cycling (per ASTM E 1996 and E 1886) at +/- 80 psf Design Pressure with use of 3M Impact Protection Adhesive attachment system.
 8. Blast Hazard Mitigation: Independent testing with results from high explosive arena blast testing.
 - a. GSA Rating of "2" / ASTM F1642 "No Hazard" with minimum blast load of 9 psi and 60 psi*msec, on 1 inch (25 mm) double pane tempered glass and 3M Impact Protection Adhesive film attachment system.
- C. 3M Scotchshield Ultra Night Vision S25: Optically clear polyester film comprised of co-extruded micro-layers, laminated to a metalized polyester film. Additional film layer is added for color and performance, with a durable abrasion resistant coating over one surface and a pressure sensitive adhesive on the other. The adhesive is pressure-activated, not water-activated, and forms a physical bond, not chemical bond, to the glass. The film color is derived from the metal coating and the product will not contain dyed polyester.
 1. Physical / Mechanical Performance Properties:
 - a. Film Color: Moderately tinted.
 - b. Thickness: Nominal 8.0 mils
 - c. Tensile Strength (ASTM D 882): 28,000 psi (MD) / 27,000 psi (TD)
 - d. Break Strength (ASTM D 882): 235 lbs/in (MD) / 230 lbs/in (TD)
 - e. Percent Elongation at Break (ASTM D882): 120% (MD) / 85% (TD)
 - f. Yield Strength (ASTM D882): 17,000 psi (MD)
 - g. Percent Elongation at Yield (ASTM D882): 8% (MD)
 - h. Graves Tear Resistance (ASTM D1004):
 - 1) Maximum Force: 37 lbs (MD) / 38 lbs (TD)
 - 2) Maximum Strain: 49% (MD) / 46% (TD)
 - 3) Graves Area Tear Resistance: 1,100 lbs% (MD) / 900 lbs% TD)
 - i. Puncture Propagation Tear (ASTM D 2582): 10 lbf
 2. Solar Performance Properties: Film applied to 1/4 Inch thick clear glass.
 - a. Visible Light Transmission (ASTM E 903): 24 percent.
 - b. Visible Reflection (ASTM E 903): Not more than 20 percent exterior / 7% interior.
 - c. Ultraviolet Transmission (ASTM E 903): Less than 0.5 percent.
 - d. Solar Heat Gain Coefficient (ASTM E 903): 0.40
 - e. Total Solar Energy Rejected: 60%
 3. Uniformity: No noticeable pin holes, streaks, thin spots, scratches, banding or other optical defects.
 4. Variation in Total Transmission across the Width: Less than 2 percent over the average at any portion along the length.
 5. Identification: Labeled as to Manufacturer as listed in this Section.

6. Impact Resistance for Safety Glazing: Tested on 1/4 inch (6 mm) annealed glass.
 - a. Safety Rating (CPSC 16 CFR, Part 1201): Category II (400 ft.-lbs).
 - b. Safety Rating (ANSI Z97.1): Class A, Unlimited Size.
7. Impact and Pressure Cycling:
 - a. Safety film component shall pass impact of Small Missile "A" and withstand subsequent pressure cycling (per ASTM E 1996 and E 1886) at +/- 80 psf Design Pressure with use of 3M Impact Protection Adhesive attachment system.
8. Blast Hazard Mitigation: Independent testing with results from high explosive arena blast testing.
 - a. GSA Rating of "2" / ASTM F1642 "No Hazard" with minimum blast load of 6 psi and 45 psi*msec, on 1/4 inch (6 mm) single pane tempered glass and 3M Impact Protection Adhesive film attachment system.
 - b. GSA Rating of "2" / ASTM F1642 "No Hazard" with minimum blast load of 9 psi and 61 psi*msec, on 1 inch (25 mm) double pane tempered glass and 3M Impact Protection Adhesive film attachment system

2.04 CLEAR SAFETY AND SECURITY WINDOW FILM

- A. 3M Safety S40 (SH4CLARL): Optically clear polyester film with a durable acrylic abrasion resistant coating over one surface and a pressure sensitive adhesive over the other. The adhesive is pressure-activated, not water-activated, and forms a physical bond, not chemical bond, to the glass.
 1. Physical / Mechanical Performance Properties:
 - a. Film Color: Clear.
 - b. Thickness: Nominal 4.0 mils
 - c. Tensile Strength (ASTM D 882): 25,000 psi.
 - d. Elongation: 130 percent.
 - e. Break Strength (ASTM D 882): 100 lbs/in
 2. Uniformity: No noticeable pin holes, streaks, thin spots, scratches, banding or other optical defects.
 3. Variation in Total Transmission across the Width: Less than 2 percent over the average at any portion along the length.
 4. Identification: Labeled as to Manufacturer as listed in this Section.
 5. Solar Performance Properties: Film applied to 1/4 Inch (6 mm) thick clear glass.
 - a. Visible Light Transmission (ASTM E 903): 87 percent.
 - b. Ultraviolet Transmission (ASTM E 903): Less than 1 percent.
 6. Impact Resistance for Safety Glazing: Tested on 1/4 inch (6 mm) annealed glass.
 - a. Safety Rating (CPSC 16 CFR, Part 1201): Category I (150 ft.-lbs).
 - b. Safety Rating (ANSI Z97.1): Class B, Unlimited Size.
- B. 3M Safety S70 (SH7CLARL): Optically clear polyester film with a durable acrylic abrasion resistant coating over one surface and a pressure sensitive adhesive over the other.
 1. Physical / Mechanical Performance Properties:
 - a. Film Color: Clear.
 - b. Thickness: Nominal 7.0 mils
 - c. Tensile Strength (ASTM D 882): 25,000 psi.
 - d. Break Strength (ASTM D 882): 175 lbs/in.
 2. Uniformity: No noticeable pin holes, streaks, thin spots, scratches, banding or other optical defects.
 3. Variation in Total Transmission across the Width: Less than 2 percent over the average at any portion along the length.
 4. Identification: Labeled as to Manufacturer as listed in this Section.
 5. Solar Performance Properties: Film applied to 1/4 Inch (6 mm) thick clear glass.
 - a. Visible Light Transmission (ASTM E 903): 87 percent.
 - b. Ultraviolet Transmission (ASTM E 903): Less than 1 percent.

6. Impact Resistance for Safety Glazing: Tested on 1/4 inch (6 mm) annealed glass.
 - a. Safety Rating (CPSC 16 CFR, Part 1201): Category I (150 ft.-lbs).
 7. Blast Hazard Mitigation: Independent testing with results from high explosive arena blast testing.
 - a. GSA Rating of "3B" with minimum blast load of 10 psi and 89 psi*msec, on 1 inch (25 mm) double pane annealed glass and 3M Impact Protection Adhesive film attachment system.
- C. 3M Safety S80 (SH8CLARL): Optically clear polyester film with a durable acrylic abrasion resistant coating over one surface and a pressure sensitive adhesive over the other. The adhesive is pressure-activated, not water-activated, and forms a physical bond, not chemical bond, to the glass. The film may be laminated to other clear polyester film layers to achieve the desired thickness of the film.
1. Physical / Mechanical Performance Properties:
 - a. Film Color: Clear.
 - b. Thickness: Nominal 8 mils.
 - c. Tensile Strength (ASTM D 882): 25,000 psi.
 - d. Break Strength (ASTM D 882): 200 lbs/in
 2. Uniformity: No noticeable pin holes, streaks, thin spots, scratches, banding or other optical defects.
 3. Variation in Total Transmission across the Width: Less than 2 percent over the average at any portion along the length.
 4. Identification: Labeled as to Manufacturer as listed in this Section.
 5. Solar Performance Properties: Film applied to 1/4 Inch (6 mm) thick clear glass.
 - a. Visible Light Transmission (ASTM E 903): 87 percent.
 - b. Ultraviolet Transmission (ASTM E 903): Less than 1 percent.
 6. Impact Resistance for Safety Glazing: Tested on 1/4 inch (6 mm) annealed glass.
 - a. Safety Rating (CPSC 16 CFR, Part 1201): Category II (400 ft.-lbs).
 - b. Safety Rating (ANSI Z97.1): Class A, Unlimited Size.
 7. Blast Hazard Mitigation:
 - a. GSA Rating of "3B" / ASTM F1642 "Minimal Hazard" with minimum blast load of 6 psi and 41 psi*msec, on 1/4 inch (6 mm) single pane annealed glass and 3M Impact Protection Adhesive film attachment system.
 - b. GSA Rating of "2" with minimum blast load of 12 psi and 66 psi*msec, on 1 inch double pane annealed glass and 3M Impact Protection Adhesive film attachment system.
- D. 3M Safety S140 (SH14CLARL): Optically clear polyester film with a durable acrylic abrasion resistant coating over one surface and a pressure sensitive adhesive over the other. The adhesive is pressure-activated, not water-activated, and forms a physical bond, not chemical bond, to the glass. The film may be laminated to other clear polyester film layers to achieve the desired thickness of the film.
1. Physical / Mechanical Performance Properties:
 - a. Film Color: Clear.
 - b. Thickness: Nominal 14 mils
 - c. Tensile Strength (ASTM D 882): 25,000 psi.
 - d. Break Strength (ASTM D 882) (Per Inch Width): 350 lbs.
 2. Uniformity: No noticeable pin holes, streaks, thin spots, scratches, banding or other optical defects.
 3. Variation in Total Transmission across the Width: Less than 2 percent over the average at any portion along the length.
 4. Identification: Labeled as to Manufacturer as listed in this Section.
 5. Solar Performance Properties: Film applied to 1/4 Inch (6 mm) thick clear glass.
 - a. Visible Light Transmission (ASTM E 903): 85 percent.
 - b. Ultraviolet Transmission (ASTM E 903): Less than 1 percent.

6. Impact Resistance for Safety Glazing: Tested on 1/4 inch (6 mm) annealed glass.
 - a. Safety Rating (CPSC 16 CFR, Part 1201): Category II (400 ft.-lbs).
 7. Impact Resistance and Pressure Cycling:
 - a. Film shall pass impact of Medium Large Missile "C" and withstand subsequent pressure cycling (per ASTM E 1996 and E 1886) at +/- 50 psf Design Pressure with use of 3M Impact Protection Adhesive attachment system.
 8. Blast Hazard Mitigation: Independent testing with results from high explosive arena blast testing.
 - a. GSA Rating of "3B" with minimum blast load of 8 psi and 44 psi*msec, on 1/4 inch single pane annealed glass and 3M Impact Protection Profile film attachment system.
 - b. GSA level 3B rating with minimum blast load of 15 psi overpressure and 58 psi*msec blast impulse on 1 inch double pane annealed glass without use of film attachment system.
 9. Forced Entry Protection: Independent lab testing according to UL 972 protocol (Multiple Impact Test).
 - a. Annealed Glass (1/4 inch) - Pass
 - b. Tempered Glass (1/4 inch) - Pass
- E. 3M Safety Exterior S20: Optically clear polyester film with an exterior durable abrasion resistant coating over one surface and a pressure sensitive adhesive over the other.
1. Physical / Mechanical Performance Properties:
 - a. Film Color: Clear.
 - b. Thickness: Nominal 2 mils
 - c. Tensile Strength (ASTM D 882): 25,000 psi.
 - d. Elongation: 88 percent.
 - e. Break Strength (ASTM D 882): 50 lbs/in
 2. Uniformity: No noticeable pin holes, streaks, thin spots, scratches, banding or other optical defects.
 3. Variation in Total Transmission across the Width: Less than 2 percent over the average at any portion along the length.
 4. Identification: Labeled as to Manufacturer as listed in this Section.
 5. Solar Performance Properties: Film applied to 1/4 Inch (6 mm) thick clear glass.
 - a. Visible Light Transmission (ASTM E 903): 88 percent.
 - b. Ultraviolet Transmission (ASTM E 903): Less than 0.5 percent.
 6. Impact Resistance for Safety Glazing: Tested on 1/4 inch (6 mm) annealed glass.
 - a. Safety Rating (CPSC 16 CFR, Part 1201): Category I (150 ft.-lbs).
 - b. Safety Rating (ANSI Z97.1): Class B, Unlimited Size.
- F. 3M Safety Exterior S40. Optically clear polyester film with a durable acrylic abrasion resistant coating over one surface and a pressure sensitive adhesive over the other.
1. Physical / Mechanical Performance Properties:
 - a. Film Color: Clear.
 - b. Thickness: Nominal 4 mils
 - c. Tensile Strength (ASTM D 882): 25,000 psi.
 - d. Break Strength (ASTM D 882): 100 lbs/in.
 2. Uniformity: No noticeable pin holes, streaks, thin spots, scratches, banding or other optical defects.
 3. Variation in Total Transmission across the Width: Less than 2 percent over the average at any portion along the length.
 4. Identification: Labeled as to Manufacturer as listed in this Section.
 5. Solar Performance Properties: Film applied to 1/4 Inch (6 mm) thick clear glass.
 - a. Visible Light Transmission (ASTM E 903): 89 percent.
 - b. Ultraviolet Transmission (ASTM E 903): Less than 0.5 percent.
 6. Impact Resistance for Safety Glazing: Tested on 1/4 inch (6 mm) annealed glass.
 - a. Safety Rating (CPSC 16 CFR, Part 1201): Category I (150 ft.-lbs).

- G. 3M Safety Exterior S70. Optically clear polyester film with a durable acrylic abrasion resistant coating over one surface and a pressure sensitive adhesive over the other.
1. Physical / Mechanical Performance Properties:
 - a. Film Color: Clear.
 - b. Thickness: Nominal 7 mils
 - c. Tensile Strength (ASTM D 882): 25,000 psi.
 - d. Break Strength (ASTM D 882): 140 lbs/in.
 2. Uniformity: No noticeable pin holes, streaks, thin spots, scratches, banding or other optical defects.
 3. Variation in Total Transmission across the Width: Less than 2 percent over the average at any portion along the length.
 4. Identification: Labeled as to Manufacturer as listed in this Section.
 5. Solar Performance Properties: Film applied to 1/4 Inch (6 mm) thick clear glass.
 - a. Visible Light Transmission (ASTM E 903): 88 percent.
 - b. Ultraviolet Transmission (ASTM E 903): Less than 0.5 percent.
 6. Impact Resistance for Safety Glazing: Tested on 1/4 inch (6 mm) annealed glass.
 - a. Safety Rating (CPSC 16 CFR, Part 1201): Category I (150 ft.-lbs).

2.05 SAFETY AND SECURITY WINDOW FILM WITH SUN CONTROL

- A. 3M Safety Neutral S35. Dual reflective polyester film, nominally 8 mils (0.008") thick, with a durable abrasion resistant coating over one surface and a pressure sensitive adhesive on the other. The film is comprised of an optically clear safety film laminated to a metalized film layer for reflective and sun control properties. The adhesive is pressure-activated, not water-activated, and forms a physical bond, not chemical bond, to the glass.
1. Physical / Mechanical Performance Properties (nominal):
 - a. Film Color: Neutral
 - b. Film Thickness (excluding coatings or adhesive liner): Nominal 8 mils
 - c. Tensile Strength 33,000 psi (MD) / 23,000 psi (TD)
 - d. Break Strength: 170 lb/in (MD) / 280 lb/in (TD)
 - e. Percent Elongation at Break: 100 % (MD) / 80 % (TD)
 - f. Yield Strength: 23,000 psi
 - g. Percent Elongation at Yield: 80%
 2. Uniformity: No noticeable pin holes, streaks, thin spots, scratches, banding or other optical defects.
 3. Variation in Total Transmission across the width: Less than 2 percent over the average at any portion along the length.
 4. Identification: Labeled as to Manufacturer as listed in this Section.
 5. Solar Performance Properties: Film applied to 1/4 inch (6 mm) thick clear glass (NFRC 100/200).
 - a. Visible Light Transmission: 39%
 - b. Visible Reflection: 23% exterior / 13% interior
 - c. Ultraviolet Transmission: Not more than 1%.
 - d. Solar Heat Gain Coefficient: 0.43
 6. Impact Resistance for Safety Glazing: Tested on 1/4 inch (6 mm) annealed glass.
 - a. Safety Rating (CPSC 16 CFR, Part 1201): Category 2 (400 ft.-lbs).
 - b. Safety Rating (ANSI Z97.1): Class A, Unlimited (400 ft.-lbs).
 7. Impact Resistance and Pressure Cycling
 - a. Film shall pass impact of Large Missile "C" and withstand subsequent pressure cycling (per ASTM E1996 and ASTM E1886) at +/- 60 psf Design Pressure with use of 3M Impact Protection Adhesive attachment system. Tested on 1/4 inch (6 mm) tempered glass.
 8. Blast Hazard Mitigation:

- a. GSA Rating of "2"/ ASTM F1642 "Minimal Hazard" with blast pressure of 6 psi and 42 psi*msec blast impulse, on 1/4 inch (6 mm) annealed single pane glass and 3M Impact Protection Adhesive Attachment system
 - b. GSA Rating of "2" / ASTM F1642 "No Hazard" with blast pressure of 6 psi and 42 psi*msec blast impulse, on 1 inch (25 mm) double pane tempered glass and 3M Impact Protection Adhesive Attachment system
- B. 3M Safety Silver S20. Highly reflective polyester film, nominally 8 mils (0.008") thick, with a durable abrasion resistant coating over one surface and a pressure sensitive adhesive on the other. The film is comprised of an optically clear safety film laminated to a metalized film layer for reflective and sun control properties. The adhesive is pressure-activated, not water-activated, and forms a physical bond, not chemical bond, to the glass.
 - 1. Physical / Mechanical Performance Properties (nominal):
 - a. Film Color: Silver reflective
 - b. Film Thickness (excluding coatings or adhesive liner): Nominal 8 mils
 - c. Tensile Strength: 20,000 psi (MD) / 30,000 psi (TD)
 - d. Break Strength: 160 lb/in (MD) / 247 lb/in (TD)
 - e. Percent Elongation at Break: 95 % (MD) / 76 % (TD)
 - f. Yield Strength: 15,000 psi
 - g. Percent Elongation at Yield: 7%
 - 2. Uniformity: No noticeable pin holes, streaks, thin spots, scratches, banding or other optical defects.
 - 3. Variation in Total Transmission across the width: Less than 2 percent over the average at any portion along the length.
 - 4. Identification: Labeled as to Manufacturer as listed in this Section.
 - 5. Solar Performance Properties: Film applied to 1/4 inch (6 mm) thick clear glass (NFRC 100/200).
 - a. Visible Light Transmission: 18%
 - b. Visible Reflection: 61%
 - c. Ultraviolet Transmission: Not more than 1%.
 - d. Solar Heat Gain Coefficient: 0.25
 - 6. Impact Resistance for Safety Glazing: Tested on 1/4 inch (6 mm) annealed glass.
 - a. Safety Rating (CPSC 16 CFR, Part 1201): Category 2 (400 ft-lbs).
 - b. Safety Rating (ANSI Z97.1): Class A, Unlimited (400 ft-lbs).
 - 7. Impact Resistance and Pressure Cycling
 - a. Film shall pass impact of Small Missile "A" and withstand subsequent pressure cycling (per ASTM E1996 and ASTM E1886) at +/- 60 psf Design Pressure with use of 3M Impact Protection Adhesive attachment system. Tested on 1/4 inch (6 mm) tempered glass.
 - 8. Blast Hazard Mitigation:
 - a. GSA Rating of "2"/ ASTM F1642 "Minimal Hazard" with blast pressure of 6 psi and 42 psi*msec blast impulse, on 1/4 inch (6 mm) annealed single pane glass and 3M Impact Protection Adhesive Attachment system
 - b. GSA Rating of "2" / ASTM F1642 "No Hazard" with blast pressure of 6 psi and 42 psi*msec blast impulse, on 1 inch (25 mm) double pane tempered glass and 3M Impact Protection Adhesive Attachment system

2.06 ANTI-GRAFFITI WINDOW FILM

- A. 3M Anti-Graffiti 4 (AG-4): Optically clear polyester film with a durable acrylic abrasion resistant coating over one surface and a pressure sensitive adhesive over the other. The film may be laminated to other clear polyester film layers to achieve the desired thickness of the film.
 - 1. Physical / Mechanical Performance Properties:
 - a. Film Color: Clear.
 - b. Thickness: Nominal 4.0 mils

- c. Tensile Strength (ASTM D 882): 25,000 psi.
 - d. Break Strength (ASTM D 882) (Per Inch Width): 136 lbs.
 - e. Elongation at Break (ASTM D 882): > 100 percent.
 - f. Peel Strength: 1 lb/inch.
 - g. Puncture Strength (ASTM D 4830): 90 lbs.
 - h. Abrasion Resistance (ASTM D1044): < 2 percent increase in haze.
 - 2. Uniformity: No noticeable pin holes, streaks, thin spots, scratches, banding or other optical defects.
 - 3. Variation in Total Transmission across the Width: Less than 2 percent over the average at any portion along the length.
 - 4. Identification: Labeled as to Manufacturer as listed in this Section.
 - 5. Solar Performance Properties: Film applied to 1/4 Inch (6 mm) thick clear glass.
 - a. Visible Light Transmission (ASTM E 903): 81 percent.
 - b. Ultraviolet Transmission (ASTM E 903): Less than 1 percent.
- B. 3M Anti-Graffiti 6 (AG-6): Optically clear polyester film with a durable acrylic abrasion resistant coating over one surface and a pressure sensitive adhesive over the other. The film may be laminated to other clear polyester film layers to achieve the desired thickness of the film.
- 1. Physical / Mechanical Performance Properties:
 - a. Film Color: Clear.
 - b. Thickness: Nominal 6.0 mils
 - c. Tensile Strength (ASTM D 882): 25,000 psi.
 - d. Break Strength (ASTM D 882): 150 lbs/in
 - e. Elongation at Break (ASTM D 882): > 100 percent.
 - f. Peel Strength: 1 lb/inch.
 - g. Puncture Strength (ASTM D 4830): 125 lbs.
 - h. Abrasion Resistance (ASTM D 1044): < 2 percent increase in haze.
 - 2. Uniformity: No noticeable pin holes, streaks, thin spots, scratches, banding or other optical defects.
 - 3. Variation in Total Transmission across the Width: Less than 2 percent over the average at any portion along the length.
 - 4. Identification: Labeled as to Manufacturer as listed in this Section.
 - 5. Solar Performance Properties: Film applied to 1/4 Inch (6 mm) thick clear glass.
 - a. Visible Light Transmission (ASTM E 903): 87 percent.
 - b. Ultraviolet Transmission (ASTM E 903): Less than 1 percent.

2.07 3M IMPACT PROTECTION FILM ATTACHMENT SYSTEMS

- A. 3M Impact Protection Adhesive (IPA): Weatherable, UV-resistant, moisture curable structural sealant wet glaze.
 - 1. Color:
 - a. Black.
 - b. White.
 - 2. Material Properties (as supplied):
 - a. Typical Cure Time: 3 - 7 days (25 degrees C, 50% RH)
 - b. Full Adhesion: 7 - 14 days
 - c. Tack-Free Time (ASTM D 5895): 21 minutes (25 degrees C, 50% RH)
 - d. Flow, Sag or Slump (ASTM D 2202): 0 inches
 - e. Specific Gravity: 1.4
 - f. Working Time: 10 - 20 minutes (25 degrees C, 50% RH)
 - g. VOC Content: 16 g/L
 - 3. Material Properties (as cured - 21 days at 25 degrees C, 50% RH):
 - a. Ultimate Tensile Strength (ASTM D412): 380 psi (2.62 MPa)
 - b. Ultimate Elongation (ASTM D412): 640 psi
 - c. Durometer Hardness, Shore A (ASTM D2240): 38-39 points

- d. Tear Strength, Die B (ASTM D624): 72 ppi
 - 4. Uniformity: Product shall have uniform consistency and appearance, with no clumping.
 - 5. Impact Resistance and Pressure Cycling:
 - a. As part of a filmed glass system, film attachment shall demonstrate ability to withstand Medium Large Missile C and Small Missile A impact, with subsequent pressure cycling (per ASTM E 1996 and ASTM E 1886) at +/- 75 psf design pressure.
 - b. As part of a filmed glass system, film attachment shall demonstrate ability withstand structural load requirements of ASTM E330 when tested at +/- 100 psf design pressure.
 - 6. Blast Hazard Mitigation:
 - a. GSA level "2" rating (minimal hazard) of "2" with minimum blast load of 11 psi overpressure and 55 psi*msec blast impulse.
 - b. GSA level "3B" rating (low hazard) with minimum blast load of 10 psi overpressure and 89 psi*msec blast impulse.
 - c. ASTM F1642 rating of "Low Hazard" with minimum blast load of 8 psi overpressure and 42 psi*msec blast impulse.
- B. 3M Impact Protection Profile (IPP): Weatherable, flexible-mechanical style film attachment made of extruded rubber profile with two strips of double coated foam tape: one strip for bonding to applied film and the other strip for bonding to the window frame.
- 1. 3M Impact Protection Profile, BP-700.
 - a. Total width: 1.0 inches.
 - b. Tape width: 0.5 inches.
 - 2. 3M Impact Protection Profile, BP-950.
 - a. Total width: 1.3 inches.
 - b. Tape width: 0.625 inches.
 - 3. 3M Impact Protection Profile, BP-950 XL.
 - a. Total width: 1.3 inches.
 - b. Tape width: 0.38 inches.
 - 4. Material Properties:
 - a. Full Adhesion: 1 - 2 days (25 degrees C, 50% RH)
 - b. Ultimate Tensile Strength (A ASTM D412): > 20,500 psi
 - c. Ultimate Elongation (ASTM D412): 400%
 - d. Break Strength, Die B (ASTM D624): > 71 ppi
 - e. Durometer Hardness, Shore A: (ASTM D2240): 70 pts
 - 5. Uniformity: Product shall have uniform consistency and appearance.
 - 6. Impact Resistance and Pressure Cycling:
 - a. As part of a filmed glass system, film attachment shall demonstrate ability to withstand Small Missile A impact, with subsequent pressure cycling (per ASTMs E 1996 and E 1886) at +/- 50 psf design pressure.
 - 7. Blast Hazard Mitigation:
 - a. GSA level "2" rating (minimal hazard) with minimum blast load of 4 psi overpressure and 28 psi*msec blast impulse.
 - b. GSA level "3B" rating (low hazard) with minimum blast load of 10 psi overpressure and 89 psi*msec blast impulse.
 - c. ASTM F1642 rating of "Low Hazard" with minimum blast load of 4 psi overpressure and 28 psi*msec blast impulse.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Film Examination:

1. If preparation of glass surfaces is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.
 2. Glass surfaces receiving new film should first be examined to verify that they are free from defects and imperfections, which will affect the final appearance.
 3. Do not proceed with installation until glass surfaces have been properly prepared and deviations from manufacturer's recommended tolerances are corrected. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result under the project conditions.
 4. Commencement of installation constitutes acceptance of conditions.
- B. Impact Protection Adhesive Examination:
1. If application of window film is/was the responsibility of another installer, notification in writing shall be made of deviations from manufacturer's recommended installation tolerances and conditions.
 2. Filmed glass surfaces receiving new attachment should first be examined to verify that they are free from defects and imperfections, and that the film edges extend sufficiently to the frame edges.
 3. Do not proceed with installation until film and frame surfaces have been properly prepared and deviations from manufacturer's recommended tolerances are corrected. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result under the project conditions.
 4. Conduct an adhesion test to the frame surface may be conducted by applying a 4 - 6 inch long bead, approximately 0.5 - 1 inch in width, masking one side of the frame surface underneath the strip with tape. Allow the Impact Protection Adhesive to cure for 7 days and test adhesion by pulling up on the masked end and a 90 degree angle. If cohesive failure is observed (adhesive residue left behind on the frame surface), adhesion is acceptable; if adhesive failure is observed (clean peel from the frame), adhesion is unacceptable and product is not recommended.
- C. Impact Protection Profile Examination:
1. If application of window film is/was the responsibility of another installer, notification in writing shall be made of deviations from manufacturer's recommended installation tolerances and conditions.
 2. Windows and frames must be examined to ensure that they are fit to receive the Impact Protection Profile in a manner such that the two profile adhesive strips will be perpendicularly opposed to each other and that they will not contact glazing stops or frame gaskets without stretching the profile.
 3. Filmed glass surfaces receiving new attachment should first be examined to verify that they are free from defects and imperfections, and that the film edges extend sufficiently to the frame edges.
 4. Do not proceed with installation until film and frame surfaces have been properly prepared and deviations from manufacturer's recommended tolerances are corrected. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result under the project conditions.
 5. Conduct an adhesion test to the frame surface may be conducted by applying a 4 - 6 inch long strip on the frame surface, using the sufficient pressure to achieve good adhesive wet-out. Allow the Impact Protection Profile to cure for 1-2 days and test adhesion by removing the test strip. If cohesive failure is observed (adhesive residue left behind on the frame surface), adhesion is acceptable; if adhesive failure is observed (clean peel from the frame), adhesion is unacceptable and product is either not recommended, or an adhesion promoter, such as 3M Primer 94, must be used.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.

- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Refer to Manufacturer's installation instructions for methods of preparation for Impact Protection Adhesive or Impact Protection Profile film attachment systems.

3.03 INSTALLATION

- A. Film Installation:
 - 1. Install in accordance with manufacturer's instructions.
 - 2. Cut film edges neatly and square at a uniform distance of 1/8 inch (3 mm) to 1/16 inch (1.5 mm) of window sealant. Use new blade tips after 3 to 4 cuts.
 - 3. Spray the slip solution, composed of one capful of baby shampoo or dishwashing liquid to 1 gallon of water, on window glass and adhesive to facilitate proper positioning of film.
 - 4. Apply film to glass and lightly spray film with slip solution.
 - 5. Squeegee from top to bottom of window. Spray slip solution to film and squeegee a second time.
 - 6. Bump film edge with lint-free towel wrapped around edge of a 5-way tool.
 - 7. Upon completion of film application, allow 30 days for moisture from film installation to dry thoroughly, and to allow film to dry flat with no moisture dimples when viewed under normal viewing conditions.
- B. Impact Protection Adhesive Installation:
 - 1. The film attachment system shall be applied according to the specifications of the Manufacturer by an Authorized Dealer/Applicator. Refer to 3M publication, 70-0709-0322-7, 3M Impact Protection Adhesive Attachment System Installation Instructions.
 - a. For blast hazard mitigation: minimum 1/2 inch bead overlap on both frame and film (excluding glazing stops or compression gaskets).
 - b. For impact resistance and building envelope protection: minimum 3/8 inch bead overlap on both frame and film (excluding glazing stops or compression gaskets).
 - 2. To ensure a straight and consistent bead width is achieved, masking tape may be applied to film and frame surfaces prior to application.
 - 3. With prior approval of the building owner or property manager, existing compression gaskets may be partially removed or trimmed to allow for a thinner bead and stronger anchorage. If removing the gaskets, sections shall be trimmed approximately 3 inches in length and inserted with appropriate spacing along all sides of the window to help secure the glazing during application and curing of the Impact Protection Adhesive.
 - 4. The Impact Protection Adhesive shall be dispensed with a caulk gun with nozzle opening diameter sized to match the approximate size of the desired bead width.
 - 5. A plastic putty knife or other tool with a clean straight edge shall be used to trowel and smooth out the adhesive. The completed adhesive bead shall be relatively triangular in shape.
 - 6. Any masking tape used shall be carefully removed within 10 minutes after applying the wet glaze.
- C. Impact Protection Profile Installation:
 - 1. The film attachment system shall be applied according to the specifications of the Manufacturer by an Authorized Dealer/Applicator trained to install 3M Impact Protection Profile. Refer to 3M publication, 3M Impact Protection Profile Installation Systems Instructions.
 - 2. Each profile piece must span continuously to both sides of the window, within 1/8 inch to the frame edge. Splicing the profile between frame edges is prohibited.
 - 3. Profile must be aligned and applied by 3M recommended or approved methods and tools to ensure a quality installation.

4. Corner joints must be fabricated by 3M recommended and approved methods. No part of the profile adhesive shall make contact with an adjacent profile.
5. Sufficient pressure must be evenly applied along the entire length of the profile to ensure full adhesion from both adhesive strips. A roller tool is required to minimize entrapment of air in the adhesive.

3.04 CLEANING AND PROTECTION

- A. Remove left over material and debris from Work area. Use necessary means to protect film before, during, and after installation.
- B. Touch-up, repair or replace damaged products before Substantial Completion.
- C. After application of film, wash film using common window cleaning solutions, including ammonia solutions, 30 days after application. Do not use abrasive type cleaning agents and bristle brushes to avoid scratching film. Use synthetic sponges or soft cloths.

END OF SECTION 088716

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Agreement, including General and Supplementary Conditions, and Division 01 of the Project Manual, apply to work of this Section.

1.02 SUMMARY

- A. This Section includes the following:
 - 1. Non-load bearing steel framing members for gypsum board walls, soffits and ceilings.
 - 2. Gypsum board assemblies attached to steel framing.
 - 3. Resilient channels and metal furring.
 - 4. Control Joints in gypsum board ceiling and wall assemblies.
 - 5. Joint treatments, tapes, compounds and finishing.
 - 6. Levels of finish for gypsum board surfaces
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Section 054000 - Cold Formed Metal Framing
 - 2. Section 061000 - Rough Carpentry for solid wood blocking built into gypsum board assemblies
 - 3. Section 061643 - Gypsum sheathing for exterior building sheathing.
 - 4. Section 072116 - Blanket Insulation for thermal and sound attenuation insulation installed in assemblies that incorporate gypsum board.
 - 5. Section 072129 - Sprayed Insulation for foam insulation installed in assemblies that incorporate gypsum board and/or non-load bearing framing.
 - 6. Section 078400 - Firestopping for firestopping systems and fire-resistive-rated joint sealants.
 - 7. Section 078600 - Smoke Barrier Systems for through penetrations smoke barrier systems.
 - 8. Section 095100 - Acoustical Ceiling suspension assemblies for suspension systems for gypsum ceilings.
 - 9. Section 099100 - Painting for GWB primers and finish painting.

1.03 STANDARDS

- A. All work of this section shall conform to industry standards and/or manufacturer's recommendations.
- B. ASTM C11 "Standard Terminology Relating to Gypsum and Related Building Materials and Systems".
- C. ASTM C475/C475M "Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board".
- D. ASTM C645 "Standard Specification for Nonstructural Steel Framing Members".
- E. ASTM C754 "Standard Specification for Installation of Steel Framing Members To Receive Screw-Attached Gypsum Board, Backing Board, or Water-Resistant Backing Board".
- F. ASTM C840 "Standard Specification for Application and Finishing of Gypsum Board".

- G. ASTM C954 "Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness".
- H. ASTM C1047 "Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base".
- I. ASTM C1396/C1396M "Standard Specification for Gypsum Board".
- J. GA-216 "Recommended Specifications for the Application and Finishing of Gypsum Board".
- K. GA-253 "Application of Gypsum Board to Form Curved Surfaces".
- L. Recommended Levels of Gypsum Board Finish" published jointly by AWCI, CISCA, GA and PDCA.
- M. Gypsum Board Construction Technology: Refer to ASTM C11 and GA-505 for definitions of terms related to gypsum board assemblies not defined in this Section or in other referenced standards.

1.04 TERMINOLOGY

- A. The terms "drywall", "GWB", "gypsum board", "gypsum wallboard", and "sheetrock" are synonymous.

1.05 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide interior non-load-bearing metal framing capable of withstanding design loads within limits and under conditions indicated.
 - 1. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
 - a. Interior Framing Systems:
 - 1) Maximum Deflection: L/240 at 5 psf, stud spacing at 16 inches o.c.
 - 2. Design framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 129° F.
 - 3. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:
 - a. Upward and downward movement of ¾ inch.
- B. Cold-Formed Steel Framing, General: Design according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions".
 - 1. Provide interior framing systems sized to accommodate maximum deflection using limiting heights of metal studs without contribution of gypsum wallboard (non-composite).
- C. 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.

- D. 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.

1.06 SUBMITTALS

- A. Pursuant to Section 013300 - Submittal Procedures.
- B. Pursuant to Section 016000 - Product Requirements
- C. Submit manufacturers' product information, specifications, and installation instructions for the specified products including, GWB, joint compounds, fasteners, trim, control joints, joint reinforcing, metal furring members, metal studs, tracks, runners, bridging, resilient channels, steel grounds, and all related accessories.
- D. Test Reports: For all stud framing products that do not comply with ASTM C645 or C754, provide independent laboratory reports showing maximum stud heights at required spacings and deflections.

1.07 QUALITY ASSURANCE

- A. Experienced workers familiar with the work and according to manufacturer's recommendations and/or industry standards shall perform all work of this section.
- B. Single-Source Responsibility for Steel Framing: Obtain steel framing members for gypsum board assemblies from a single manufacturer, unless otherwise indicated.
- C. Single-Source Responsibility for Panel Products: Obtain each type of gypsum board and other panel products from a single manufacturer.
- D. Single-Source Responsibility for Finishing Materials: Obtain finishing materials either from the same manufacturer that supplies gypsum board and other panel products or from a manufacturer acceptable to gypsum board manufacturer.
- E. Fire-Test-Response Characteristics: Where fire-rated gypsum board assemblies are indicated, provide gypsum board assemblies that comply with the following requirements:
 - 1. Fire Resistance Ratings: As indicated by reference to GA File Numbers in GA-600 "Fire Resistance Design Manual" or design designations in UL "Fire Resistance Directory" or in the listing of another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 2. Gypsum board assemblies indicated are identical to assemblies tested for fire resistance according to ASTM E119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
 - 3. Deflection and Firestop Track: Top runner provided in fire-resistance-rated assemblies indicated is labeled and listed by UL, Warnock Hersey, or another testing and inspecting agency acceptable to authorities having jurisdiction.

1.08 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Pursuant to manufacturers published instructions.

- B. Protect against moisture exposure, condensation, direct sunlight, construction damage and other potential causes of damage.
- C. Neatly stack gypsum panels flat to prevent sagging.
- D. Do not install GWB that is wet, that is moisture damaged, and/or that is mold damaged.

1.09 ENVIRONMENTAL CONDITIONS

- A. General: Establish and maintain environmental conditions for applying and finishing gypsum board to comply with ASTM C840 and with gypsum board manufacturer's written recommendations, whichever is more stringent.
- B. Room Temperatures: For non-adhesive attachment of gypsum board to framing, maintain not less than 40 deg F (4 deg C). For adhesive attachment and finishing of gypsum board, maintain not less than 50 deg F (10 deg C) for 48 hours prior to application and continuously after until dry. Do not exceed 95 deg F (35 deg C) when using temporary heat sources.
- C. Provide adequate ventilation to carry off excess moisture. Avoid drafts during hot dry weather to prevent finishing materials from drying too rapidly.
- D. Do not install gypsum board that is wet, those that are moisture damaged, and those that are mold damaged.

1.10 DEFINITIONS

- A. Gypsum Board Construction Terminology: Refer to ASTM C11 and GA-505 for definitions of terms related to gypsum board assemblies not defined in this Section or in other referenced standards.
- B. Rated or Tested Assemblies: As specified under the individual assembly description and shown in the drawings.
- C. Non-rated Assemblies: As specified under the individual assembly description and shown in the drawings.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. 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:
 - 1. Gypsum Board and Related Products
 - a. CertainTeed
 - b. G-P Gypsum Corp.
 - c. National Gypsum Company
 - d. USG Corporation.
 - 2. Steel Framing and Furring
 - a. ClarkDietrich Building Systems
 - b. National Gypsum Company
 - c. United States Gypsum Company
 - d. Marino/Ware: a Division of Ware Industries, Inc.

2.02 MATERIALS

- A. Runners: "U" shaped steel of same type, gage, and finish as studs with web depth compatible with studs and designed to hold studs temporarily in place at top and bottom by friction.
 - 1. Top Runners (Track): Where framing extends to overhead structural supports and/or decking, install to produce joints at top of framing systems that prevent axial loading of finished assemblies. In fire rated walls use Firestop Deflection Track.
- B. Steel Stud Framing:
 - 1. Channel shaped with return leg.
 - 2. Non-load bearing: ASTM C 645.
 - 3. Hot dip galvanized:
- C. Metal/Rigid Furring Channel:
 - 1. Product: ASTM C645.
 - 2. Hot dip galvanized:
- D. Resilient Channel:
 - 1. Product: Sound Transmission Resilient Channel.
 - 2. Corrosion-resistant steel channel.
- E. 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:
 - 2. ClarkDietrich Building Systems; BlazeFrame.
 - 3. Fire Trak Corp.; Fire Trak attached to studs with Fire Trak Posi Clips.
 - 4. Metal-lite, Inc.; The System.
 - 5. Sliptrack Systems; SLP-TRK.
- F. Deflection Track:
 - 1. Double track condition.
 - 2. Oversized outer track (2" deep minimum).
 - 3. Long leg inside track.
 - 4. Same gage or heavier than studs.
 - 5. Hot dip galvanized.
- G. Bridging
 - 1. Cold-rolled Channel Bridging
 - a. 16 Gauge (minimum) screwed to each stud with a clip angle not less than 1-1/2" x 1-1/2", 16 gauge, galvanized steel. Clip angle to be screwed to bridging at each stud. Use 3-3/8" wide clips for 3-5/8" studs and 5-3/4" wide clips for 6" studs. Two screws into bridging and two screws into stud.
- H. Hat-Shaped Rigid Furring Channels: ASTM C645
 - 1. Minimum Base-Metal Thickness: 20 gauge.
 - 2. Depth: 7/8 inch, 1-1/2 inches as indicated on the Contract Drawings.
- I. Resilient Furring Channels: 1/2-inch deep, 20 gauge galvanized steel sheet members designed to reduce sound transmission.

1. Configuration: Asymmetrical, single leg with 1-1/2" screw flange.
- J. Z-Shaped Furring: With non-slotted web, face flange of 1-1/4 inches, wall attachment flange of 3/4 inch, minimum uncoated-metal thickness of 16 gauge unless noted otherwise and depth required to fit insulation thickness indicated.
- K. Blocking
 1. Solid wood - See Section 061000 - Rough Carpentry
- L. Column and beam clip
 1. "The Claw" manufactured by Claw International, 139 Parkview Drive, Lakeview, AR 72642
Phone: 870-431-5654 www.BEAMCLIPS.com or Architect Approved equivalent.
- M. Fasteners:
 1. Steel drill screws; for fastening gypsum boards to steel members from 0.033 to 0.112 in. thick: ASTM C954.
 2. Steel drill screws:
 - a. Type S: for fastening gypsum board to steel framing members.
 - b. Type W: for fastening gypsum boards to wood members.
 - c. Type G: for fastening gypsum board to gypsum board.
 3. Concrete anchors: Sized for installation loads imposed.
 - a. Power driven.
 - b. Pre-drilled expansion type.
 - c. Self-drilling expansion type.
- N. Gypsum Wall Board:
 1. Recycled Content of Gypsum Panel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
 2. Size: Provide maximum lengths and widths available that will minimize joints in each area, correspond with support system indicated, and be efficient in unusable off-cuts and waste.
 3. Gypsum Soffit Board
 - a. Description: Specially formulated core to resist sag and moisture
 - b. Thickness - 5/8" unless noted otherwise
 - c. Use:
 - 1) Provide on all exterior soffit/ceiling locations
 - 2) Provide on interior soffit locations where noted on Drawings
 4. Abuse Resistant Type
 - a. Manufactured to produce greater resistance to surface indentation, through-penetration (impact resistance), and abrasion than standard, regular-type and Type X gypsum board.
 - b. Core: 5/8", Type X
 - c. Long Edges: Tapered.
 - d. Abuse-Resistant Performance:
 - 1) Surface Abrasion: ASTM D 4977, 0.015" at 50 rubs
 - 2) Surface Indentation: ASTM D 5420, 0.15" maximum
 - 3) Soft-Body impact: ASTM E 695, surface failure at 150 ft-lbs. minimum.
 - e. Products:
 - 1) Georgia Pacific DensArmor Plus® Fireguard® Abuse-Resistant Interior Gypsum Panel.
 - 2) Gold Bond® Hi-Abuse® XP® Gypsum Board
 - 3) Sheetrock® Brand Mold Tough® VHI Firecode X Panels
 - 4) Certainteed Extreme Abuse Resistant Gypsum Board with M2 Tech® Type X.

5. Tile Backing Panels
 - a. Provide on all walls to receive ceramic tile except showers.
 - b. Glass-mat, Water-Resistant Backing Board
 - 1) Complying with ASTM C 1178.
 - 2) Core: 5/8", Type X
 - 3) Products:
 - (a) DensShield® Tile Backer by Georgia Pacific Gypsum.
 - (b) FIBEROCK® Tile Backerboard by USG
- O. Gypsum Board Accessories:
 1. All accessories must be taped.
 2. Galvanized steel; ASTM C1047
 3. Corner bead: Solid flange.
 4. Expansion (control) joint, with removable strip.
 5. U-bead.
 6. L-bead:
 - a. Solid flange.
 - b. Tear away L-bead at window applications.
 7. LK-bead: Solid flange.
 8. LC-bead: Solid flange.
 9. Edge trim: Tapeable J-bead.
- P. Joint Finishing Materials: ASTM C475
 1. Joint reinforcing tape: ASTM C475
 - a. Size: not less than 1-7/8 in. or more than 2-1/4 in.
 - b. Thickness: Not more than 0.012 in.
 - c. Tensile strength: Not less than 30 lb./in. when tested pursuant to ASTM C474.
 - d. Dimensional stability: Expansion no more than 0.40% lengthwise and not more than 2.5% crosswise when tested pursuant to ASTM C474.
 2. Glass fiber joint reinforcement tape: Open weave tape; ASTM C475.
 3. Joint compound: Provide one or more of following pursuant to ASTM C475:
 - a. Ready-mix or dry taping or bedding compound.
 - b. Ready-mix or dry finishing or topping compound.
 - c. Ready-mix or dry all-purpose compound.
 - d. Compounds selected to be compatible.

2.03 STEEL FRAMED PARTITION: (NON-LOAD BEARING)

- A. Steel Framing:
 1. Runners, floor and ceiling:
 - a. Size: As shown on the drawings.
 - b. Material: 20 gage MSG (minimum) galvanized standard steel track or 33 mil (50 ksi) if using ViiperStud®, ProSTUD®, or other proprietary stud system unless noted otherwise on the Drawings.
 - c. Attachment to Floor and Ceiling: 16 in. o.c., maximum.
 2. Steel Studs:
 - a. Size: As shown on the drawings.
 - b. Material: 20 gage MSG (minimum) standard, galvanized steel stud, 33 mil (33 ksi) ViiperStud®, 33 mil (33ksi) ProSTUD®, 33 mil (33 ksi) other proprietary stud unless noted otherwise on the Drawings.
 - c. Spacing: As shown on the Drawings.

- B. Bridging:
 - 1. U-Channel
 - a. 16 gauge (minimum).
 - b. 4'-0" o.c. vertically (maximum). Screwed to each stud. Provide bridging within 12" of the stud end at deflection top track.
 - 2. Blocking
 - a. FR Solid Wood - See Section 061000 - Rough Carpentry.
- C. Boards, Both Sides:
 - 1. Layers: As required for fire rating of wall assembly:
 - a. Edge: Tapered.
 - b. Type: As listed in 2.02 N.
 - c. Orientation: Parallel with studs or perpendicular to studs.
- D. Fasteners: Steel drill screws.

2.04 FURRED ASSEMBLY

- A. Rating: None.
- B. Metal/Rigid Furring Channel:
 - 1. Orientation: Installed vertically.
 - 2. Type: DWC.
 - 3. Depth: 7/8" or 1 1/2" in.
 - 4. Gage: 20.
 - 5. Finish: Galvanized, G60.
 - 6. Substrate Attachment:
 - a. Direct Method: Fasten alternately through both flanges directly to wall substrate at 24 in. o.c., maximum.
 - b. Fasteners to substrate: Steel power driven fasteners.
- C. Metal Furring Stud:
 - 1. Orientation: Installed vertically.
 - 2. Type: DWS.
 - 3. Depth: 1 5/8".
 - 4. Gage: 20
 - 5. Finish: Galvanized, G60.
 - 6. Substrate Attachment:
 - a. No attachment to substrate. Furring studs and GWB are an independent system when built tight to substrate.
- D. Boards and Sheathing:
 - 1. Layers: Single, face layer only.
 - 2. Face layer:
 - a. Type: As listed in 2.02 N.
 - b. Edge: Tapered.
 - c. Orientation: Parallel with, or perpendicular to, framing.
- E. Fasteners: Steel drill screws.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates to which gypsum board assemblies attach or abut, installed hollow metal frames, cast-in-anchors, and structural framing with Installer present for compliance with requirements for installation tolerances and other conditions affecting performance of assemblies specified in this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Ceiling Anchorage: Coordinate ceiling suspension systems with installation of overhead structural assemblies to ensure that inserts and other provisions for anchorage to building structure have been installed to receive ceiling hangers that will develop their full strength and at spacing required to support ceilings.

3.03 INSTALLATION

- A. Install Pursuant to: Manufacturer's published instructions. Comply with ASTM C754 and with ASTM C840 requirements that apply to framing installation.
- B. Install supplementary framing, and FR solid wood blocking to support fixtures, equipment services, heavy trim, casework, TV mounts, projection screens, white boards, bulletin boards, lockers, hand rails, grab bars, toilet accessories, furnishings, or similar construction including Owner furnished items requiring attachment.
- C. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- D. Install bridging at 4'-0" o.c. vertically for full length of wall. If wall has a top deflection track, install an additional row of bridging within 12" of the top end of the studs. Install bridging prior to electrical conduit, piping and other utility installation within the wall or passing thru the wall to avoid conflicts. If bridging can not run full length of wall due to obstruction, continue bridging above or below obstruction overlapping one full stud cavity of main bridging run. Do not exceed 2 feet vertical between offset bridging runs and primary bridging run.
- E. Install bracing at terminations in assemblies.
- F. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.
- G. Runner Installation:
 - 1. Attach steel runners at floor and ceiling to structural elements with suitable fasteners located 2 in. from each end and spaced 16 in. o.c., maximum.
- H. Steel Stud Installation:
 - 1. Position studs vertically, with open side facing in the same direction, engaging floor and ceiling runners, and spaced pursuant to specific partition description. Trade holes (knockouts) shall not be located within 10 inches of the end of the stud. When necessary, splice studs with 8 in. nested lap and two positive attachments per stud flange. Place studs in direct contact with all door frame jambs, abutting partitions, partition corners, and

- existing construction elements. Where studs are installed directly against exterior walls and a possibility of water penetration through walls exists, install asphalt felt strips between studs and wall surfaces.
2. Anchor both flanges of all studs to ceiling (unless it is deflection track) and floor runner or track flanges as specified under specific partition description, or, if silent, with metal lock fastener tool, or 3/8 in. Type S or Type S-12 steel drill screw. Securely anchor studs to jamb and head anchors of door or borrowed-light frames by bolt or screw attachment. Over metal door and borrowed-light frames, place horizontally a cut-to-length section of runner or track, with a web-flange bend at each end, and secure to strut-studs with 2 screws in each bent web. Position a cut-to-length stud (extending to ceiling runner or track) at vertical board joints over door frame header.
 - a. Install two studs at each jamb unless otherwise indicated.
 - b. Install cripple studs at head adjacent to each jamb stud, with a maximum 1/2-inch 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.
- I. Metal/Rigid Furring Channels Erection:
1. Direct attachment: Attach furring channels in a vertical position directly to interior concrete or masonry surface with appropriate anchors and fasteners staggered 16 in. o.c. on opposite flanges. When there is a possibility of moisture penetration through walls, install asphalt felt protection strip between furring channel and wall.
- J. Soffit and Fascia Erection:
1. Fasten runners to concrete or masonry substrate with appropriate fasteners spaced 16 in. o.c., maximum. Fasten runners to steel studs used as a substrate used as a substrate with steel drill screws.
 2. Fasten steel studs to runners and other steel studs with steel drill screws.
 3. Install steel stud diagonal bracing, if necessary; fasten with steel drill screws.
- K. Gypsum Board Erection:
1. Clean stud and furring cavities of all construction debris and vacuum clean all track sections prior to installing GWB.
 2. Apply gypsum boards pursuant to specific partition description. Position all edges centered over studs for parallel application; all ends centered over studs for perpendicular application. Use maximum practical lengths to minimize end joints. Fit ends and edges closely, but not forced together.
 3. Stagger vertical board joints from joints in adjacent layer and from joints on opposite side of studs. Stagger horizontal joints 1 stud spacing from boards directly above and below, from joints in adjacent layer, and from joints on opposite side of studs. Locate screws 1/2 in. from board edges or ends.
 4. Fit gypsum panels around ducts, pipes, and conduits.
 5. Where partitions intersect structural members and/or decking projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members and decking flutes; allow 1/4"-3/8" wide joints to install sealant or firestopping.
 6. For single-layer parallel application of gypsum boards, space screws pursuant to specific partition description in field of boards and along vertical abutting edges. For single-layer perpendicular board application, space screws pursuant to specific partition description in field and along abutting end joints.
- L. For single layer application erect and fasten gypsum boards pursuant to GA-216.
- M. For double layer application erect and fasten gypsum boards pursuant to GA-216.

- N. For exterior gypsum boards, erect pursuant to GA-216, and fasten at 6" o.c. along panel edge locations and 12" o.c. field locations with 1¼" S #6 screws.
- O. Furring Installation for Suspended Gypsum Board Ceiling.
 - 1. Install per manufactures instructions, 16" o.c. maximum spacing.
- P. All joints and screw heads in GWB construction not exposed to view shall be fire taped and finished to a minimum AWCI Level 2 finish.

3.04 ACCESSORY APPLICATION

- A. Corner Bead:
 - 1. Reinforce all vertical and horizontal exterior corners with corner bead fastened by crimping at 6" o.c. on both flanges along entire length of bead. If framing is wood, apply screws at 9" o.c. both flanges along entire length of bed in addition to crimping.
- B. Edge Trim:
 - 1. Where assembly terminates against masonry or other dissimilar material, apply tapeable metal trim over board edge and fasten with 9/16 in. galvanized staples 9" o.c.
- C. Opening Trim:
 - 1. Provide and attach with screws 9" o.c. special J-type (semi-finishing) zinc-alloy edge trim at all exposed edges of exterior gypsum board that are not concealed by applied moldings.
 - 2. Provide and attach with screws 9" o.c. special J-type plastic edge trim at all exposed edges of exterior gypsum board that are not concealed by applied moldings.
- D. Control Joints:
 - 1. Provide control joint units, of either metal or PVC at one side of door frame extending from door frame head upward to top track and/or window unit extending from window jamb upward and downward at a maximum spacing of 24' o.c. of straight wall and for straight wall sections longer than 24' without a door or window provide full height control joint extending from door frame head upward to top track and elsewhere, where control joints are indicated.
 - 2. Control joints shall be provided in gypsum board ceilings not more than 30'-0" o.c. in each direction and at junction of gypsum board partitions with walls or partitions of other finish materials, and at "T", "U" and "I" shaped areas.
 - 3. Each side of a control joint must be independently supported.
 - 4. Provide acoustical sealant at control joints as recommended by Drywall System manufacturer.
 - 5. In fire rated assemblies, control joints shall be backed as required to maintain rating of wall or ceiling.
 - 6. Where gypsum board is vertically continuous, as at stairwells, provide control joints at each floor level.

3.05 CONTROL JOINT INSTALLATION

- A. Attach control joint with screws or Architect approved substitution, spaced not over 6 in. apart in each flange. Cut end joints square and align for neat fit. Remove protective tape when joint treatment is completed.

3.06 FASTENER APPLICATION

- A. Drywall Screws:
 - 1. Power-drive with an electric screwdriver so screw heads provide a slight depression below surface of gypsum boards without breaking face paper. Do not drive screws closer than 3/8 in. from edges and ends of gypsum boards.

3.07 PRE-FILL APPLICATION

- A. Use ready-mix or field mix dry taping or bedding compound pursuant to directions on container. Do not over mix, nor use extremely cold water or cold joint compound.
- B. Pre-fill all "V" grooves formed by abutting tapered eased edges of gypsum board with taping or bedding compound, or Architect approved substitution, using a flexible 5 in. or 6 in. joint finishing knife or specialty pre-fill tool. Fill "V" joint flush and wipe off excess compound beyond "V" groove, leaving a clear depression to receive tape. Allow pre-fill to harden prior to next application, taping, or embedding coat.

3.08 JOINT TREATMENT APPLICATION

- A. Mix joint compound pursuant to manufacturer's published instructions.
- B. Apply taping, embedding, or ready-mixed all-purpose compound in a thin uniform layer to all joints, angles, finishing beads, trim and control joints. Immediately apply reinforcing tape centered over joint and seated into compound. Sufficient compound, approximately 1/64 in. to 1/32 in., must remain on tape to provide proper bond. Follow immediately with a thin skim coat to embed tape, but not to function as a second coat. Fold and embed tape properly in all interior angles to provide a true angle. Tape or embedding coat must be thoroughly dry prior to application of second coat. Exception: Some joint compounds need only to have hardened prior to application of next coat. Refer to instructions on container.
- C. Spread finish coat evenly over and extend at least 2 in. beyond second coat on all joints and feather to a smooth, uniform finish. Over tapered edges, do not allow finished joint to protrude beyond plane of surface. Apply a finish coat to cover tape and taping compound at all tapered angles and provide a true angle. Where necessary, sand lightly between coats and following final application of compound to provide a smooth surface ready for decoration. When sanding, do not roughen face paper.

3.09 FINISHING FASTENERS

- A. Apply a taping, all-purpose type, or ready-mixed compound to fastener depressions as first coat. Follow with a minimum of 2 additional coats of topping or all-purpose compound, leaving all depressions level with surface.

3.10 FINISHING BEADS, TRIMS, AND CONTROL JOINTS

- A. Apply first coat and tape to all flanges, and properly feather out from ground to plane of surface. Compound must thoroughly dry prior to application of second coat. Some joint compounds need only to have hardened prior to application of next coat. Refer to instructions on container.
- B. Apply a second coat in same manner as first coat, extending compound slightly beyond onto face of board. Compound must be thoroughly dry prior to application of finish coat.

- C. Apply finish coat, extending compound slightly beyond second coat and properly feathering from ground to plane or surface. Exception: Only two coats of some ready-mixed compounds are needed. Sand finish as necessary to provide a flat, smooth surface ready for decoration. When sanding, do not roughen face paper.

3.11 LEVEL OF FINISH

- A. Surfaces to receive tile, surfaces to receive fire taping, and/or surfaces not exposed to view, shall be finished to a minimum of AWCI Level 2.
- B. Surfaces to receive heavy textured finish or heavy grade wall covering shall be finished to a minimum of AWCI level 3.
- C. Surfaces to receive paint or light grade wall coverings shall be finished to a minimum of AWCI level 4.
- D. Surfaces to receive gloss, semi-gloss, or egg shell paint shall be finished to a minimum of AWCI level 4.
- E. Level 5 finish only required in locations specifically noted on the contract drawings. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.

3.12 TOLERANCES

- A. Maximum variation of finished gypsum board surface from true flatness: 1/8 inch in 10 feet in any direction.

3.13 WASTE MANAGEMENT

- A. Separate and recycle waste materials to maximize extent economically feasible in compliance with Waste Management Plan for LEED Credit MR 2.1 and MR 2.2
- B. Plan and coordinate work to minimize generation of off-cuts and waste. Sequences work to maximize use of GWB off-cuts and waste.

3.14 CLEANING AND REPAIR

- A. Clean all excess materials each day. Promptly remove any residual joint compound from adjacent surfaces.
- B. Provide final protection and maintain conditions, in a manner suitable to Installer, which ensures gypsum board assemblies remain without damage or deterioration at time of Substantial Completion.
- C. Repair damaged work prior to Punch List

END OF SECTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Resilient base.
 - 2. Resilient molding accessories.

1.03 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 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.

1.04 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. Furnish not less than 10 linear feet (3 linear m) for every 300 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.05 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) nor more than 90 deg F (32 deg C).

1.06 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) nor more than 95 degrees F, 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

2.01 THERMOPLASTIC-RUBBER BASE

- A. Manufacturers:
 - 1. Roppe Corporation, USA
 - 2. Allstate Rubber Corp.
 - 3. Burke Mercer Flooring Products, Division of Burke Industries Inc.
 - 4. Johnsonite; A Tarkett Company
 - 5. Or approved equal.
- B. Product Standard: ASTM F1861, Type TP (rubber, thermoplastic).
 - 1. Group: I (solid, homogeneous).
 - 2. Style and Location:
 - a. Style A, Straight: Provide in areas with carpet.
 - b. Style B, Cove: Provide in areas with resilient flooring.
 - c. Style D, Sculptured: Provide in areas indicated.
 - 1) Profile: As indicated.
- C. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
- D. Thickness: 0.125 inch (3.2 mm).
- E. Height: 6 inch or as indicated on Drawings.
- F. Lengths: Coils in manufacturer's standard length.
- G. Outside Corners: Preformed.
- H. Inside Corners: Preformed.
- I. Colors: As selected by Architect from manufacturer's full range of colors.

2.02 RUBBER MOLDING ACCESSORY

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Roppe Corporation, USA.
 - 2. VPI, LLC, Floor Products Division.
 - 3. Or approved equal.
- B. Description: Rubber nosing for carpet 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 manufacture's full range of colors and patterns.

2.03 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.
- C. Floor Polish: Provide protective, liquid floor-polish products recommended by resilient stair-tread manufacturer.

PART 3 - EXECUTION

3.01 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.

3.02 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- C. 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.
- D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.03 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.

3.04 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. 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.

3.05 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. Floor Polish: Remove soil, visible adhesive, and surface blemishes from resilient stair treads before applying liquid floor polish.
 - 1. Apply two coat(s).
- E. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Vinyl composition floor tile.

1.03 REFERENCE STANDARDS

- A. Install resilient floor tiles in accordance with the recommended method of the "Tile Contractors Association of America" Handbook.
- B. American Society for Testing and Materials (ASTM):
 - 1. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile.
 - 2. ASTM F1700 - Standard Specification for Solid Vinyl Floor Tile
 - 3. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
 - 4. Federal specification SS-T-312B(1) Type IV composition product.
 - 5. ASTM E662 Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
 - 6. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.
 - 7. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.

1.04 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Installation Instructions: Provide a copy of the manufacturer's installation instructions to the Owner's Construction Representative.
- C. Samples: Two (2) Full-size units of each color and pattern of floor tile / plank required.

1.05 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

1.06 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of this Section with minimum 5 years documented experience.
- B. Perform moisture tests to ascertain moisture content of concrete floors scheduled to receive resilient tile flooring and base.
 - 1. Concrete subfloors to receive VCT, LVT, Solid Vinyl, and Carpet Tile shall meet the following requirements for moisture and alkalinity levels:

- a. Moisture vapor emissions shall not exceed three (3) pounds per 1,000 square feet for 24 hours.
 - b. Alkalinity levels shall be between 7.0 and 9.0 pH.
 2. Contractor shall submit to the Architect a written report on the moisture and surface alkalinity of the concrete subfloors verifying compliance with the acceptable parameters listed herein or to the more stringent requirements required by the manufacturer PRIOR to the installation of new flooring materials.
- C. Resilient floor tiles and plank shall be of through-pattern construction and shall contain recycled vinyl content as a percentage of the product composition. Tiles shall be asbestos free.

1.07 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.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Materials shall be delivered and stored under the provisions of 016500 - PRODUCT DELIVERY, STORAGE AND HANDLING.
- B. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store floor tiles / planks on flat surfaces.
- C. Deliver materials to project site in original, unopened packages, labeled to allow easy identification.
- D. Handle materials carefully to avoid chipping edges or damaging tiles in any way.

1.09 MAINTENANCE MATERIALS

- A. Furnish an extra 3% of each tile type, lot, shape, size, gloss, and color in clean, clearly marked containers to the Owner for maintenance use.

1.10 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 65 degrees F or more than 95 deg F 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. Close spaces to traffic for 48 hours after floor tile installation.
- C. Install floor tile after ambient conditions have been met; testing and other finishing operations, including overhead work, dust generating activities and painting, have been completed.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For resilient tile flooring, as determined by testing identical products according to ASTM D648 or NFPA 253 by a qualified testing agency.

2.02 VINYL COMPOSITION FLOOR TILE

- A. Products: Subject to compliance with requirements, provide one of the following as approved by the architect:
 - 1. Armstrong World Industries, Inc.; Premium Excelon Stonetex
 - 2. Or approved equal.
- B. Critical Radiant Flux (CRF): Minimum 0.45 watts per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.
- C. Minimum Requirements: Comply with ASTM F1066, of Class corresponding to type specified.
- D. Tile Standard: ASTM F1066
 - 1. Class: Class 2 - Through Pattern Vinyl Tile.
- E. Static Load Limit: 125 psi
- F. Wearing Surface: Smooth.
- G. Thickness: 1/8 inch.
- H. Size: 12 inch x 12 inch.
- I. Colors and Patterns: As selected by the Architect from the manufacturer's full color range.
- J. Certifications: Floorscore, NSF / ANSI 332 Gold, 3rd Party Certified Industry-Wide Type III EPD.
- K. Warranty: Manufacturer's Limited 5 year Commercial warranty.

2.03 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 floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.
- C. Floor Polish: Provide protective, liquid floor-polish products recommended by floor tile manufacturer.

PART 3 - EXECUTION

3.01 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.

3.02 PREPARATION

- A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by 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 10 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 F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lbs. of water/1000 sq. ft. in 24 hours.
 - b. Perform relative humidity test using in situ probes according to ASTM F2170. 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. 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.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.03 FLOOR TILE INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile. Provide a copy of the Manufacturer's Installation Instructions to the Owner's Construction Representative prior to the commencement of work of this Section.

- 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 square with room axis unless indicated otherwise on the contract documents.
- 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.
- 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 non-permanent 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.
- I. Set flooring in place, press with heavy roller to attain full adhesion.
- J. Where applicable for certain floor tile and plank patterns, apply specially formulated acrylic grout between the tiles / planks in strict accordance with the manufacturer's recommendations.
- K. Lay tile in full bond with grain in all tile running in one direction. Coordinate with Architect before installation for direction of grain.
- L. Install feature strips, edge strips and floor graphics / markings as indicated. Fit joints tightly.
- M. Comply with manufacturer's written instructions for cleaning and protecting floor tile.
- N. 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.
- O. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- P. Floor Polish: Remove soil, adhesive, and blemishes from floor tile surfaces before applying liquid floor polish.
 - 1. Apply two coat(s).

RESILIENT TILE FLOORING
Irvington Union Free School District
Main Street School Renovations
Main Street School
SED No.: 66-04-02-02-0-001-016

H2M

Q. Cover floor tile until Substantial Completion.

END OF SECTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section includes surface preparation and the application of paint systems on the following exterior substrates:
 - 1. Concrete.
 - 2. Steel.
 - 3. Wood.

1.03 DEFINITIONS

- A. Gloss Level 1: Not more than 5 units at 60 degrees and not more than 10 units at 85 degrees, according to ASTM D523.
- B. Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523.
- C. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523.
- D. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D523.
- E. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D523.
- F. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D523.
- G. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D523.

1.04 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 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, with the proposed product highlighted.

3. VOC content.

1.05 CLOSEOUT SUBMITTALS

- A. Coating Maintenance Manual: Upon conclusion of the project, the Contractor or paint manufacturer/supplier shall furnish a coating maintenance manual, such as Sherwin-Williams "Custodian Project Color and Product Information report or equal. Manual shall include an Area Summary with finish schedule, Area Detail designating where each product/color/finish was used, product data pages, Material Safety Data Sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

1.06 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Paint: 5 percent, but not less than 1 gal. of each material and color applied.

1.07 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..
 - 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.
 - b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - c. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 1. Maintain containers in clean condition, free of foreign materials and residue.
 2. Remove rags and waste from storage areas daily.
- B. Delivery and Handling: Deliver products to Project site in an undamaged condition in manufacturer's original sealed containers, complete with labels and instructions for handling, storing, unpacking, protecting, and installing. Packaging shall bear the manufacture's label with the following information:
 1. Product name and type (description).
 2. Batch date.
 3. Color number.
 4. VOC content.
 5. Environmental handling requirements.
 6. Surface preparation requirements.

- 7. Application instructions.

1.09 FIELD CONDITIONS

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

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Sherwin Williams
 - 2. Benjamin Moore & Co.
 - 3. PPG Architectural Finishes, Inc.
- B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to products listed in other Part 2 articles for the paint category indicated.

2.02 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: Provide materials that comply with VOC limits of authorities having jurisdiction.
- D. Colors: As selected by Architect from manufacturer's full range.

2.03 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 paints 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.

2.04 METAL PRIMERS

- A. Primer, Alkyd, Anti-Corrosive for Metal: MPI #79.
- B. Primer, Galvanized: As recommended in writing by topcoat manufacturer.

2.05 WOOD PRIMERS

- A. Primer, Latex for Exterior Wood: MPI #6.

2.06 WATER-BASED PAINTS

- A. Latex, Exterior Low Sheen (Gloss Level 3-4): MPI #15.
- B. Latex, Exterior Semi-Gloss (Gloss Level 5): MPI #11.

PART 3 - EXECUTION

3.01 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. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers. Where acceptability of substrate conditions is in question, apply samples and perform in-situ testing to verify compatibility, adhesion, and film integrity of new paint application.
 - 1. Report, in writing, conditions that may affect application, appearance, or performance of paint.
- B. Substrate Conditions:
 - 1. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - a. Concrete: 12 percent.
 - b. Masonry (Clay and CMU): 12 percent.
 - c. Wood: 15 percent.
 - d. Portland Cement Plaster: 12 percent.
 - e. Gypsum Board: 12 percent.
 - 2. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
 - 3. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - a. Application of coating indicates acceptance of surfaces and conditions.

3.02 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
- F. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:
 - 1. SSPC-SP 3, "Power Tool Cleaning."
 - 2. SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."
 - 3. SSPC-SP 11, "Power Tool Cleaning to Bare Metal."
- G. 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.
- H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- I. Aluminum Substrates: Remove loose surface oxidation.
- J. Wood Substrates:
 - 1. Scrape and clean knots. Before applying primer, apply coat of knot sealer recommended in writing by topcoat manufacturer for exterior use in paint system indicated.
 - 2. Sand surfaces that will be exposed to view, and dust off.
 - 3. Stain 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.
- K. Plastic Trim Fabrication Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.03 APPLICATION

- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
 - 3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
 - 4. Paint entire exposed surface of window frames and sashes.
 - 5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

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6. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. 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 to view:
 - 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.

3.04 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.

3.05 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.

3.06 EXTERIOR PAINTING SCHEDULE

- A. Concrete Substrates, Traffic Surfaces: (MPI EXT 3.2C)

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1. Pigmented Polyurethane over Epoxy Slip-Resistant Deck Coating System:
 - a. Prime Coat: Epoxy gloss, Gloss Level 6, MPI #212: Sherwin-Williams Armorseal 1000 HS. B67W2001 Series, at 2.5 to 4.0 mils dry, per coat.
 - b. Intermediate: Polyurethane, gloss matching Topcoat.
 - c. Topcoat: Polyurethane, two-component, pigmented, gloss, Gloss Level 6, MPI #212: Sherwin - Williams Armorseal HS Polyurethane, B65W220 Series, at 2.0 to 3.0 mils dry per coat, with manufacturer's slip resistant aggregate to produce a non-slip finish.
- B. Steel Substrates:
 1. Pigmented Polyurethane System: (MPI EXT 5.1H)
 - a. Prime Coat: Alkyd anti-corrosive, quick dry for metal, MPI #79: Sherwin-Williams KemBond Hi-Solids Alkyd Metal Primer, B50WZ0003 Series, at 3.0 to 4.0 mils dry, per coat.
 - b. Intermediate Coat: Polyurethane, two component, pigmented, semi-gloss, Gloss Level 5, MPI #72: Sherwin-Williams Acrolon 218 HS Acrylic Polyurethane, B65W00611 Series, at 3.0 to 6.0 mils dry , per coat.
 - c. Topcoat: Polyurethane, two-component, pigmented, gloss (Gloss Level 6), MPI #72: Sherwin Williams Acrolon 218 HS Acrylic Polyurethane, B65W00611 Series, at 3.0 to 6.0 mils dry, per coat.
- C. Galvanized-Metal Substrates:
 1. Alkyd System:
 - a. Prime Coat: Primer, galvanized metal, as recommended in writing by topcoat manufacturer for exterior use on galvanized-metal substrates with topcoat indicated.
 - b. Intermediate Coat: Exterior alkyd enamel matching topcoat.
 - c. Topcoat: Sherwin-Williams, Protective & Marine, Steel Spec Fast Dry Alkyd, B55 Series, gloss (Gloss Level 5), MPI #96.
 2. Water-Based Light Industrial Coating System:
 - a. Prime Coat: Primer, water-based, anti-corrosive for metal, MPI #107: S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series, 5.0 to 10.0 mils wet, 2.0 to 4.0 mils dry.
 - b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.
 - c. Topcoat as selected by the Architect from the following:
 - 1) Topcoat: Light industrial coating, exterior, water based, eggshell, (Gloss Level 3), MPI #161: S-W Pro Industrial Eg-Shel Acrylic B66-660 Series, at 2.5 to 4.0 mils dry, per coat.
 - 2) Topcoat: Light industrial coating, exterior, water based, semi-gloss, (Gloss Level 5), MPI #163: S-W Pro Industrial Acrylic Semi-Gloss Coating, B66-650 Series, at 2.5 to 4.0 mils dry, per coat.
 - 3) Topcoat: Light industrial coating, exterior, water based, gloss, (Gloss Level 6), MPI #164: S-W Pro Industrial Acrylic Gloss Coating, B66-600 Series, at 2.5 to 4.0 mils dry, per coat.
- D. Wood Substrates: Including wood ceilings and trim , window sash and trim.
 1. Latex System:
 - a. Prime Coat: Primer, latex for exterior wood, MPI #6.
 - b. Intermediate Coat: Latex, exterior, matching topcoat.
 - c. Topcoat: Latex, exterior, flat, (Gloss Level 1), MPI #10: S-W A-100 Exterior Latex Flat, A6 Series, at 4.0 mils wet, 1.2 mils dry, per coat.
 - d. Topcoat: Latex, exterior, low-sheen, (Gloss Level 3-4), MPI #15: S-W A-100 Exterior Latex Low Sheen, A12 Series, at 4.0 mils wet, 1.5 mils dry, per coat.

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- e. Topcoat: Latex, exterior, satin, (Gloss Level 3-4), MPI #15: S-W A-100 Exterior Latex Satin, A82 Series, at 4.0 mils wet, 1.5 mils dry, per coat.
- f. Topcoat: Latex, exterior, semi-gloss, (Gloss Level 5), MPI #11: S-W Solo Acrylic Semi-Gloss, A76 Series, at 4.0 mils wet, 1.5 mils dry, per coat.
- g. Topcoat: Latex, exterior, gloss, (Gloss Level 6), MPI #119: S-W A-100 Exterior Latex Gloss, A8 Series, at 4.0 mils wet, 1.3 mils dry, per coat.
- h. Topcoat: Latex, exterior semi-gloss (Gloss Level 5), MPI #11.
- 2. Solid Color Stain System:
 - a. First Coat: Solid color stain, latex, matching topcoat.
 - b. Topcoat: Solid color stain, latex, slip-resistant, flat, interior/exterior: S-W DeckScapes Exterior Acrylic Solid Color Deck, A15-Series, (Gloss Level 1), MPI #33, at 200 to 400 sq. ft. per gal (4.9 to 9.8 sq. m per l).
- 3. Semi-Transparent Stain System: (MPI EXT 6.2P)
 - a. First Coat: Semi-Transparent color stain, waterborne, matching topcoat.
 - b. Topcoat: Semi-transparent color stain, waterborne, flat, exterior: S-W Superdeck® 2650, A15 Series, Semi-Transparent Waterborne Stain, (Gloss Level 1), MPI #33, at 150 to 250 sq. ft. per gal (4.9 to 9.8 sq. m per l).
- E. Wood Substrates, Pedestrian Traffic Surfaces:
 - 1. Latex Floor Paint System:
 - a. First Coat: Floor paint, latex, slip-resistant, matching topcoat.
 - b. Topcoat: Floor paint, latex, slip-resistant, low gloss, (maximum Gloss Level 3), MPI #60: S-W ArmorSeal Tread-Plex, B90 Series, at 1.5 to 2.0 mils dry per coat.

END OF SECTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section includes surface preparation and the application of paint systems on interior substrates.
 - 1. Concrete.
 - 2. Concrete Masonry Units.
 - 3. Steel.
 - 4. Galvanized metal.
 - 5. Gypsum board.
 - 6. Wood.
 - 7. Aluminum.

1.03 DEFINITIONS

- A. Flat: Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D523.
- B. Matte: Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523.
- C. Eggshell: Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523.
- D. Satin: Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D523.
- E. Semi-Gloss: Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D523.
- F. Gloss: Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D523.
- G. High Gloss: Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D523.

1.04 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.
 - 1. Product List: For each product indicated, include the following:
 - 2. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
 - 3. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.
 - 4. VOC content.

1.05 CLOSEOUT SUBMITTALS

- A. Coating Maintenance manual: Manual: Upon conclusion of the project, the Contractor or paint manufacturer/supplier shall furnish a coating maintenance manual, such as Sherwin-Williams "Custodian Project Color and Product Information report or equal. Manual shall include an Area Summary with finish schedule, Area Detail designating where each product/color/finish was used, product data pages, Material Safety Data Sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

1.06 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Paint: 5 percent, but not less than 1 gal. of each material and color applied.
- B. Coating Maintenance Manual: Upon conclusion of the project, the Contractor or paint manufacturer/supplier shall furnish a coating maintenance manual, such as Sherwin-Williams "Custodian Project Color and Product Information report or equal. Manual shall include an Area Summary with finish schedule, Area Detail designating where each product/color/finish was used, product data pages, Material Safety Data Sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

1.07 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..
 - 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.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.
- B. Delivery and Handling: Deliver products to Project site in an undamaged condition in manufacturer's original sealed containers, complete with labels and instructions for handling, storing, unpacking, protecting, and installing. Packaging shall bear the manufacturer's label with the following information:
 - 1. Product name and type (description).

2. Batch date.
3. Color number.
4. VOC content.
5. Environmental handling requirements.
6. Surface preparation requirements.
7. Application instructions.

1.09 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
- C. Lead Paint: It is not expected that lead paint will be encountered in the Work.

PART 2 - PRODUCTS

2.01 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. Benjamin Moore & Co.
 2. PPG Architectural Finishes, Inc.
 3. Sherwin-Williams Company.

2.02 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. Anti-corrosive 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 selected by Architect from manufacturer's full range.
1. 30 percent of surface area will be painted with deep tones.

2.03 PRIMERS/SEALERS

- A. Primer Sealer, Latex, Interior: MPI #50.
1. Benjamin Moore - Ultra Spec 500 Latex Primer N534 (0 g/l), 50 X-Green (E3)
 2. Sherwin-Williams - Pro Mar 200 Zero - Interior Latex Primer - B28W02600/B28WQ2600 (E3)
 3. PPG - Speedhide Interior Latex - Quick-Drying #6-2 (E3)
- B. Primer, Latex, for Interior Wood: MPI #39.
1. Benjamin Moore - Fresh Start N023 Primer, CHPS Certified (E3)
 2. Sherwin-Williams - PrepRite ProBlock Primer Sealer - B51-620 Series, at 4.0 mils wet, 1.4 mils dry. (E3)
 3. Or approved equal.
- C. Primer, Alkyd, Anti-Corrosive, for Metal: MPI #79.
1. Benjamin Moore - Super Spec Alkyd Metal Primer P06, 1.9 mdf, VOC - 313 (E2)
 2. Sherwin-Williams - Protective & Marine - Kem Bond HS - B50WZ4 (E2)
 3. Rustoleum - High Performance - 7400 System - #2082402 (E2)
 4. Or approved equal
- D. Primer, Galvanized, Water Based: MPI #134.
1. Benjamin Moore Super Spec HP Acrylic Metal Primer P04/KP04.
 2. Sherwin Williams - Pro Industrial - Pro-Cryl Universal Primer - B66W310 (E2)
 3. Or approved equal.

2.04 WATER-BASED PAINTS

- A. Latex, Interior, High Performance Architectural, (Gloss Level 2): MPI #138.
1. Benjamin Moore Regal Select Waterborne Interior Paint - Eggshell Finish 549, 1.5 mdf, (0 g/l), MPI #138 X-Green, CHPS Certified.
 2. Sherwin-Williams - SuperPaint - Interior Latex Satin - A87W001151/A87WQ1151 (E3)
 3. Or approved equal.

PART 3 - EXECUTION

3.01 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. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers. Where acceptability of substrate conditions is in question, apply samples and perform in-situ testing to verify compatibility, adhesion, and film integrity of new paint application.
1. Report in writing conditions that may affect application, appearance, or performance of paint.
- B. Substrate Conditions:

1. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - a. Concrete: 12 percent.
 - b. Masonry (Clay and CMU): 12 percent.
 - c. Wood: 15 percent.
 - d. Gypsum Board: 12 percent.
 2. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Proceed with coating application only after unsatisfactory conditions have been corrected.
1. Application of coating indicates acceptance of surfaces and conditions.

3.02 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.
1. Concrete Floors: Remove oil, dust, grease, dirt and other foreign materials. Comply with SSPC-SP-13/NACE 6 or ICRI 03732.
- E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceed that permitted in manufacturer's written instructions.
1. SSPC-SP 3, "Power Tool Cleaning."
- F. 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."
- G. 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.

- H. Galvanized Metal Surfaces: 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.
- I. Aluminum Substrates: Remove loose surface oxidation.
- J. 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.
- K. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt and other foreign material that might impair the bond of paints to substrates.

3.03 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. Unless otherwise specified or noted, paint all "unfinished" conduits, piping, hangers, ductwork and other mechanical and electrical equipment with color and texture to match adjacent surfaces, in the following areas:
 - a. where exposed-to-view in all exterior and interior areas.
 - b. in all interior high humidity interior areas.
 - c. in all boiler room, mechanical and electrical rooms.
 - 2. In unfinished areas leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.

3. Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.
4. Do not paint over nameplates.
5. Paint the inside of all ductwork where visible behind louvers, grilles and diffusers for a minimum of 460 mm (18") or beyond sight line, whichever is greater, with primer and one coat of matt black (non-reflecting) paint.
6. Paint the inside of light valances gloss white.
7. Paint disconnect switches for fire alarm system and exit light systems in red enamel.
8. Paint red or band all fire protection piping and sprinkler lines in accordance with mechanical specification requirements and the AHJ. Keep sprinkler heads free of paint.
9. Paint yellow or band all natural gas piping in accordance with mechanical specification requirements and the AHJ.
10. Backprime and paint face and edges of plywood service panels for telephone and electrical equipment before installation to match adjacent wall surface. Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.
 - a. Uninsulated plastic piping.
 - b. Pipe hangers and supports.
 - c. Metal conduit.
 - d. Plastic conduit.
 - e. Tanks that do not have factory-applied final finishes.
 - f. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material. Coordinate the installation of required piping labels with the installing contractor in order to schedule painting prior to application of labels.
11. 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.
12. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.04 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.

3.05 PROTECTION

- A. Protect all exterior surfaces and areas, including landscaping, walks, drives, all adjacent building surfaces (including glass, aluminum surfaces, etc.) and equipment and any labels and signage from painting operations and damage by drop cloths, shields, masking, templates, or

other suitable protective means and make good any damage caused by failure to provide such protection.

- B. Protect all interior surfaces and areas, including glass, aluminum surfaces, etc. and equipment and any labels and signage from painting operations and damage by drop cloths, shields, masking, templates, or other suitable protective means and make good any damage caused by failure to provide such protection.
- C. Erect barriers or screens and post signs to warn of or limit or direct traffic away or around work area as required.

3.06 CLEANING

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site. Keep work area free from an unnecessary accumulation of tools, equipment, surplus materials and debris.
- 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. Remove combustible rubbish materials and empty paint cans each day and safely dispose of same in accordance with requirements of authorities having jurisdiction.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.07 INTERIOR PAINTING SCHEDULE

- A. Glazed Brick Masonry:
 - 1. Latex Systems
 - a. Semi-Gloss Finish
 - 1) First Coat: Benjamin Moore, Fresh Start High Hiding All-purpose Primer 0046, 1.2 mils DFT.
 - 2) Second Coat: Coronado, Rust Scat Acrylic WB Int/Ext Enamel Semi-Gloss C90, 1.4 - 1.7 mils DFT.
 - 3) Third Coat: Coronado, Rust Scat Acrylic WB Int/Ext Enamel Semi-Gloss C90, 1.4 - 1.7 mils DFT.
- B. Concrete Block Masonry (CMU)
 - 1. Latex System:
 - a. Semi Gloss Finish:
 - 1) First Coat: Benjamin Moore, Corotech Acrylic Block Filler V114, 8 - 16 mils DFT.
 - 2) Second Coat: Coronado, Rust Scat Acrylic WB Int/Ext Enamel Semi-Gloss C90, 1.4 - 1.7 mils DFT.
 - 3) Third Coat: Coronado, Rust Scat Acrylic WB Int/Ext Enamel Semi-Gloss C90, 1.4 - 1.7 mils DFT.
 - 2. Two Component Epoxy System (Water Base)
 - a. Gloss Finish:
 - 1) First Coat: Benjamin Moore, Corotech Acrylic Block Filler V114, 8 - 16 mils DFT.
 - 2) Second Coat: Benjamin Moore, Corotech Waterborne Amine Epoxy V440, 1.5 - 1.9 mils DFT.
 - 3) Third Coat: Benjamin Moore, Corotech Waterborne Amine Epoxy V440, 1.5 - 1.9 mils DFT.

- C. Concrete Substrates, Traffic Surfaces:
 - 1. Latex Floor Enamel System: (MPI INT 3.2A)
 - a. Prime Coat: Floor paint, latex, slip-resistant, matching topcoat.
 - b. Topcoat: Floor paint, latex slip-resistant, low gloss (maximum Gloss Level 3), MPI #60: Benjamin Moore - Insl-X Tough Shield Floor and Patio TS-3 (<200 g/l).
 - 2. Concrete Stain System (Water-based): (MPI INT 3.2E)
 - a. First Coat: Benjamin Moore - Insl-X Tuffcrete Waterborne Acrylic Concrete Stain CST-2xxx, 450-500 sq. ft. / gal., 153 g/l, MPI #58.
 - b. Second coat: Benjamin Moore - Insl-X Tuffcrete Waterborne Acrylic Concrete Stain CST-2xxx, 450-500 sq. ft. / gal., 153 g/l, MPI #58.
- D. Metal Substrates:
 - 1. Latex System:
 - a. Gloss Finish:
 - 1) First Coat: First Coat: Coronado, Rust Scat Int/Ext WB Acrylic Metal Primer 36, 1.5-1.9 mils .
 - 2) Second Coat: Coronado, Rust Scat Acrylic WB Int/Ext Enamel Semi-Gloss C90, 1.4-1.7 DFT.
 - 3) Third Coat: Coronado, Rust Scat Acrylic WB Int/Ext Enamel Semi-Gloss C90, 1.4-1.7 DFT.
 - 2. Acrylic System (Solvent Base Finish):
 - a. Gloss Finish Silicone Modified:
 - 1) First Coat: First Coat: Coronado Rust Scat Polyurethane Int-Ext Alkyd Metal Primer 35, 1.8-2.2 mils DFT .
 - 2) Second Coat: Coronado, Rust Scat Silicone Alkyd Enamel Gloss 39 , 2.0-2.5 mils DFT.
 - 3) Third Coat: Coronado, Rust Scat Silicone Alkyd Enamel Gloss 39 , 2.0-2.5 mils DFT.
- E. Metal (Steel Joists, Trusses)
 - 1. Latex Systems:
 - a. Gloss Finish:
 - 1) First Coat: First Coat: Coronado, Rust Scat Int/Ext WB Acrylic Metal Primer 36, 1.5-1.9 mils DFT.
 - 2) Second Coat: Coronado, Rust Scat Acrylic WB Int/Ext Enamel Semi-Gloss C90, 1.4-1.7 DFT.
 - 3) Third Coat: Coronado, Rust Scat Acrylic WB Int/Ext Enamel Semi-Gloss C90, 1.4-1.7 DFT.
 - 2. Alkyd System (Solvent Base Finish):
 - a. Gloss Finish Silicone Modified:
 - 1) First Coat: First Coat: Coronado Rust Scat Polyurethane Int-Ext Alkyd Metal Primer 35, 1.8-2.2 mils DFT.
 - 2) Second Coat: Coronado, Rust Scat Silicone Alkyd Enamel Gloss 39 , 2.0-2.5 mils DFT.
 - 3) Third Coat: Coronado, Rust Scat Silicone Alkyd Enamel Gloss 39 , 2.0-2.5 mils DFT.
- F. Galvanized-Metal and Aluminum Substrates:
 - 1. Pigmented Polyurethane System: (MPI INT 5.4C)
 - a. Prime Coat, MPI #105: Benjamin Moore - Corotech Acrylic Metal Primer V110, 1.5 - 2.0 mdf, (VOC ,<200)

- b. Intermediate Coat: Polyurethane, two-component, pigmented, matching topcoat.
 - c. Topcoat: Polyurethane, two-component, pigmented, gloss, MPI #105: Benjamin Moore - Corotech Urethane Waterborne Urethane Gloss, V540, 470-530 sq. ft. / gal., 1.6-1.8 mdf, (19 g/l).
 - 2. Latex System
 - a. Gloss Finish:
 - 1) First Coat: Coronado, Rust Scat Int/Ext WB Acrylic Metal Primer 36, 1.5-1.9 mils DFT.
 - 2) Second Coat: Coronado Rust Scat Acrylic WB Int/Ext Enamel Semi-Gloss C90, 1.4-1.7 mils DFT.
 - 3) Third Coat: Coronado, Rust Scat Acrylic WB Int/Ext Enamel Semi-Gloss C90, 1.4-1.7 mils DFT.
 - 3. Alkyd System (Waterbased)
 - a. Gloss Finish:
 - 1) First Coat: Coronado, Rust Scat Int/Ext WB Acrylic Metal Primer 36, 1.5 - 1.9 mils DFT.
 - 2) Second Coat: Coronado, Super Kote 5000 Waterborne Acrylic Alkyd Semi-Gloss Finish 204, 1.4 - 1.6 mils DFT.
 - 3) Third Coat: Coronado, Super Kote 5000 Waterborne Acrylic Alkyd Semi-Gloss Finish 204, 1.4 - 1.6 mils DFT.
- G. Wood Substrates:
- 1. Latex System:
 - a. Semi-Gloss Finish:
 - 1) First Coat: Benjamin Moore, Fresh Start Latex Primer 023 1.2 DFT.
 - 2) Second Coat: Coronado, Rust Scat Acrylic WB Int/Ext Enamel Semi-Gloss C90, 1.4-1.7 DFT.
 - 3) Third Coat: Coronado, Rust Scat Acrylic WB Int/Ext Enamel Semi-Gloss C90, 1.4-1.7 DFT.
 - 2. Stain and Varnish System:
 - a. Gloss Finish:
 - 1) First Coat: Lenmar Waterborne Interior Wiping Stain 1WB.1300.
 - 2) Second Coat: Lenmar Waterborne Aqua-Plastic Urethane Gloss 1WB.1400 .
 - 3) Third Coat: Lenmar Waterborne Aqua-Plastic Urethane Gloss 1WB.1400.
- H. Gypsum Board Substrates:
- 1. Latex System:
 - a. Semi-Gloss Finish:
 - 1) First Coat: Benjamin Moore, Ultra Spec 500 Interior Latex Primer N534.
 - 2) Second Coat: Coronado, Rust Scat Acrylic WB Int/Ext Enamel Semi-Gloss C90, 1.4-1.7 DFT .
 - 3) Third Coat: Coronado, Rust Scat Acrylic WB Int/Ext Enamel Semi-Gloss C90, 1.4-1.7 DFT.
 - 2. Institutional Low-Odor/VOC Latex System: (MPI INT 9.2M)
 - a. Prime Coat: Primer sealer, interior, institutional low odor/VOC, MPI #149 X- Green. Benjamin Moore - Ultra Spec 500 Latex Primer, N534, (0 g/l).
 - b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
 - c. Topcoat: Latex, interior, institutional low odor/VOC, flat (Gloss Level 1), MPI #143: Benjamin Moore - Ultra-Spec 500 Latex Flat, N536, (0 g/l), CHPS Certified.
 - 3. High-Performance Architectural Latex System: (INT 9.2B)

- a. Prime Coat: Primer sealer, latex, interior, MPI #50 X-Green. Benjamin Moore - Ultra Spec 500 Latex Primer, N534, (0 g/l),
- b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
- c. Topcoat: Latex, interior, high performance architectural, (Gloss Level 3), MPI #139: Benjamin Moore Ultra spec 500 Latex Eggshell, N538, (0 g/l), CHPS certified.
- 4. Water-Based Light Industrial Coating System:
 - a. Prime Coat: Primer sealer, latex, interior, MPI #50 X-Green: Benjamin Moore - Ultra Spec 500 Latex Primer, N534, (0 g/l).
 - b. Intermediate Coat: Light industrial coating, interior, water based, matching topcoat.
 - c. Topcoat: Light industrial coating, interior, water based, eggshell, (Gloss Level 3), MPI #151: Benjamin Moore - Corotech Pre-Catalyzed Waterborne Epoxy Eggshell, v342, 1.5- 2.0 mdf, (VOC-72).
 - d. Topcoat: Light industrial coating, interior, water based, semi-gloss, (Gloss Level 5), MPI #153 X-Green: S Benjamin Moore Ultra Spec HP DTM Acrylic Enamel Semi-Gloss HP29, 2.3 mdf, (VOC-45).
- 5. Epoxy-Modified Latex System: (MPI INT 9.2F)
 - a. Prime Coat: Primer sealer, latex, interior, MPI #50 X-Green: Benjamin Moore - Ultra Spec 500 Latex Primer, N534, (0 g/l).
 - b. Intermediate Coat: Epoxy-modified latex, interior, matching topcoat.
 - c. Topcoat: Epoxy-modified latex, interior, eggshell, (Gloss Level 3), MPI #115: Benjamin Moore - Corotech Pre-Catalyzed Waterborne Epoxy Eggshell, V342, 1.5 - 2.0 mdf, (VOC-72).
 - d. Topcoat: Epoxy-modified latex, interior, gloss, (Gloss Level 6), MPI #115: Benjamin Moore - Corotech, Acrylic Epoxy Gloss, V450/V450-90, 1.5 - 2.0 mdf, (168 g/l).

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Window shades and accessories.

1.02 PRICE AND PAYMENT PROCEDURES

- A. See Section 012100 - Allowances, for cash allowances affecting this section.

1.03 REFERENCE STANDARDS

- A. ASTM D4674 - Standard Practice for Accelerated Testing for Color Stability of Plastics Exposed to Indoor Office Environments; 2002a (Reapproved 2010).

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Sequencing:
 - 1. Do not fabricate shades until field dimensions for each opening have been taken.
 - 2. Do not install shades until final surface finishes and painting are complete.

1.05 SUBMITTALS

- A. See Section 013300 - SUBMITTALS, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets including materials, finishes, fabrication details, dimensions, profiles, mounting requirements, and accessories.
- C. Shop Drawings: Include shade schedule indicating size, location and keys to details, head, jamb and sill details, mounting dimension requirements for each product and condition, and operation direction.
- D. Samples:
 - 1. Minimum size 6 inches square, representing actual materials, color and pattern of each shade type material.
 - 2. Metal finishes: 2 inch square samples of entire color offering for selection by the Architect.
- E. Manufacturer's Instructions: Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- F. Warranty: Submit sample of manufacturer's warranty and documentation of final executed warranty completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of this type with minimum 5 years of documented experience.

1.07 MOCK-UP

- A. Mock-Up: Provide full size mock-up of window shade complete with selected shade fabric including sample of seam when applicable.
 - 1. Obtain Architect's approval of light and privacy characteristics of fabric prior to fabrication.
 - 2. Full-sized mock-up will become the property of the Owner to be used for spare parts.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Schedule delivery after building is enclosed and construction is Substantially Complete.
- B. Deliver shades in manufacturer's unopened packaging, labeled to identify each shade for each opening.
- C. Handle and store shades in accordance with manufacturer's recommendations.

1.09 FIELD CONDITIONS

- A. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.10 WARRANTY

- A. Provide manufacturer's warranty from Date of Substantial Completion, covering the following:
 - 1. Shade Hardware: One year.
 - 2. Fabric: One year.
 - 3. Aluminum and Steel Coatings: One year.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Manually Operated, Dual Roller Shades:
 - 1. Draper, Inc; Clutch Operated FlexShade - Dual Rollers: www.draperinc.com/sle.
 - 2. Or approved equal.
- B. Shade Fabric:
 - 1. Phifer, Inc; Style 2410 3%: www.phifer.com.
 - 2. Color: As selected by the Architect from the manufacturer's full color offering.
- C. Source Limitations: Furnish products produced by a single manufacturer and obtained from a single supplier.

2.02 WINDOW SHADE APPLICATIONS

- A. Shades at windows as indicated: Blackout shades with second shade in same opening.
 - 1. Type: Dual Roller shades.
 - 2. Color: As selected by Architect from manufacturer's full range of colors.
 - 3. Mounting: Inside and outside, where indicated on drawings.
 - 4. Operation: Manual.

2.03 ACCESSORIES

- A. Endcaps: 1028 steel stamping. Complete with adapter roller bracket. Installs to wall or ceiling. Accepts fascia.
- B. Nominal size: 4-3/4 inches deep by 7 inches high by length required by window opening, with a return of 1-11/16 inches.
- C. Fascias: Size as required to conceal dual shade mounting.
 - 1. Fascia: L-shaped cover of extruded aluminum, 0.060 wall. Assembly snaps onto endcaps without exposed fasteners. Clear Anodized (standard) or color powder coat finish as selected by the Architect / Owner.
 - 2. Style: As selected by Architect from shade manufacturer's full selection.
- D. Rescue Window Labels: One window and associated shade per classroom or teaching area shall be deemed a "rescue window", for egress in case of emergency. All rescue windows shall comply with SED regulations and applicable codes and shall include a conforming label. At a minimum, provide the following:
 - 1. Letters: bright yellow background with black letters
 - 2. Label size: 3 inches high by 5 inches wide
 - 3. Text: the words "RESCUE WINDOW" must be visible from Interior and Exterior sides of each rescue window.
 - 4. Any window treatment/coverings at each of these locations must also have labels.
 - 5. Visible window operating instructions shall be provided if operation is not readily apparent.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine finished openings for deficiencies that may preclude satisfactory installation.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Start of installation shall be considered acceptance of substrates.

3.02 PREPARATION

- A. Field verify window dimensions prior to fabrication.
- B. Prepare surfaces using methods recommended by manufacturer for achieving best result for substrate under the project conditions.
- C. Coordinate with window installation and placement of concealed blocking to support shades.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions and approved shop drawings, using mounting devices as indicated.
- B. Installation Tolerances:
 - 1. Maximum Offset From Level: 1/16 inch (1.5 mm).

- C. Adjust level, projection and shade centering from mounting bracket. Verify there is no telescoping of shade fabric. Ensure smooth shade operation.

3.04 CLEANING

- A. Clean soiled shades and exposed components as recommended by manufacturer.
- B. Replace shades that cannot be cleaned to "like new" condition.

3.05 CLOSEOUT ACTIVITIES

- A. Demonstration: Demonstrate operation and maintenance of window shade system to Owner's personnel.
- B. Training: Train Owner's personnel on operation and maintenance of system.
 - 1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
 - 2. Provide minimum of two hours training by manufacturer's authorized personnel at location designated by the Owner.

3.06 PROTECTION

- A. Protect installed products from subsequent construction operations.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section includes plastic-laminate countertops.

1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
 - 1. Show locations and sizes of cutouts and holes for installed in plastic-laminate countertops.
 - 2. Apply AWI Quality Certification Program label to Shop Drawings.
- C. Samples for Initial Selection:
 - 1. Plastic laminates.

1.04 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For fabricator.
- B. Woodwork Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

1.05 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance. Shop is a certified participant in AWI's Quality Certification Program.
- B. Installer Qualifications: Certified participant in AWI's Quality Certification Program.
- C. 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.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver countertops until painting and similar operations that could damage countertops have been completed in installation areas. If countertops must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.07 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install countertops until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Environmental Limitations: Do not deliver or install countertops until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity between 25 and 55 percent during the remainder of the construction period.
- C. Field Measurements: Where countertops are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- D. Established Dimensions: Where countertops are indicated to fit to other construction, establish dimensions for areas where countertops are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.01 PLASTIC-LAMINATE COUNTERTOPS

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades indicated for construction, installation, and other requirements.
 - 1. Provide certificates from AWI certification program indicating that countertops, including installation, comply with requirements of grades specified.
 - 2. The Contract Documents contain selections chosen from options in the quality standard and additional requirements beyond those of the quality standard. Comply with those selections and requirements in addition to the quality standard.
- B. Grade: Custom.
- C. Regional Materials: Plastic-laminate countertops shall be manufactured within 500 miles (800 km) of Project site.
- D. High-Pressure Decorative Laminate: NEMA LD 3, Grade HGS .
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Formica Corporation
 - b. Wilsonart International Holdings, Inc
 - c. Or approved equal.
- E. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
 - 1. As indicated by manufacturer's designations.
 - 2. Match Architect's sample.
 - 3. As selected by Architect from manufacturer's full range in the following categories:
 - a. Solid colors, matte finish.
 - b. Solid colors with core same color as surface, matte finish.

- c. Wood grains, matte finish.
 - d. Patterns, matte finish.
- 4. Grain Direction: Parallel to cabinet fronts.
- F. Edge Treatment: Same as laminate cladding on horizontal surfaces.
- G. Core Material: Particleboard Particleboard made with exterior glue.
- H. Core Thickness: 3/4 inch (19 mm).
 - 1. Build up countertop thickness to 1-1/2 inches (38 mm) at front, back, and ends with additional layers of core material laminated to top.
- I. Paper Backing: Provide paper backing on underside of countertop substrate.

2.02 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard unless otherwise indicated.
 - 1. Wood Moisture Content: 5 to 10 percent.
- B. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.
 - 1. Recycled Content of Medium-Density Fiberboard and Particleboard: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 10 percent.
 - 2. Particleboard: ANSI A208.1, Grade M-2, made with binder containing no urea formaldehyde.

2.03 ACCESSORIES

- A. Grommets for Cable Passage through Countertops :2-inch (51-mm) OD, Color as selected by the Architect, molded-plastic grommets and matching plastic caps with slot for wire passage.
 - 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. Doug Mockett & Company, Inc.; SG Series.
 - b. Or approved equal.

2.04 MISCELLANEOUS MATERIALS

- A. Adhesives: Do not use adhesives that contain urea formaldehyde.
- B. Adhesive for Bonding Plastic Laminate: Unpigmented contact cement .
 - 1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.
- C. VOC Limits for Installation Adhesives and Sealants: Use products that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - 1. Wood Glues: 30 g/L.
 - 2. Multipurpose Construction Adhesives: 70 g/L.
 - 3. Structural Wood Member Adhesive: 140 g/L.
 - 4. Architectural Sealants: 250 g/L.

2.05 FABRICATION

- A. Fabricate countertops to dimensions, profiles, and details indicated. Provide front and end overhang of 1 inch (25 mm) over base cabinets. Ease edges to radius indicated for the following:
 - 1. Solid-Wood (Lumber) Members: 1/16 inch (1.5 mm) unless otherwise indicated.
- B. Complete fabrication, including assembly, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
 - 1. Notify Architect seven days in advance of the dates and times woodwork fabrication will be complete.
 - 2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements before disassembling for shipment.
- C. Shop cut openings to maximum extent possible to receive 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. Sand edges of cutouts to remove splinters and burrs.
 - 1. Seal edges of openings in countertops with a coat of varnish.

PART 3 EXECUTION

3.01 PREPARATION

- A. Before installation, condition countertops to average prevailing humidity conditions in installation areas.
- B. Before installing countertops, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.02 INSTALLATION

- A. Grade: Install countertops to comply with same grade as item to be installed.
- B. Assemble countertops and complete fabrication at Project site to the extent that it was not completed in the shop.
 - 1. Provide cutouts for appliances, plumbing fixtures, electrical work, and similar items.
 - 2. Seal edges of cutouts by saturating with varnish.
- C. Field Jointing: Where possible, make in the same manner as shop jointing, using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be joined in shop so Project-site processing of top and edge surfaces is not required. Locate field joints where shown on Shop Drawings.
 - 1. Secure field joints in plastic-laminate countertops with concealed clamping devices located within 6 inches (150 mm) of front and back edges and at intervals not exceeding 24 inches (600 mm). Tighten according to manufacturer's written instructions to exert a constant, heavy-clamping pressure at joints.

- D. Install countertops level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm).
- E. Scribe and cut countertops to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- F. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
 - 1. Install countertops with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) sag, bow, or other variation from a straight line.
 - 2. Secure backsplashes to tops with concealed metal brackets at 16 inches (400 mm) o.c. and to walls with adhesive.
 - 3. Seal junctures of tops, splashes, and walls with mildew-resistant silicone sealant or another permanently elastic sealing compound recommended by countertop material manufacturer.

3.03 ADJUSTING AND CLEANING

- A. Repair damaged and defective countertops, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
- B. Clean countertops on exposed and semi-exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION

SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING

H2M

Irvington Union Free School District
Main Street School Renovations
Main Street School
SED No.: 66-04-02-02-0-001-016

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Pipe sleeves.

1.02 RELATED REQUIREMENTS

- A. Section 078400 - Firestopping.
- B. Section 099113 - Exterior Painting: Preparation and painting of exterior piping systems.
- C. Section 099123 - Interior Painting: Preparation and painting of interior piping systems.
- D. Section 220523 - General-Duty Valves for Plumbing Piping.
- E. Section 220553 - Identification for Plumbing Piping and Equipment: Piping identification.
- F. Section 220719 - Plumbing Piping Insulation.

1.03 REFERENCE STANDARDS

- A. ASTM C592 - Standard Specification for Mineral Fiber Blanket Insulation and Blanket-Type Pipe Insulation (Metal-Mesh Covered) (Industrial Type); 2016.
- B. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2013a (Reapproved 2017).

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate pipe materials used, jointing methods, supports, floor and wall penetration seals. Indicate installation, layout, weights, mounting and support details, and piping connections.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified this section.
 - 1. Minimum three years experience.
 - 2. Approved by manufacturer.
- C. Clean equipment, pipes, valves, and fittings of grease, metal cuttings, and sludge that may have accumulated from the installation and testing of the system.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store sleeve and sleeve seals in shipping containers, with labeling in place.

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- B. Provide temporary protective coating on cast iron and steel sleeves if shipped loose.

1.07 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 PIPE SLEEVES

- A. Manufacturers:
 - 1. Flexicraft Industries; Pipe Wall Sleeve: www.flexicraft.com/#sle.
 - 2. Substitutions: See Section 016000 - Product Requirements.
- B. Plastic or Sheet Metal: Pipe passing through interior walls, partitions, and floors, unless steel or brass sleeves are specified below.
- C. Pipe Passing Through Below Grade Exterior Walls:
 - 1. Zinc coated or cast iron pipe.
 - 2. Provide watertight space with link rubber or modular seal between sleeve and pipe on both pipe ends.

PART 3 EXECUTION

3.01 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and foreign material, from inside and outside, before assembly.

3.02 INSTALLATION

- A. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient.
- B. Install piping to conserve building space, to not interfere with use of space and other work.
- C. Install piping and pipe sleeves to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- D. Provide sleeves when penetrating footings, floors, and walls. Seal pipe including sleeve penetrations to achieve fire resistance equivalent to fire separation required.
 - 1. Underground Piping: Caulk pipe sleeve watertight with lead and oakum or mechanically expandable chloroprene inserts with bitumen sealed metal components.
 - 2. Aboveground Piping:
 - a. Pack solid using mineral fiber complying with ASTM C592.
 - b. Fill space with an elastomer caulk to a depth of 0.50 inch (15 mm) where penetrations occur between conditioned and unconditioned spaces.
 - 3. All Rated Openings: Caulk tight with fire stopping material complying with ASTM E814 in accordance with Section 078400 to prevent the spread of fire, smoke, and gases.

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- 4. Caulk exterior wall sleeves watertight with lead and oakum or mechanically expandable chloroprene inserts with mastic-sealed components.
- E. When installing more than one piping system material, ensure system components are compatible and joined to ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.

3.03 CLEANING

- A. Upon completion of work, clean all parts of the installation.
- B. Clean equipment, pipes, valves, and fittings of grease, metal cuttings, and sludge that may have accumulated from the installation and testing of the system.
- C. See Section 017419 - Construction Waste Management and Disposal, for additional requirements.

END OF SECTION

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PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Applications.
- B. General requirements.
- C. Ball valves.
- D. Check valves.
- E. Gate valves.

1.02 RELATED REQUIREMENTS

- A. Section 083100 - Access Doors and Panels.
- B. Section 220553 - Identification for Plumbing Piping and Equipment.
- C. Section 220719 - Plumbing Piping Insulation.
- D. Section 221005 - Plumbing Piping.

1.03 ABBREVIATIONS AND ACRONYMS

- A. CWP: Cold working pressure.
- B. EPDM: Ethylene propylene copolymer rubber.
- C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.
- D. NRS: Non-rising stem.
- E. OS&Y: Outside screw and yoke.
- F. PTFE: Polytetrafluoroethylene.
- G. RS: Rising stem.
- H. SWP: Steam working pressure.
- I. TFE: Tetrafluoroethylene.
- J. WOG: Water, oil, and gas.

1.04 REFERENCE STANDARDS

- A. ASME B1.20.1 - Pipe Threads, General Purpose (Inch); 2013 (Reaffirmed 2018).
- B. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250; 2015.

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- C. ASME B16.5 - Pipe Flanges and Flanged Fittings NPS 1/2 Through NPS 24 Metric/Inch Standard; 2017.
- D. ASME B16.10 - Face-to-Face and End-to-End Dimensions of Valves; 2017.
- E. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2018.
- F. ASME B16.34 - Valves - Flanged, Threaded and Welding End; 2017.
- G. ASME B31.9 - Building Services Piping; 2020.
- H. ASME BPVC-IX - Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators - Welding Brazing and Fusing Qualifications; 2019.
- I. ASTM B61 - Standard Specification for Steam or Valve Bronze Castings; 2015.
- J. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings; 2017.
- K. AWWA C606 - Grooved and Shouldered Joints; 2015.
- L. MSS SP-80 - Bronze Gate, Globe, Angle and Check Valves; 2013.
- M. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends; 2010.
- N. NSF 61 - Drinking Water System Components - Health Effects; 2020.
- O. NSF 372 - Drinking Water System Components - Lead Content; 2020.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on valves including manufacturers catalog information. Submit performance ratings, rough-in details, weights, support requirements, and piping connections.
- C. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- D. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, maintenance and repair data, and parts listings.
- E. Maintenance Materials: Furnish Owner with one wrench for every five plug valves, in each size of square plug valve head.
 - 1. See Section 016000 - Product Requirements, for additional provisions.

1.06 QUALITY ASSURANCE

- A. Manufacturer:
 - 1. Obtain valves for each valve type from single manufacturer.

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2. Company must specialize in manufacturing products specified in this section, with not less than three years of documented experience.

B. Welding Materials and Procedures: Comply with ASME BPVC-IX.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
 1. Minimize exposure of operable surfaces by setting plug and ball valves to open position.
 2. Protect valve parts exposed to piped medium against rust and corrosion.
 3. Protect valve piping connections such as grooves, weld ends, threads, and flange faces.
 4. Adjust globe, gate, and angle valves to the closed position to avoid clattering.
 5. Secure check valves in either the closed position or open position.
 6. Adjust butterfly valves to closed or partially closed position.
- B. Use the following precautions during storage:
 1. Maintain valve end protection and protect flanges and specialties from dirt.
 - a. Provide temporary inlet and outlet caps.
 - b. Maintain caps in place until installation.
 2. Store valves in shipping containers and maintain in place until installation.
 - a. Store valves indoors in dry environment.
 - b. Store valves off the ground in watertight enclosures when indoor storage is not an option.

1.08 EXERCISE THE FOLLOWING PRECAUTIONS FOR HANDLING:

- A. Handle large valves with sling, modified to avoid damage to exposed parts.
- B. Avoid the use of operating handles or stems as rigging or lifting points.

PART 2 PRODUCTS

2.01 APPLICATIONS

- A. See drawings for specific valve locations.
- B. Provide the following valves for the applications if not indicated on drawings:
 1. Shutoff: gate or ball valve.
- C. Substitutions of valves with higher CWP classes or SWP ratings for same valve types are permitted when specified CWP ratings or SWP classes are not available.

2.02 GENERAL REQUIREMENTS

- A. Valve Pressure and Temperature Ratings: No less than rating indicated; as required for system pressures and temperatures.
- B. Valve Sizes: Match upstream piping unless otherwise indicated.
- C. Valve Actuator Types:
 1. Hand Lever: Quarter-turn valves 6 NPS (150 DN) and smaller except plug valves.

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- D. Valve-End Connections:
 - 1. Threaded End Valves: ASME B1.20.1.
 - 2. Flanges on Iron Valves: ASME B16.1 for flanges on iron valves.
 - 3. Pipe Flanges and Flanged Fittings 1/2 NPS (15 DN) through 24 NPS (600 DN): ASME B16.5.
 - 4. Solder Joint Connections: ASME B16.18.
 - 5. Grooved End Connections: AWWA C606.
- E. General ASME Compliance:
 - 1. Ferrous Valve Dimensions and Design Criteria: ASME B16.10 and ASME B16.34.
 - 2. Solder-joint Connections: ASME B16.18.
 - 3. Building Services Piping Valves: ASME B31.9.
- F. Potable Water Use:
 - 1. Certified: Approved for use in compliance with NSF 61 and NSF 372.
 - 2. Lead-Free Certified: Wetted surface material includes less than 0.25 percent lead content.
- G. Bronze Valves:
 - 1. Fabricate from dezincification resistant material.
 - 2. Copper alloys containing more than 15 percent zinc are not permitted.
- H. Source Limitations: Obtain each valve type from a single manufacturer.

2.03 BRASS, BALL VALVES

- A. One-Piece, Reduced-Port with Brass Trim:
 - 1. Comply with MSS SP-110.
 - 2. Body: Forged brass.
 - 3. Ends: Threaded.
 - 4. Seats: PTFE.
 - 5. Stem: Brass.
 - 6. Ball: Chrome-plated brass.
 - 7. Manufacturers:
 - a. Ferguson Enterprises Inc: www.fnw.com/#sle.
 - b. Substitutions: See Section 016000 - Product Requirements.

2.04 BRONZE, LIFT CHECK VALVES

- A. General:
 - 1. Fabricate from dezincification resistant material.
 - 2. Copper alloys containing more than 15 percent zinc are not permitted.
- B. Class 125:
 - 1. Comply with MSS SP-80, Type 1, Metal Disc to Metal Seat and Type 2, Nonmetallic Disc to Metal Seat.
 - 2. CWP Rating: 200 psig (1380 kPa).
 - 3. Design: Vertical flow.
 - 4. Body: Comply with ASTM B61 or ASTM B62, bronze.
 - 5. Ends: Threaded as indicated.

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2.05 BRONZE, GATE VALVES

- A. General:
 - 1. Fabricate from dezincification resistant material.
 - 2. Copper alloys containing more than 15 percent zinc are not permitted.
- B. Non-Rising Stem (NRS) or Rising Stem (RS):
 - 1. Comply with MSS SP-80, Type I.
 - 2. Class 125: CWP Rating: 200 psig: (1380 kPa), and Class 150: CWP Rating: 300 psig: (2070 kPa).
 - 3. Body: ASTM B62, bronze with integral seat and screw-in bonnet.
 - 4. Ends: Threaded or solder joint joint.
 - 5. Stem: Bronze.
 - 6. Disc: Solid wedge; bronze.
 - 7. Packing: Asbestos free.
 - 8. Handwheel: Malleable iron, bronze, or aluminum.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Discard all packing materials and verify that valve interior, including threads and flanges are completely clean without signs of damage or degradation that could result in leakage.
- B. Verify valve parts to be fully operational in all positions from closed to fully open.
- C. Confirm gasket material to be suitable for the service, to be of correct size, and without defects that could compromise effectiveness.
- D. Should valve is determined to be defective, replace with new valve.

3.02 INSTALLATION

- A. Provide unions or flanges with valves to facilitate equipment removal and maintenance while maintaining system operation and full accessibility for servicing.
- B. Provide separate valve support as required and locate valve with stem at or above center of piping, maintaining unimpeded stem movement.
- C. Where valve support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welds.

END OF SECTION

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PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Support and attachment components for equipment, piping, and other plumbing work.

1.02 RELATED REQUIREMENTS

- A. Section 033000 - Cast-in-Place Concrete: Concrete equipment pads.
- B. Section 055000 - Metal Fabrications: Materials and requirements for fabricated metal supports.

1.03 REFERENCE STANDARDS

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2019.
- D. MFMA-4 - Metal Framing Standards Publication; 2004.
- E. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2018.
- F. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.
 - 2. Coordinate the work with other trades to provide additional framing and materials required for installation.
 - 3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
 - 4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
 - 5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Sequencing:
 - 1. Do not install products on or provide attachment to concrete surfaces until concrete has fully cured in accordance with Section 033000.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.

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- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for metal channel (strut) framing systems, nonpenetrating rooftop supports, post-installed concrete and masonry anchors, and thermal insulated pipe supports.
- C. Shop Drawings: Include details for fabricated hangers and supports where materials or methods other than those indicated are proposed for substitution.
- D. Evaluation Reports: For products specified as requiring evaluation and recognition by ICC Evaluation Service, LLC (ICC-ES), provide current ICC-ES evaluation reports upon request.
- E. Installer's Qualifications: Include evidence of compliance with specified requirements.
- F. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.06 QUALITY ASSURANCE

- A. Comply with applicable building code.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Installer Qualifications for Field-Welding: As specified in Section 055000.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 SUPPORT AND ATTACHMENT COMPONENTS

- A. General Requirements:
 - 1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of plumbing work.
 - 2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
 - 3. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported. Include consideration for vibration, equipment operation, and shock loads where applicable.
 - 4. Do not use wire, chain, perforated pipe strap, or wood for permanent supports unless specifically indicated or permitted.
 - 5. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
 - a. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
 - b. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.
- B. Materials for Metal Fabricated Supports: Comply with Section 055000.

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- C. Metal Channel (Strut) Framing Systems:
 - 1. Comply with MFMA-4.
- D. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.
- E. Anchors and Fasteners:
 - 1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.
 - 2. Post-Installed Concrete and Masonry Anchors: Evaluated and recognized by ICC Evaluation Service, LLC (ICC-ES) for compliance with applicable building code.

PART 3 EXECUTION

3.01 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.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install anchors and fasteners in accordance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.
- C. Provide independent support from building structure. Do not provide support from piping, ductwork, conduit, or other systems.
- D. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.
- E. Unless specifically indicated or approved by Architect, do not provide support from roof deck.
- F. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
- G. Field-Welding (where approved by Architect): Comply with Section 055000.
- H. Provide thermal insulated pipe supports complete with hangers and accessories. Install thermal insulated pipe supports during the installation of the piping system.
- I. Equipment Support and Attachment:
 - 1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
 - 2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
 - 3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.

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4. Unless otherwise indicated, mount floor-mounted equipment on properly sized 3 inch (80 mm) high concrete pad constructed in accordance with Section 033000.
 5. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.
- J. Secure fasteners according to manufacturer's recommended torque settings.
- K. Remove temporary supports.

3.03 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Inspect support and attachment components for damage and defects.
- C. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- D. Correct deficiencies and replace damaged or defective support and attachment components.

END OF SECTION

IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

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PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Nameplates.
- B. Tags.
- C. Stencils.
- D. Pipe markers.
- E. Ceiling tacks.

1.02 RELATED REQUIREMENTS

- A. Section 099123 - Interior Painting: Identification painting.

1.03 REFERENCE STANDARDS

- A. ASME A13.1 - Scheme for the Identification of Piping Systems; 2020.
- B. ASTM D709 - Standard Specification for Laminated Thermosetting Materials; 2017.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. List: Submit list of wording, symbols, letter size, and color coding for mechanical identification.
- C. Chart and Schedule: Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.
- D. Product Data: Provide manufacturers catalog literature for each product required.
- E. Manufacturer's Installation Instructions: Indicate special procedures, and installation.

PART 2 PRODUCTS

2.01 IDENTIFICATION APPLICATIONS

- A. Piping: Tags.
- B. Small-sized Equipment: Tags.
- C. Tanks: Nameplates.
- D. Valves: Tags and ceiling tacks where located above lay-in ceiling.

2.02 NAMEPLATES

- A. Manufacturers:

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1. Brimar Industries, Inc: www.pipemarker.com/#sle.
 2. Kolbi Pipe Marker Co: www.kolbipipemarkers.com/#sle.
 3. Seton Identification Products: www.seton.com/#sle.
 4. Substitutions: See Section 016000 - Product Requirements.
- B. Description: Laminated three-layer plastic with engraved letters.
1. Letter Color: White.
 2. Letter Height: 1/4 inch (6 mm).
 3. Background Color: Black.
 4. Plastic: Comply with ASTM D709.

2.03 TAGS

- A. Manufacturers:
1. Advanced Graphic Engraving: www.advancedgraphicengraving.com/#sle.
 2. Brady Corporation: www.bradycorp.com/#sle.
 3. Brimar Industries, Inc: www.pipemarker.com/#sle.
 4. Craftmark Pipe Markers: www.craftmarkid.com/#sle.
 5. Kolbi Pipe Marker Co: www.kolbipipemarkers.com/#sle.
 6. Seton Identification Products: www.seton.com/#sle.
 7. Substitutions: See Section 016000 - Product Requirements.
- B. Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inch (40 mm) diameter.
- C. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch (40 mm) diameter with smooth edges.

2.04 STENCILS

- A. Manufacturers:
1. Brady Corporation: www.bradycorp.com/#sle.
 2. Craftmark Pipe Markers: www.craftmarkid.com/#sle.
 3. Kolbi Pipe Marker Co.: www.kolbipipemarkers.com/#sle.
 4. Seton Identification Products: www.seton.com/#sle.
 5. Substitutions: See Section 016000 - Product Requirements.
- B. Stencils: With clean cut symbols and letters of following size:
1. 3/4 to 1-1/4 inch (20-30 mm) Outside Diameter of Insulation or Pipe: 8 inch (200 mm) long color field, 1/2 inch (15 mm) high letters.
 2. 1-1/2 to 2 inch (40-50 mm) Outside Diameter of Insulation or Pipe: 8 inch (200 mm) long color field, 3/4 inch (20 mm) high letters.
 3. 2-1/2 to 6 inch (65-150 mm) Outside Diameter of Insulation or Pipe: 12 inch (300 mm) long color field, 1-1/4 inch (30 mm) high letters.

2.05 PIPE MARKERS

- A. Manufacturers:
1. Brady Corporation: www.bradycorp.com/#sle.
 2. Brimar Industries, Inc: www.pipemarker.com/#sle.
 3. Kolbi Pipe Marker Co; _____: www.kolbipipemarkers.com/#sle.

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4. Seton Identification Products: www.seton.com/#sle.
 5. Substitutions: See Section 016000 - Product Requirements.
- B. Comply with ASME A13.1.
- C. Plastic Pipe Markers: Factory fabricated, flexible, semi- rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.
- D. Underground Plastic Pipe Markers: Bright colored continuously printed plastic ribbon tape, minimum 6 inches (150 mm) wide by 4 mil (0.10 mm) thick, manufactured for direct burial service.
- E. Color code as follows:
1. Potable, Cooling, Boiler, Feed, Other Water: Green with white letters.

2.06 CEILING TACKS

- A. Manufacturers:
1. Craftmark Pipe Markers: www.craftmarkid.com/#sle.
 2. Substitutions: See Section 016000 - Product Requirements.
- B. Description: Steel with 3/4 inch (20 mm) diameter color coded head.
- C. Color code as follows:
1. Plumbing Valves: Green.

PART 3 EXECUTION

3.01 PREPARATION

- A. Degrease and clean surfaces to receive adhesive for identification materials.

3.02 INSTALLATION

- A. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
- B. Install tags with corrosion resistant chain.
- C. Install plastic pipe markers in accordance with manufacturer's instructions.
- D. Install underground plastic pipe markers 6 to 8 inches (150 to 200 mm) below finished grade, directly above buried pipe.
- E. Use tags on piping 3/4 inch (20 mm) 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 (6 m) 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

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PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Piping insulation.

1.02 RELATED REQUIREMENTS

- A. Section 099113 - Exterior Painting: Painting insulation jacket.
- B. Section 099123 - Interior Painting: Painting insulation jacket.
- C. Section 221005 - Plumbing Piping: Placement of hangers and hanger inserts.

1.03 REFERENCE STANDARDS

- A. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2020a.
- B. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2019.
- C. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation; 2021.
- D. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2013 (Reapproved 2019).
- E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018a.
- F. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
- G. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.
- C. Manufacturer's Instructions: Indicate installation procedures that ensure acceptable workmanship and installation standards will be achieved.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

- c. Moisture Vapor Permeability: 0.002 perm inch (0.0029 ng/Pa s m), maximum, when tested in accordance with ASTM E96/E96M.
- d. Thickness: 10 mil (0.25 mm).
- e. Connections: Brush on welding adhesive.
- 3. Covering Adhesive Mastic: Compatible with insulation.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that piping has been tested before applying insulation materials.
- B. Verify that surfaces are clean and dry, with foreign material removed.

3.02 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. For hot piping conveying fluids 140 degrees F (60 degrees C) or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.
- F. Inserts and Shields:
 - 1. Application: Piping 1-1/2 inches (40 mm) 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 (150 mm) 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.
- G. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces (less than 10 feet (3 meters) above finished floor): Finish with canvas jacket sized for finish painting.
- H. Buried Piping: Provide factory fabricated assembly with inner all-purpose service jacket with self-sealing lap, and asphalt impregnated open mesh glass fabric, with one mil (0.025 mm) thick aluminum foil sandwiched between three layers of bituminous compound; outer surface faced with a polyester film.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Pipe, pipe fittings, specialties, and connections for piping systems.
 - 1. Sanitary sewer.
 - 2. Domestic water.
 - 3. Storm water.
 - 4. Pipe hangers and supports.
 - 5. Ball valves.
 - 6. Butterfly valves.

1.02 RELATED REQUIREMENTS

- A. Section 099113 - Exterior Painting.
- B. Section 099123 - Interior Painting.
- C. Section 220553 - Identification for Plumbing Piping and Equipment.
- D. Section 220719 - Plumbing Piping Insulation.
- E. Section 330110.58 - Disinfection of Water Utility Piping Systems.

1.03 REFERENCE STANDARDS

- A. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2018.
- B. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2018.
- C. ASSE 1003 - Performance Requirements for Water Pressure Reducing Valves for Domestic Water Distribution Systems; 2009.
- D. ASTM A74 - Standard Specification for Cast Iron Soil Pipe and Fittings; 2017.
- E. ASTM B32 - Standard Specification for Solder Metal; 2008 (Reapproved 2014).
- F. ASTM B42 - Standard Specification for Seamless Copper Pipe, Standard Sizes; 2020.
- G. ASTM B68/B68M - Standard Specification for Seamless Copper Tube, Bright Annealed; 2011.
- H. ASTM B75/B75M - Standard Specification for Seamless Copper Tube; 2020.
- I. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2020.
- J. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2020.
- K. ASTM B813 - Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube; 2016.
- L. ASTM B828 - Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings; 2016.

- M. ASTM C564 - Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings; 2014.
- N. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems; 2020.
- O. ASTM D2729 - Standard Specification for Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2017.
- P. ASTM D2855 - Standard Practice for the Two-Step (Primer & Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets; 2020.
- Q. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2018.
- R. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends; 2010.
- S. NSF 61 - Drinking Water System Components - Health Effects; 2020.
- T. NSF 372 - Drinking Water System Components - Lead Content; 2020.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: For non-penetrating rooftop supports, submit detailed layout developed for this project, with design calculations for loadings and spacings.

1.05 QUALITY ASSURANCE

- A. Perform work in accordance with applicable codes.

1.06 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.

1.07 FIELD CONDITIONS

- A. Do not install underground piping when bedding is wet or frozen.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Potable Water Supply Systems: Provide piping, pipe fittings, and solder and flux (if used), that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

2.02 SANITARY SEWER PIPING, BURIED BEYOND 5 FEET (1500 MM) OF BUILDING

- A. Cast Iron Pipe: ASTM A74 extra heavy weight.
 - 1. Fittings: Cast iron.
 - 2. Joint Seals: ASTM C564 neoprene gaskets, or lead and oakum.

2.03 SANITARY SEWER PIPING, BURIED WITHIN 5 FEET (1500 MM) OF BUILDING

- A. Cast Iron Pipe: ASTM A74 extra heavy weight.
 - 1. Fittings: Cast iron.
 - 2. Joints: Hub-and-spigot, CISPI HSN compression type with ASTM C564 neoprene gaskets or lead and oakum.

2.04 SANITARY SEWER PIPING, ABOVE GRADE

- A. Cast Iron Pipe: ASTM A74, service weight.
 - 1. Fittings: Cast iron.
 - 2. Joint Seals: ASTM C564 neoprene gaskets, or lead and oakum.
- B. PVC Pipe: ASTM D2729.
 - 1. Fittings: PVC.
 - 2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.05 DOMESTIC WATER PIPING, BURIED BEYOND 5 FEET (1500 MM) OF BUILDING

- A. Copper Pipe: ASTM B42, hard drawn.
 - 1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22 wrought copper and bronze.
 - 2. Joints: ASTM B32, alloy Sn95 solder.

2.06 DOMESTIC WATER PIPING, BURIED WITHIN 5 FEET (1500 MM) OF BUILDING

- A. Copper Pipe: ASTM B42, hard drawn.
 - 1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22 wrought copper and bronze.
 - 2. Joints: ASTM B32, alloy Sn95 solder.

2.07 DOMESTIC WATER PIPING, ABOVE GRADE

- A. Copper Tube: ASTM B88 (ASTM B88M), Type K (A), Drawn (H).
 - 1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
 - 2. Joints: ASTM B32, alloy Sn95 solder.
 - 3. Mechanical Press Sealed Fittings: Double-pressed type, NSF 61 and NSF 372 approved or certified, utilizing EPDM, nontoxic, synthetic rubber sealing elements.
 - a. Manufacturers:
 - 1) Apollo Valves: www.apollovalves.com/#sle.

- 2) Viega LLC; _____: www.viega.us/#sle.
- 3) Substitutions: See Section 016000 - Product Requirements.

2.08 STORM WATER PIPING, BURIED BEYOND 5 FEET (1500 MM) OF BUILDING

- A. Cast Iron Pipe: ASTM A74 extra heavy weight.
 1. Fittings: Cast iron.
 2. Joint Seals: ASTM C564 neoprene gaskets, or lead and oakum.

2.09 STORM WATER PIPING, BURIED WITHIN 5 FEET (1500 MM) OF BUILDING

- A. Cast Iron Pipe: ASTM A74 extra heavy weight.
 1. Fittings: Cast iron.
 2. Joint Seals: ASTM C564 neoprene gaskets, or lead and oakum.

2.10 STORM WATER PIPING, ABOVE GRADE

- A. Cast Iron Pipe: ASTM A74 extra heavy weight.
 1. Fittings: Cast iron.
 2. Joint Seals: ASTM C564 neoprene gaskets, or lead and oakum.

2.11 PIPE HANGERS AND SUPPORTS

- A. Provide hangers and supports that comply with MSS SP-58.
 1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
 2. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.
 3. Trapeze Hangers: Welded steel channel frames attached to structure.
 4. Vertical Pipe Support: Steel riser clamp.
- B. Plumbing Piping - Drain, Waste, and Vent:
 1. Hangers for Pipe Sizes 1/2 Inch (15 mm) to 1-1/2 Inches (40 mm): Malleable iron, adjustable swivel, split ring.
 2. Hangers for Pipe Sizes 2 Inches (50 mm) and Over: Carbon steel, adjustable, clevis.
 3. Wall Support for Pipe Sizes to 3 Inches (80 mm): Cast iron hook.
 4. Wall Support for Pipe Sizes 4 Inches (100 mm) and Over: Welded steel bracket and wrought steel clamp.
 5. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
- C. Plumbing Piping - Water:
 1. Hangers for Pipe Sizes 1/2 Inch (15 mm) to 1-1/2 Inches (40 mm): Malleable iron, adjustable swivel, split ring.
 2. Hangers for Cold Pipe Sizes 2 Inches (50 mm) and Over: Carbon steel, adjustable, clevis.
 3. Hangers for Hot Pipe Sizes 2 Inches (50 mm) to 4 Inches (100 mm): Carbon steel, adjustable, clevis.
 4. Hangers for Hot Pipe Sizes 6 Inches (150 mm) and Over: Adjustable steel yoke, cast iron pipe roll, double hanger.
 5. Wall Support for Pipe Sizes to 3 Inches (80 mm): Cast iron hook.
 6. Wall Support for Pipe Sizes 4 Inches (100 mm) and Over: Welded steel bracket and wrought steel clamp.

7. Wall Support for Hot Pipe Sizes 6 Inches (150 mm) and Over: Welded steel bracket and wrought steel clamp with adjustable steel yoke and cast iron pipe roll.
8. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
9. Floor Support for Hot Pipe Sizes to 4 Inches (100 mm): Cast iron adjustable pipe saddle, locknut, nipple, floor flange, and concrete pier or steel support.
10. Floor Support for Hot Pipe Sizes 6 Inches (150 mm) and Over: Adjustable cast iron pipe roll and stand, steel screws, and concrete pier or steel support.
11. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

2.12 BALL VALVES

- A. Manufacturers:
 1. Apollo Valves: www.apollovalves.com/#sle.
 2. Viega LLC: www.viega.us/#sle.
 3. Substitutions: See Section 016000 - Product Requirements.
- B. Construction, 4 Inches (100 mm) and Smaller: MSS SP-110, Class 150, 400 psi (2760 kPa) CWP, bronze or ductile iron body, 304 stainless steel or chrome plated brass ball, regular port, teflon seats and stuffing box ring, blow-out proof stem, lever handle with balancing stops, threaded or grooved ends with union.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that excavations are to required grade, dry, and not over-excavated.

3.02 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.

3.03 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.
 1. See Section 220719.

- G. Provide access where valves and fittings are not exposed.
- H. Prepare exposed, unfinished pipe, fittings, supports, and accessories for finish painting.
 - 1. See Section 099123 for painting of interior plumbing systems and components.
 - 2. See Section 099113 for painting of exterior plumbing systems and components.
- I. Install valves with stems upright or horizontal, not inverted. See Section 220523.
- J. 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.
- K. PVC Pipe: Make solvent-welded joints in accordance with ASTM D2855.
- L. 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 (15 mm) space between finished covering and adjacent work.
 - 4. Place hangers within 12 inches (300 mm) of each horizontal elbow.
 - 5. Use hangers with 1-1/2 inch (40 mm) minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
 - 6. Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.
 - 7. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
 - 8. Provide copper plated hangers and supports for copper piping.
 - 9. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

3.04 APPLICATION

- A. Use grooved mechanical couplings and fasteners only in accessible locations.
- B. Install unions downstream of valves and at equipment or apparatus connections.
- C. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.
- D. Install gate valves for shut-off and to isolate equipment, part of systems, or vertical risers.

3.05 TOLERANCES

- A. Drainage Piping: Establish invert elevations within 1/2 inch (10 mm) vertically of location indicated and slope to drain at minimum of 1/4 inch per foot (1:50) slope.
- B. Water Piping: Slope at minimum of 1/32 inch per foot (1:400) and arrange to drain at low points.

3.06 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A. Disinfect water distribution system in accordance with Section 330110.58.

- B. Prior to starting work, verify system is complete, flushed, and clean.

3.07 SERVICE CONNECTIONS

- A. Provide new sanitary and storm sewer services. Before commencing work check invert elevations required for sewer connections, confirm inverts and ensure that these can be properly connected with slope for drainage and cover to avoid freezing.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Drains.
- B. Cleanouts.
- C. Hose bibbs.
- D. Hydrants.
- E. Mixing valves.

1.02 RELATED REQUIREMENTS

- A. Section 016000 - Product Requirements: Procedures for Owner-supplied products.
- B. Section 221005 - Plumbing Piping.
- C. Section 224000 - Plumbing Fixtures.

1.03 REFERENCE STANDARDS

- A. ASME A112.6.3 - Floor and Trench Drains; 2019.
- B. ASME A112.6.4 - Roof, Deck, and Balcony Drains; 2008 (Reaffirmed 2012).
- C. ASSE 1011 - Performance Requirements for Hose Connection Vacuum Breakers; 2017.
- D. ASSE 1019 - Performance Requirements for Wall Hydrant with Backflow Protection and Freeze Resistance; 2011 (Reaffirmed 2016).
- E. NSF 61 - Drinking Water System Components - Health Effects; 2020.
- F. NSF 372 - Drinking Water System Components - Lead Content; 2020.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide component sizes, rough-in requirements, service sizes, and finishes.
- C. Shop Drawings: Indicate dimensions, weights, and placement of openings and holes.
- D. Manufacturer's Instructions: Indicate Manufacturer's Installation Instructions: Indicate assembly and support requirements.
- E. Sustainable Design Documentation: Submit appropriate evidence that materials used in potable water systems comply with the specified requirements.
- F. Operation Data: Indicate frequency of treatment required for interceptors.

- G. Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Accept specialties on site in original factory packaging. Inspect for damage.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Specialties in Potable Water Supply Systems: Provide products that comply with NSF 61 and NSF 372 for maximum lead content.

2.02 DRAINS

- A. Roof Drains:
1. Assembly: ASME A112.6.4.
 2. Body: Galvanized cast iron with sump.
 3. Strainer: Removable cast iron dome with vandal proof secured top.
 4. Manufacturers:
 - a. Zurn; Model #Z164.
 - b. Substitutions: See Section 016000 - Product Requirements.
- B. Downspout Nozzles:
1. All aluminum body with straight bottom section.
 2. Manufacturers:
 - a. Zurn; Model #ZF199 CHAMELEON.
 - b. Substitutions: See Section 016000 - Product Requirements.
- C. Floor Drains:
1. Manufacturers:
 - a. Zurn; Model #Z415SZ.
 - b. Substitutions: See Section 016000 - Product Requirements.
- D. Floor Drain (FD-1):
1. ASME A112.6.3; Dura-Coated cast iron, two piece body with double drainage flange, seepage slots, combination invertible membrane clamp with adjustable collar, and nickel-bronze, light duty, square leveling strainer.

2.03 CLEANOUTS

- A. Manufacturers:
1. Jay R. Smith Manufacturing Company; _____: www.jayrsmith.com/#sle.
 2. Josam Company; _____: www.josam.com/#sle.
 3. Zurn Industries, LLC; _____: www.zurn.com/#sle.
 4. Substitutions: See Section 016000 - Product Requirements.

- B. Cleanouts at Interior Finished Floor Areas:
 - 1. Lacquered cast iron body with anchor flange, reversible clamping collar, threaded top assembly, and round gasketed scored cover in service areas and round gasketed depressed cover to accept floor finish in finished floor areas.
- C. Cleanouts at Interior Unfinished Accessible Areas: Calked or threaded type. Provide bolted stack cleanouts on vertical rainwater leaders.

2.04 HOSE BIBBS (HB-2)

- A. Manufacturers:
 - 1. Murdock Manufacturing, Inc; Model #8120-LF: www.murdockmfg.com/#sle.
 - 2. Substitutions: See Section 016000 - Product Requirements.
- B. Interior Hose Bibbs:
 - 1. Bronze or brass with integral mounting wall flange, hose thread spout, chrome plated where exposed with lockshield and removable key, less vacuum breaker in compliance with ASSE 1011.

2.05 HYDRANTS (HB-1)

- A. Manufacturers:
 - 1. Watts; Model #HY-725-44.
 - 2. Substitutions: See Section 016000 - Product Requirements.
- B. Wall Hydrants:
 - 1. ASSE 1019; freeze resistant, self-draining type with chrome plated lockable recessed box hose thread spout, key operated with nickel bronze box and door, and integral vacuum breaker.

2.06 MIXING VALVES

- A. Thermostatic Mixing Valves:
 - 1. Manufacturers:
 - a. Leonard Valve Company: www.leonardvalve.com/#sle.
 - b. Substitutions: See Section 016000 - Product Requirements.

PART 3 EXECUTION

3.01 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 approved potable water protection devices on plumbing lines where contamination of domestic water may occur; janitor rooms, flush valves, interior and exterior hose bibbs.

- E. Install water hammer arrestors complete with accessible isolation valve on hot and cold water supply piping to lavatory sinks.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Sinks.

1.02 RELATED REQUIREMENTS

- A. Section 011000 - Summary: Owner-furnished fixtures.
- B. Section 221005 - Plumbing Piping.
- C. Section 221006 - Plumbing Piping Specialties.

1.03 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. ANSI Z358.1 - American National Standard for Emergency Eyewash and Shower Equipment; 2014.
- C. ASME A112.18.1 - Plumbing Supply Fittings; 2018, with Errata.
- D. ASME A112.19.3 - Stainless Steel Plumbing Fixtures; 2017.
- E. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- F. NSF 61 - Drinking Water System Components - Health Effects; 2020.
- G. NSF 372 - Drinking Water System Components - Lead Content; 2020.
- H. UL (DIR) - Online Certifications Directory; Current Edition.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.
- C. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Accept fixtures on site in factory packaging. Inspect for damage.

- B. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

1.07 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year manufacturer warranty for electric water cooler.

PART 2 PRODUCTS

2.01 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.

2.02 REGULATORY REQUIREMENTS

- A. Comply with applicable codes for installation of plumbing systems.
- B. Comply with UL (DIR) requirements.
- C. Perform work in accordance with local health department regulations.
- D. Provide certificate of compliance from Authority Having Jurisdiction indicating approval of installation.

2.03 SINKS

- A. Sink Manufacturers:
 - 1. Elkay; Model LRADQ172060.
 - 2. Substitutions: See Section 016000 - Product Requirements.
- B. Single Compartment Bowl: 1; 17 by 20 by 6 inch (____ by ____ by ____ mm) outside dimensions 18 gauge, 0.05 inch (1.27 mm) thick, Type 304 stainless steel, self rimming and undercoated, with ledge back drilled for trim.
 - 1. Drain: 3-1/2 inch (90 mm) crumb cup and tailpiece.
- C. Supply Faucet Manufacturers:
 - 1. Elkay; Model LK406GN05L2.
 - 2. Substitutions: See Section 016000 - Product Requirements.
- D. Supply Faucet: ASME A112.18.1; gooseneck, chrome plated combination supply fitting with pop-up waste, water economy aerator with maximum flow of 1.5 gpm, 2" lever handle.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.

3.02 PREPARATION

- A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

3.03 INSTALLATION

- A. Install each fixture with trap, easily removable for servicing and cleaning.
- B. Install components level and plumb.

3.04 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

GENERAL MECHANICAL REQUIREMENTS

H2M

Irvington Union Free School District
Main Street School Renovations
Main Street School
SED No.: 66-04-02-02-0-001-016

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. This section describes the general requirements for all mechanical items and systems required by the Contract Documents.
- B. Comply with all Contract Requirements, General Conditions, Supplementary Conditions and Division 1 Sections applying to or affecting the Work of Division 23.
- C. Unless specifically dimensioned, the Work shown on the Drawings is in diagrammatic form only to show general arrangement.
- D. Include, in the Work, all accessories and appurtenances, necessary and integral, for the intended operation of any system, component or device, as such systems, components and devices are specified.
- E. Do not install pipe or conduit through ductwork.
- F. If the pipe or duct size shown on the Drawings does not match the connection size of the equipment that it is connected to, provide the necessary transition pieces at the piece of equipment.
- G. Do not use or allow to be used asbestos or asbestos-containing materials on this project. Be rigorous in assuring that all materials, equipment, systems and components thereof do not contain asbestos. Any deviations from this requirement shall be remedied at the Contractor's expense without regard to prior submittal approvals.

1.02 RELATED DOCUMENTS

- A. The General Conditions and General Requirements Division 1 apply to the Work of this Section.

1.03 REFERENCE STANDARDS

- A. Compliance with the following codes and standards shall be required:
 - 1. Codes, Rules and Regulations of the State of New York
 - 2. USAS USA Standards Institute (Formerly ASA)
 - 3. AMCA Air Moving and Conditioning Association
 - 4. ADC Air Diffusion Council
 - 5. NEMA National Electrical Manufacturers Association
 - 6. FM Factory Mutual
 - 7. NFPA National Fire Protection Association
 - 8. ASTM American Society for Testing Materials
 - 9. UL Underwriters Laboratories, Inc.
 - 10. NEC National Electrical Code
 - 11. ASME American Society of Mechanical Engineers
 - 12. ANSI American National Standards Institute
 - 13. OSHA Occupational Safety and Health Act
 - 14. BSA Board of Standards and Appeals
 - 15. MEA Materials and Equipment Acceptance
 - 16. DEC New York State Department of Environmental Conservation - 6 NYCRR Part 613 Handling and Storage of Petroleum

GENERAL MECHANICAL REQUIREMENTS

H2M

Irvington Union Free School District
Main Street School Renovations
Main Street School
SED No.: 66-04-02-02-0-001-016

- | | | |
|-----|--|--|
| 17. | ASHRAE | American Society of Heating, Refrigeration and Air Conditioning Engineers. |
| 18. | AWWA | American Water Works Association |
| 19. | MSS | Manufacturer's Standardization Society of the Valve and Fitting Industry |
| 20. | ARI | American Refrigeration Institute |
| 21. | SMACNA | Sheet Metal and Air Conditioning Contractor's National Association |
| 22. | TEMA | Tubular Exchanger Manufacturers Association |
| 23. | F.S. or FED | Spec. Federal Specification |
| 24. | ASA | Acoustical Society of America |
| 25. | NACE | National Association of Corrosion Engineers |
| 26. | ASSE | American Society of Sanitary Engineers |
| 27. | International Building Code | |
| 28. | International Fire Code | |
| 29. | International Existing Building Code | |
| 30. | International Fuel Gas Code | |
| 31. | International Plumbing Code | |
| 32. | International Energy Conservation Code | |
| 33. | International Mechanical Code | |
| 34. | New York State Industrial Code Rules | |
| 35. | IRI | Industrial Risk Insurers |
| 36. | AGA | American Gas Association |
| 37. | AABC | American Air Balance Council |
| 38. | NEBB | National Environmental Balancing Bureau |
| 39. | AWS | American Welding Society |

1.04 DEFINITIONS

- A. "Provide" means furnish and install, complete the specified material, equipment or other items and perform all required labor to make a finished installation.
- B. "Furnish and install" has the same meaning as given above for "Provide."
- C. Refer to General Conditions for other definitions.

1.05 ABBREVIATIONS

- A. Reference by abbreviation may be made in the Specifications and the Drawings in accordance with the following list:
 - 1. HVAC Heating, Ventilating and Air Conditioning
 - 2. CM Construction Manager
 - 3. AC Air Conditioning
 - 4. H & V Heating and Ventilating
 - 5. AWG American Wire Gauge
 - 6. BWG Birmingham Wire Gauge
 - 7. USS United States Standard
 - 8. B & S Brown & Sharpe
 - 9. OS & Y Outside Screw and Yoke
 - 10. IBBM Iron Body Brass Mounted
 - 11. WSP Working Steam Pressure
 - 12. PSIG Pounds per Square Inch Gauge
 - 13. PRV Pressure Reducing Valve

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- 14. GPM Gallons per Minute
 - 15. MBH Thousand BTU per hour
 - 16. BTU British Thermal Units
 - 17. WG Water Gage
 - 18. LB Pound (Also shown as: #)
 - 19. ASME American Society of Mechanical Engineers
 - 20. ASTM American Society for Testing Materials
 - 21. ABMA American Boiler Manufacturers Association
 - 22. ASA American Standards Associates
 - 23. MER Mechanical Equipment Room
- See Drawings for additional abbreviations

1.06 REVIEW OF CONTRACT DOCUMENTS AND SITE

- A. Give written notice with the submission of bid to the Architect/Engineer of any materials or apparatus believed inadequate or unsuitable, in violation of laws, ordinances, rules or regulations of Authorities having jurisdiction, and any necessary items of work omitted. In the absence of such written notice it is mutually agreed that the Contractor has included the cost of all required items in his proposal for a complete project.
- B. Contractors shall acknowledge that they have examined the Plans, Specifications and Site, and that from his own investigations he has satisfied himself as to the nature and location of the Work; the general and local conditions, particularly those bearing upon transportation, disposal, handling and storage of materials; availability of labor, utilities, roads and uncertainties of weather; the composition and condition of the ground; the characters quality and quantity of subsurface materials to be encountered; the character of equipment and facilities needed preliminary to and during the execution of the Work; all federal, state, county, township and municipal laws, ordinances and regulations particularly those relating to employment of labor, rates of wages, and construction methods; and all other matters which can in any way affect the Work or the cost thereof under this Contract. Any failure by the Contractor to acquaint himself with the available information concerning these conditions will not relieve him from the responsibility for successfully performing the Work.
- C. Owner assumes no responsibility for any understanding or representation made during or prior to the negotiation and execution of this Contract unless such understanding or representations are expressly stated in the Contract and the Contract expressly provides that the responsibility, therefore, is assumed by the Owner.

1.07 MEASUREMENTS

- A. Base all measurements, both horizontal and vertical from established bench marks. Make all Work agree with these established lines and levels. Verify all measurements at site; and check the correctness of same as related to the Work.

1.08 LABOR AND MATERIALS

- A. Provide all materials and apparatus required for the Work of new and first-class quality. Furnish, deliver, arrange, erect, connect and finish all materials and equipment in every detail, so selected and arranged as to fit properly into the building spaces.
- B. Remove all materials delivered, or work erected, which does not comply with Drawings or Specifications, and replace with proper materials, or correct such work as directed, at no additional cost to the Owner.

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1.09 COVERING OF WORK

- A. Do not cover up or hide from view any duct, piping, fitting, or other work of any kind before it has been examined or approved by the Architect/Engineer and/or other authority having jurisdiction over the same. Remove and correct immediately any unacceptable or imperfect work or unauthorized or disapproved materials discovered immediately after being disapproved.

1.10 PROTECTION

- A. Protect the Work and material of all trades from damage and replace all damaged material with new.
- B. Protect work and equipment until the Work is finally inspected, tested, and accepted; protect the Work against theft, injury or damage; and carefully store material and equipment received on site which is not immediately installed; close open ends of work with temporary covers or plugs during construction to prevent entry of foreign material.
- C. Preserve all public and private property, along and adjacent to the Work, and use every precaution necessary to prevent damage or injury thereto. Use suitable precautions to prevent damage to pipes, conduits and other underground structures or utilities, and carefully protect from disturbance or damage all property marks until an authorized agent has witnessed or otherwise referenced their location, and do not remove them until directed.

1.11 CUTTING AND PATCHING

- A. Provide all cutting and rough patching required for the Work. Perform all finish patching.
- B. Furnish and locate all sleeves and inserts required before the floors and walls are built, pay the cost of cutting and patching required for pipes where sleeves and inserts were not installed in time, or where incorrectly located. Provide all drilling required for the installation of hangers.
- C. Punch or drill all holes cut through concrete slabs or arches from the underside. Do not cut structural members without the approval of the Architect/Engineer. Perform all cutting in a manner directed by the Architect/Engineer.
- D. Do not do any cutting that may impair strength of building construction. Do not drill any holes, except for small screws, in beams or other structural members without obtaining prior approval. All Work shall be done in a neat manner by mechanics skilled in their trades and as approved.

1.12 SUBMITTALS

- A. Submit for review, shop drawings for all materials and equipment furnished and installed under this Contract. Submissions shall include but not be limited to:
 - 1. Ductwork layout drawings, air devices and accessories
 - 2. Breeching layout drawings
 - 3. Piping and equipment layout drawings.
 - 4. Piping materials, valves, hangers, supports and accessories
 - 5. Automatic temperature control equipment, diagrams and control sequences
 - 6. Equipment, fixtures, and appurtenances
 - 7. Insulation
 - 8. Rigging Plan - Include the name of the rigging company; a layout drawing that details the crane with its outriggers extended outward. Provide dimensions showing how rigging

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operations will affect the road and parking lines being used, the type of crane and its specification including crane arm height, lift capacity, crane reach.

B. Reports

1. Compliance with listings and approvals for equipment and for fire ratings.
2. Acceptance certificates from inspecting agencies.
3. Complete printed and illustrated operating instructions in report format.
4. Manufacturer's performance tests of equipment.
5. Field pipe and duct testing reports.
6. Field operating test results for equipment.
7. Performance report on the balancing of air and water systems.
8. Performance reports for vibration isolation equipment.
9. Manufacturer's reports on motorized equipment alignment and installation.

- C. Specific references to any article, device, product or material, fixture or item of equipment by name, make or catalog number shall be interpreted as establishing a basis of cost and a standard of quality. All devices shall be of the make and type listed by Special Agencies, such as the Underwriters' Laboratories, and where required, approved by the Fire Department.

1.13 SPACE ALLOTMENTS AND SUBSTITUTIONS

- A. The space allotments and equipment layouts on the Drawings are based on the manufacturer's model indicated or scheduled as the "Basis of Design". Ensure that any equipment that is submitted other than the "Basis of Design" will fit in the space allotment and will provide the necessary maintenance clearances as recommended by the manufacturer. If maintenance clearances are not met, pay for any changes such that maintenance clearances will be met.
- B. Bear all costs associated with re-layout of the equipment, changes to piping/ductwork, and other changes as required if approved equipment other than the "Basis of Design" equipment is purchased. This shall also include any structural steel modifications and structural steel design changes. Submit, at no cost to the Owner, a steel design stamped by a structural engineer licensed in the state in which the Work is to be performed for structural modifications that must be made resulting from the use of equipment other than the "Basis of Design" or not specified.

1.14 PAINTING

- A. Prime paint all bare supplemental steel, supports and hangers required for the installation of Division 23 Work in accordance with "Painting" Specification Section. Touch up welds of galvanized surfaces with galvanizing primer.

1.15 MATERIAL SAFETY DATA SHEETS

- A. Submit material safety data sheets (MSDS) for all chemicals, hydraulic fluids, seal oils, lubricating oils, glycols and any other hazardous materials used in the performance of the Work, in accordance with the US Department of Labor, Occupational Safety and Health Administration (OSHA) hazard communication and right-to-know requirements stipulated in 29 CFR 1910.1200 (g).

1.16 MOTORS AND STARTERS

- A. Provide new NEMA Standard electric motors, sized and designed to operate at full load and full speed continuously without causing noise, vibration, and temperature rise in excess of their rating. Provide motors with a service factor of at least 1.15.

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- B. Equip motors for belt driven equipment with rails with adjusting screws for belt tension adjustment. Weather protect motors exposed to the weather.
- C. Install high efficiency electric motors for air handling units, relief fans, and exhaust fans.
- D. Provide all motors for use with Variable Frequency Drives with "high efficiency inverter duty" insulation class "F" with class "B" temperature rise and that conform to or exceed the International Energy Conservation Code or the Federal EP Act of 1992 requirements for efficiency.
- E. Provide stainless steel nameplates, permanently attached to the motor, and having the following information as a minimum:
 - 1. Manufacturer
 - 2. Type
 - 3. Model
 - 4. Horsepower
 - 5. Service Factor
 - 6. RPM
 - 7. Voltage/Phase/Frequency
 - 8. Enclosure Type
 - 9. Frame Size
 - 10. Full-Load Current
 - 11. UL Label (where applicable)
 - 12. Lead Connection Diagram
 - 13. Bearing Data
 - 14. Efficiency at Full Load.
- F. Provide motors whose sound power levels do not exceed that recommended in NEMA MG 1-12.49.
- G. Provide motors with drive shafts long enough to extend completely through belt sheaves when sheaves are properly aligned and balanced.
- H. Protect motor starters on equipment located outdoors in weatherproof NEMA 4X enclosures.
- I. Provide weatherproof NEMA 4X disconnect switches when located outdoors.
- J. Motor Characteristics:
 - 1. 120V/1/60 Hz, 208V/1/60 Hz or 240V/1/60 Hz: Capacitor start, open drip-proof type, ball bearing, rated 40 C. continuous rise.
 - 2. 208V/3/60 Hz, 240V/3/60 Hz or 460/3/60 Hz: NEMA B, normal starting torque, single speed, squirrel-cage type, open drip-proof, rated 40 C continuous rise, with ball bearings rated for B-10 life of 100,000 hours and fitted with grease fittings and relief ports. Provide motors with aluminum end brackets with steel inserts in bearing cavities.

1.17 ACOUSTICAL PERFORMANCE OF EQUIPMENT AND SYSTEMS

- A. Install the Work in such a manner that noise levels from operation of motor driven equipment, whether airborne or structure-borne, and noise levels created by or within air handling equipment and air distribution and control media, do not to exceed sound pressure levels determined by the noise criteria curves published in the ASHRAE guide.

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B. Acoustical Tests

1. Owner may direct the Contractor to conduct sound tests for those areas he deems too noisy.
2. If NC level exceeds the requirements of the Contract Documents due to improper installation or operation of mechanical systems, make changes or repairs to bring noise levels to within required levels.
3. Retest until specified criteria have been met.

1.18 OPERATING AND MAINTENANCE INSTRUCTIONS

A. Instructions and Demonstration for Owner's Personnel

1. Provide operating and maintenance instruction to the Owner when project is completed and all HVAC equipment serving the building is ready to be turned over to the Owner.
2. Turn over the HVAC equipment to the Owner only after the final testing and proper balancing of HVAC systems.
3. Instruct the Owner's personnel in the use, operation and maintenance of all equipment of each system.
4. The above instruction requirements are in addition to that specified for specific equipment or systems. Conform to specified requirements if more stringent or longer instruction is specified for specific equipment or systems.

1.19 CODES, RULES, PERMITS & FEES

- A. Give all necessary notices, obtain all permits and pay all government sales taxes, fees, and other costs, in connection with the Work. Unless indicated otherwise, fees for all utility connections, extensions, and tap fees for water, storm, sewer, gas, telephone, and electricity will be paid directly to utility companies and/or agencies by the Owner. File all necessary plans, prepare all documents and obtain all necessary approvals of all governmental departments having jurisdiction; obtain all required certificates of inspection for the Work and deliver same to the Owner's Representative before request for acceptance and final payment for the Work.
- B. Conform to the requirements of the NFPA, NEC, FM, UL and any other local or State codes which may govern.

1.20 RECORD DRAWINGS

- A. During the progress of the Work, make a record set of drawings of all changes by which the actual installation differs from the Drawings.
- B. Create all record drawings in AutoCAD version 2002 or later in .dwg format. Upon completion of the Work, submit to the Architect/Engineer for approval three complete sets of hard copies of the record drawings, of the same size as the Drawings for approval. Upon approval by the Architect/Engineer furnish the Owner a CD copy of the record drawings along with one hard copy for his records.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.01 CLEANING AND ADJUSTING

- A. Cleaning
 - 1. Blow out, clean and flush each system of piping and equipment, to thoroughly clean the systems.
 - 2. Clean all materials and equipment; leave in condition ready to operate and ready to receive final finishes where required.
 - 3. Clean the operating equipment and systems to be dust free inside and out.
 - 4. Clean concealed and unoccupied areas such as plenums, pipe and duct spaces and equipment rooms to be free of rubbish and dust.
- B. Adjusting
 - 1. Adjust and align equipment interconnected with couplings or belts.
 - 2. Adjust valves of all types and operating equipment of all types to provide proper operation.
 - 3. Clean all strainers after system cleaning and flushing and again before system startup.
- C. Lubrication
 - 1. Lubricate equipment as recommended by the manufacturer, during temporary construction use.
 - 2. Provide complete lubrication just prior to acceptance.
- D. Permanent Equipment Operating During Construction
 - 1. Use only in same service as the permanent applications.
 - 2. Use disposable filters during temporary operation.
 - 3. Replace expendable media, including belts used for temporary operation and similar materials just prior to acceptance of the Work.
 - 4. Repack packing in equipment operated during construction just prior to system acceptance, using materials and methods specified by the equipment manufacturer.
- E. Retouch or repaint equipment furnished with factory finish as required to provide same appearance as new.
- F. Tools
 - 1. Provide one set of specialized or non-standard maintenance tools and devices required for servicing the installed equipment.

3.02 EQUIPMENT BASES, PLATFORMS AND SUPPORTS

- A. Provide supporting platforms, steel supports, anchor bolts, inserts, etc., for all equipment and apparatus provided.
- B. Obtain prior approval for installation method of structural steel required to frame into building structural members for the proper support of equipment, conduit, etc. Welding will be permitted only when approved by the Architect/Engineer.

- C. Submit shop drawings of supports to the Architect/Engineer for approval before fabricating or constructing.
- D. Provide leveling channels, anchor bolts, complete with nuts and washers, for all apparatus and equipment secured to concrete pads and further supply exact information and dimensions for the location of these leveling channels, anchor bolts, inserts, concrete bases and pads.
- E. Where supports are on concrete construction, take care not to weaken concrete or penetrate waterproofing.

3.03 ACCESSIBILITY

- A. Install valves, dampers and other items requiring access conveniently and accessibly located with reference to the finished building.

3.04 USE OF EQUIPMENT

- A. The use of any equipment, or any part thereof, even with the Owner's consent, is not an indication of acceptance of the Work on the part of the Owner, nor shall it be construed to obligate the Owner in any way to accept improper work or defective materials.

3.05 MODIFICATIONS OF EXISTING WORK

- A. Coordinate the Work with all other contractors and provide necessary dimensions for all openings. Provide all cuts and openings which are necessary for the Work for passage of piping and ductwork
- B. Upon completion, remove all temporary piping and equipment, shoring, scaffolds, etc., and leave all areas clean and free from material and debris resulting from the Work performed under this Section. Provide rough patching in areas required.

3.06 EQUIPMENT INSTALLATION

- A. Locate and set equipment anchor bolts, dowels and aligning devices for equipment requiring them.
- B. Level and shim the equipment; coordinate and oversee the grouting work.
- C. Perform field assembly, installation and alignment of equipment under direct supervision provided by the manufacturer or with inspections, adjustments and approval by the manufacturer.
- D. Alignment and Lubrication Certification for Motor Driven Apparatus
 - 1. After permanent installation has been made and connections have been completed, but before the equipment is continuously operated, have a qualified representative of the equipment manufacturer inspect the installation and report in writing on the manufacturer's letterhead on the following:
 - a. Whether shaft, bearing, seal, coupling, and belt drive alignment and doweling is within the manufacturer's required tolerances so that the equipment will remain aligned in the normal service intended by the Contract Documents and that no strain or distortion will occur in normal service.
 - b. That all parts of the apparatus are properly lubricated for operation.

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- c. That the installation is in accordance with manufacturer's instructions.
 - d. That suitable maintenance and operating instructions have been provided for the Owner's use.
 - e. Make any corrections to items that are required or recommended based on the manufacturer's inspection and have the equipment re-inspected.
- E. Belt Drives
 - 1. V-belt drives - a driving and driven sheave grooved for belts of trapezoidal cross-section. Construct belts of fabric and rubber so designed so as not to touch the bottom of the grooves, the power being transmitted by the contact between the belts and V-shaped groove sides. Design drives for a minimum of 150 percent of motor horsepower. Provide companion type driven sheaves.
 - 2. Select drives to provide for 12-1/2 percent variation in speed, plus or minus, from specified speed. Provide all motors with adjustable sheaves except where indicated otherwise in the Specifications or on the Drawings.
 - 3. Install all fans with adjustable pitch sheaves on their drive motors. Select sheaves to provide air quantities under specified conditions. Put air systems into operation, and determine as a result of the completed air balance the actual size of sheaves required to produce specified air quantities on installed systems. The adjustable pitch sheaves shall then be replaced with the proper size fixed sheaves. Remove adjustable pitch sheaves from premises. Provide fixed motor sheaves manufactured by Wood's.
 - 4. Where indicated on the Drawings or specified, provide spare motor, bearings, and belts.
- F. Machinery Guards
 - 1. Protect motor drives by guards furnished by the equipment manufacturer or in accordance with the Sheet Metal and Air Conditioning Contractors National Association's Low Pressure Duct Manual. Provide guards of all types approved as acceptable under OSHA Standards.
- G. Equipment Start-up
 - 1. Require each equipment manufacturer to provide qualified personnel to inspect and approve equipment and installation and to supervise the start-up of the equipment and to supervise the operating tests of the equipment.
 - 2. If a minimum number of hours for start-up and instruction are not stated with the equipment specifications, these shall be 2 full 8-hour working days as a minimum.
 - 3. Advise Owner of start-up at least 72 hours in advance.

3.07 CLOSEOUT PROCEDURES

- A. General Operating and Maintenance Instructions: Arrange for each installer of operating equipment and other work that requires regular or continuing maintenance, to meet at the site with the Owner's personnel to provide necessary basic instructions in the proper operation and maintenance of the entire Work. Where installers are not expert in the required procedures, include instruction by the manufacturer's representatives.
- B. Where applicable, provide instruction and training, including application of special coatings systems, at manufacturer's recommendation.
- C. Provide a detailed review of the following items:
 - 1. Maintenance manuals
 - 2. Record documents and catalog cuts for each piece of equipment.
 - 3. Spare parts and materials
 - 4. Tools
 - 5. Lubricants

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6. Fuels
7. Identification systems
8. Control sequences
9. Hazards
10. Cleaning

- D. Warranties, bonds, maintenance agreements, and similar continuing commitments.
- E. Demonstrate the following procedures:
1. Start-up
 2. Shut-down
 3. Emergency operations
 4. Noise and vibration adjustments
 5. Safety procedures
 6. Economy and efficiency adjustments
 7. Effective energy utilization.
- F. Prepare instruction periods to consist of approximately 50% classroom instruction and 50% "hands-on" instruction. Provide minimum instruction periods as follows:

Systems or Equipment	Training Time (Hours)
Roof Top Units	8 hrs.
All other equipment	4 hrs. (each)

Note: Consult individual equipment specification sections for additional training requirements.

- G. Prepare a written agenda for each session and submit for review and approval. Include date, location, purpose, specific scope, proposed attendance and session duration.
- H. Record training sessions in digital format, format as selected by the Owner. Turn over digital files to the Owner after training has been completed.

END OF SECTION 230010

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. This Section describes the marking and identification materials for identifying mechanical equipment, and ductwork systems.
- B. Mark and identify all mechanical equipment, and ductwork systems described herein, and as shown and specified in the Contract Documents.

1.02 REFERENCES

- A. ANSI A13.1 - Scheme for the Identification of Piping Systems.
- B. Z53.1 - Safety Color Code for Marking Physical Hazards.
- C. OSHA 29 CFR 1910 - Subpart J, General Environmental Controls

1.03 SUBMITTALS

- A. Identification Scheme - Submit scheme of identification codes.
- B. Samples - Submit samples of tags, attachments, labeled and identified.
- C. Equipment Schedules - Submit mechanical equipment schedules, listing proposed equipment numbers, and their location and function.
- D. Product Data: Provide manufacturers catalog literature for each product required.

PART 2 - PRODUCTS

2.01 APPROVED MANUFACTURERS

- A. Seton
- B. Bunting
- C. W.H. Brady Company

2.02 MECHANICAL EQUIPMENT MARKERS

- A. Identify all mechanical equipment, bare or insulated, installed in the rooms or on the roof, by means of lettered and numbered nameplate (not stenciled) identifying the equipment and service. Refer to the Drawings for equipment identifications. Nameplates shall be aluminum with permanent 1 ½ inch high white letters on a black background, mechanically affixed and installed in a readily visible location on the equipment. Coordinate the final equipment designation with the Owner.
- B. In addition to markers, all mechanical equipment shall be furnished with the manufacturer's identification plate showing the name of equipment, manufacturer's name and address, date of purchase, model number and performance data.

2.03 DUCT WORK IDENTIFICATION

- A. Provide full air distribution system identification at each side of a wall penetration, in a mechanical room, at all changes in direction and at no more than 50 foot intervals. Provide arrows identifying direction of flow.
- B. Fire damper or Smoke damper access points shall be permanently identified on the exterior by a label having letters not less than 0.5 inch in height reading: SMOKE DAMPER or FIRE DAMPER.
- C. Identification shall be preprinted labels.
- D. Letter Size: 1-1/2 inches in height.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Apply all tags and system markers in accordance with the manufacturer's instructions.

3.02 LAY IN CEILING TILES AND ACCESS DOORS

- A. Provide a lettered and numbered nameplate for each access door indicating the mechanical equipment that the door provides access too.
- B. Where VAV boxes, hot water reheat coils, or other mechanical devices are installed above a lay-in ceiling tile system, provide and install color coded thumb tabs to mark the location of the equipment above the ceiling.

END OF SECTION 230555

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. This section specifies requirements for testing, adjusting, and balancing of all air distribution systems, including the equipment and devices associated with each system.
- B. The work includes setting speed and flow, adjusting equipment and devices installed for systems, recording data, conducting tests, preparing and submitting reports, and recommending modifications to the mechanical installations specified in other Sections of the Specifications.

1.02 RELATED WORK

- A. Drawings and general provisions of the Contract, including General Conditions, any Supplemental Conditions and Division 1 Specification Sections, govern the work of this section.

1.03 SUBMITTALS

- A. Submit proof that the testing, adjusting and balancing agency meets the requirements of Section 1.04 "Quality Assurance", and all other specified requirements.
- B. Prior to performing the work, submit sample blank forms of the test reports that will be submitted by the entity performing work of this Section, indicating all data and parameters included.
- C. Submit certified test reports, signed by the authorized representative of the testing and balancing agency. Certify the reports to be proof that the systems have been tested, adjusted and balanced in accordance with the selected reference standards (NEBB or AABC); are an accurate representation of how the systems have been installed; are a true representation of how the systems are operating at completion of the testing, adjusting and balancing procedures; and are an accurate record of all final quantities measured, to establish normal operating values of the systems. Submittal of test report shall be in the following format:
 - 1. Draft Report: Upon completion of testing, adjusting and balancing procedures, prepare draft reports on the approved forms. Draft report may be handwritten, but must be complete, factual, accurate and legible. Organize and format draft reports in the same manner specified herein for the final reports. Submit two complete sets of draft reports. Only one complete set of draft reports will be returned.
 - 2. Final Report: Upon verification and approval of draft reports, prepare final reports, type written and organized and formatted as described herein. Submit two complete sets of final reports.
 - a. Report Format: Submit reports using the standard forms prepared by the referenced standard for each respective item and system to be tested, adjusted and balanced. Include schematic systems diagrams. Enclose the report contents in a 3-ring binder. Divide the contents into the below listed divisions, separating them by divider tabs with titles descriptive of the contents:
 - 1) General Information and Summary.
 - 2) Air Systems.
 - b. Report Contents: Provide the following minimum information, forms and data:
 - 1) General Information and Summary: Identify the testing, adjusting and balancing Agency, Contractor, Owner, Architect/Engineer, and Project on the inside cover sheet. Include addresses, and contact names and telephone numbers. Include a certification sheet containing the seal and name, address, telephone number

and signature of the Agency's responsible certified Test and Balance Engineer. Include in this division a listing of the instrumentation used for the procedures, along with the proof of calibrations.

- 2) Include in the remainder of the reports the appropriate forms containing, as a minimum, the information indicated on the standard report forms prepared by AABC or NEBB, for each item of equipment and system. Prepare a schematic diagram for each item of equipment and system, to accompany each respective report form.
- c. Calibration Reports: Submit proof that all required instrumentation has been calibrated to tolerances specified in the referenced standards within a period not exceeding six months prior to conducting the test procedures.
- d. Existing Systems: Where existing systems are to be added to or modified include in the report results of operational tests taken prior to modifications including but not limited to existing fan curves, pressure readings and flow measurements. Include in the report copies of the equipment and motor nameplate data along with equipment performance curves indicating operating points prior to any modifications and, where existing equipment is retained, operating points after system balance. Where terminals are adjusted or modified include terminal performance curves/data and final readings.

1.04 QUALITY ASSURANCE

- A. Test, adjust and balance systems and equipment by using competent mechanics regularly employed by a testing, adjusting and balancing Subcontractor whose primary business is the testing, adjusting and balancing of building mechanical systems. The testing, adjusting and balancing Subcontractor shall be a business established for a minimum of 10 years.
- B. The testing, adjusting, and balancing Subcontractor shall be certified by the Associated Air Balance Council (AABC) or the National Environmental Balancing Bureau (NEBB).
- C. Instrumentation type, quantity, and accuracy shall be as described in AABC's "National Standards for Field Measurement and Instrumentation, or Total System Balance, or NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems."
- D. All instrumentation shall be calibrated at least every 6 months or more frequently if required by the instrument manufacturer.

1.05 PERFORMANCE REQUIREMENTS

- A. Comply with all applicable Federal, State and Local laws, ordinances, regulations and codes, and the latest industry standards including, but not limited to the entities listed below for procedures, measurements, instruments and test reports for testing, adjusting and balancing work:
 1. American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
 2. Sheet Metal and Air Conditioning Contractors National Association (SMACNA)
 3. National Environmental Balancing Bureau (NEBB)
 4. Associated Air Balance Council (AABC)
- B. Set the air delivery or intake of each diffuser, grille and register to be as designed or within five percent of the air flow rates shown on the Drawings.
- C. Set the fan air flow rate and static pressure rise across the fan to be within 10 percent above the design value at design speed.

1.06 JOB CONDITIONS

- A. Require the testing and balancing specialist to review his work with the respective manufacturers of the equipment and devices involved, and coordinate and schedule all work.
- B. Furnish and install balancing dampers, pressure taps, gauges, and other components as required for a properly balanced system, whether or not specified herein or shown on the Drawings, all at no additional cost to the Owner. Make all adjustment or replacement parts recommended by the testing and balancing specialist in strict accordance with the respective equipment manufacturer's recommendations.
- C. Coordinate with the control manufacturer's representative to set the adjustment of the automatically operated dampers to operate as required.

1.07 GENERAL

- A. The Owner will occupy the building during the entire testing, adjusting, and balancing period. Cooperate with the Owner during testing, adjusting, and balancing operations to minimize conflicts with the Owner's operations.
- B. Complete all tests specified herein to the satisfaction of the Architect/Engineer before final acceptance.
- C. The Architect/Engineer, or his representative, is the sole judge of the acceptability of the tests. The Architect/Engineer may direct the performance of any such additional tests, as he deems necessary in order to determine the acceptability of the systems, equipment, material and workmanship. No additional payment will be made for any test required by the Architect/Engineer.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Obtain design drawings and specifications and become thoroughly acquainted with the design intent.
- B. Obtain copies of approved shop drawings of all air handling equipment, air outlets (supply, return and exhaust), and the temperature control diagrams, including intended sequence of operations.
- C. Existing Systems: Where existing systems are to be added to or modified perform operational tests prior to modifications including but not limited to existing fan curves, pressure readings and flow measurements.
 - 1. Obtain copies of the equipment and motor nameplate data along with equipment performance curves indicating operating points prior to any modifications. Where terminal units are to be adjusted or modified obtain performance data for these units.

- D. Examine installed work and conditions under which testing is to be done to ensure that work has been completed, cleaned, and is operable. Do not proceed with testing, adjusting and balancing until unsatisfactory conditions have been corrected in a manner approved by the testing and balancing specialist.
- E. Examine the air systems to see that they are free from obstructions. Determine that all dampers and registers are open, moving equipment is lubricated, clean filters are installed, and automatic controls are functioning; and perform other inspections and maintenance activities necessary for proper operation of the systems.
- F. Where existing systems are to be modified or added to ensure that all filters are clean and any operational problems that will prevent system balance have been brought to the attention of the Owner and repaired.

3.02 TESTING, ADJUSTING AND BALANCING

- A. Notify the Owner 48 hours in advance of starting any tests. Do not perform any tests until acknowledgment of notification and approval has been received from the Owner.
- B. Provide all necessary instruments and personnel for the tests. If, in the opinion of the Architect/Engineer, the results of such tests show that the Work has not complied with the requirements of the Contract Documents, make all additions or changes necessary to put the system in proper working condition and pay all expenses for all subsequent tests which are necessary to determine whether the Work is satisfactory. Any additional work or subsequent tests shall be carried out at the convenience of the Architect/Engineer.
- C. Test all packaged equipment in strict accordance with the equipment manufacturer's requirements.
- D. Perform any and all other tests that may be required by the local municipality or other governing body, board or agency having jurisdiction.
- E. Perform testing, adjusting, and balancing after leakage and pressure tests on air distribution systems have been satisfactorily completed.
- F. Actuate all safety devices in a manner that clearly demonstrates their workability and operation.
- G. Cut insulation and ductwork for installation of test probes to the minimum extent necessary to allow adequate performance of test procedure.
- H. Perform tests and compile test data for all air systems.
- I. Include a schematic diagram locating the air inlets, outlets, fans, equipment, dampers and regulating devices for air systems.
- J. All instruments used shall be provided by the entity performing the Work of this Section, and shall be accurately calibrated and maintained in good working order.
- K. Air Systems
- L. Perform the testing, adjusting and balancing of air systems in accordance with the detailed procedures outlined in the referenced standards; including but not be limited to the following:

1. Test, record and adjust fan rpm to design requirements.
2. Test and record motor full load amperes.
3. Make a pitot tube traverse of main supply ducts and obtain design flow rate at fans.
4. Test and record system static pressure, velocity pressure and total pressure.
5. Test and adjust system for design supply, transfer and return air flow rate.
6. Test and adjust system for minimum and maximum design flow rates of outside air.
7. Test and record return air temperatures.
8. Test and record coil and fan leaving air temperatures.
9. Adjust all main supply, return, relief, and exhaust air ducts to proper design flow rate.
10. Adjust all zones to proper design flow rate for supply, return, transfer, relief and exhaust air.
11. Test and adjust each diffuser, grille and register.
12. Identify each grille, diffuser and register as to location and area on the schematic diagram.
13. Identify and list in the final report size, type and manufacturer of diffusers, grilles and registers and all tested equipment. Use manufacturer's data on all equipment to make required calculations for testing, adjusting and balancing. Include design required velocity and test resultant velocity, required flow rate and test resultant flow rate after adjustment as part of readings and tests of diffusers, grilles and registers.
14. Adjust all diffusers, grilles and registers to minimize drafts in all areas.
15. Permanently mark all dampers after air balance is complete so that they can be restored to their correct position, if disturbed later.
16. Seal openings in ductwork for pitot tube insertion with snap-in plugs after air balance is complete.

END OF SECTION 230594.12

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. This section describes the insulation, jackets and insulating accessories for sheet metal ductwork as scheduled in Part 3 of this Section and as shown on the Drawings.

1.02 REFERENCES

- A. National Fire Protection Association (NFPA):
 - 1. NFPA 255 - Surface Burning Characteristics of Building Materials.
- B. Greenguard
- C. 2015 International Energy Conservation Code
- D. Sheet Metal and Air Conditioning Contractors National Association (SMACNA):
- E. SMACNA - HVAC Duct Construction Standards - Metal and Flexible.
- F. Underwriters Laboratories, Inc. (UL):
 - 1. UL 723 - Surface Burning Characteristics of Building Materials.
- G. American Society for Testing and Materials (ASTM):
 - 1. ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.
 - 2. ASTM C177 - Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
 - 3. ASTM C518 - Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
 - 4. ASTM C553 - Mineral Fiber Blanket and Felt Insulation.
 - 5. ASTM C612 - Specification for Mineral Fiber Block and Board Thermal Insulation.
 - 6. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel
 - 7. ASTM C921 - Properties of Jacketing Materials for Thermal Insulation.
 - 8. ASTM C1136 - Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation
 - 9. ASTM D1056 - Flexible Cellular Materials - Sponge or Expanded Rubber.
 - 10. ASTM E84 - Surface Burning Characteristics of Building Materials.
 - 11. ASTM E96 - Water Vapor Transmission of Materials.

1.03 DEFINITIONS

- A. Greenguard: Greenguard Environmental Institute
- B. IAQ: Indoor Air Quality
- C. EPA: Environmental Protection Agency
- D. WHO: World Health Organization
- E. ASJ: All Service Jacket
- F. SSL: Self-Sealing Lap

- G. FSK: Foil-Scrim-Kraft; jacketing
- H. PSK: Poly-Scrim-Kraft; jacketing
- I. PVC: Polyvinyl Chloride
- J. FRP: Fiberglass Reinforced Plastic
- K. Cold Piping/Ductwork/Surfaces: Pipes or surfaces where the normal operating temperature is 60 degrees F or lower.

1.04 SUBMITTALS

- A. Product data: To include product description, manufacturer's installation instructions, types and recommended thicknesses for each application, and location of materials.
- B. Provide samples and mock-ups of systems as required.

1.05 ENVIRONMENTAL REQUIREMENTS

- A. Maintain ambient conditions required by manufacturers of tapes, adhesives, mastics, cements, and insulation materials.
- B. Follow manufacturer's recommended handling practices.
- C. Supply fiberglass products that assure excellent IAQ (Indoor Air Quality) performance through Greenguard Certification.
- D. Mold: Carefully inspect any insulation that has been exposed to water. If it shows any sign of mold growth remove it from the Site. If the material is wet but shows no sign of mold, dry rapidly and thoroughly. If it shows signs of facing degradation from wetting remove it from the Site. Discard air handling insulation used in the air stream if exposed to water.

1.06 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Manufacturer: Company specializing in manufacturing Products specified with minimum 3 years documented experience.
 - 2. Installer: Company specializing in performing the Work of this Section with minimum 3 years documented experience.
- B. Materials:
 - 1. Flame spread/smoke developed rating of 25/50 or less in accordance with ASTM E84, NFPA 255 and UL 723.
 - 2. Certify insulation for duct, pipe and equipment for above grade exposed to weather outside building as being self-extinguishing for 1" thickness in less than 53 seconds when tested in accordance with ASTM D1692.

PART 2 - PRODUCTS

2.01 FIBERGLASS RIGID BOARD

- A. Rigid Fiber Glass Board insulation meeting ASTM C 612 Type IA and IB.
- B. Mean temperature by ASTM C 177 and a maximum service temperature of 450° F.
- C. Factory Applied Vapor Retarder Jacket: ASJ conforming to ASTM C 1136 Type I, or FSK or PSK conforming to ASTM C 1136 Type II.
- D. Density:
 - 1. Concealed areas: Minimum 3 PCF
 - 2. Exposed areas: Minimum 6 PCF
- E. Approved Products:
 - 1. Insulation Board by Knauf

2.02 INTERNAL DUCT LINING

- A. Conforming to ASTM C 1071 Type 1 and NFPA 90A & 90B.
- B. Noise Reduction Coefficient (NRC): ASTM C 423 Type A Mounting, 0.40 or higher for ½" product, 0.60 or higher for 1" product.
- C. Rated for a maximum air velocity of 6000 Feet per minute.
- D. Approved Products:
 - 1. Textile Duct Liner with Hydroshield® Technology by Knauf.

2.03 SHEET WATERPROOFING MEMBRANE

- A. Prefabricated, self-adhering, sheet-type waterproofing membrane shall be FlexClad-400 by MFM Building Products Corp. or approved equal.
- B. Description:
 - 1. Top Layer: Stucco-embossed, UV-resistant aluminum weathering surface.
 - 2. Middle Layer: Multiple layers of high-density cross-linked polymer film.
 - 3. Bottom Layer: Uniform layer of rubberized asphalt adhesive, protected by disposable silicone release paper.
- C. Color: As selected by Architect/Engineer.
- D. Material Thickness: ASTM D 1970, 40 Mils Nominal
- E. Flexibility: ASTM D 1970, Pass.
- F. Vapor Permeance: ASTM E 96, 0 perms.
- G. Nail Sealability: ASTM D 1970, Pass.
- H. Heat Aging: ASTM D 794, Pass.

- I. Tear Resistance: ASTM D 1424, Average: 660 grams.
- J. Ultimate Elongation MD: ASTM D 412, 434 percent.
- K. Ultimate Elongation CMD: ASTM D 412, 246 percent.
- L. Low Temperature Flexibility: 1,000,000 Cycles at -10 Degrees F, 1,200 Cycles at -20 Degrees F, No cracking.
- M. Flame Spread Index: ASTM E 84, 0.
- N. Smoke Density Index: ASTM E 84, 5.
- O. Wind-Driven Rain: SFBC TAS-110-95, 100 mph, No leakage or failure.
- P. UV Stability: Excellent.
- Q. Accessories: MFM Spray Adhesive

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that all ductwork is tested and approved prior to insulation installation.
- B. Verify that all surfaces are clean, dry and without foreign material before applying insulation materials.

3.02 DUCTWORK REQUIRING INSULATION

- A. Insulate Ductwork as specified in the DUCTWORK INSULATION SCHEDULE.
 - 1. Insulate any additional ductwork or plenums indicated to be insulated on the Drawings.

3.03 INSTALLATION (GENERAL)

- A. Install all materials using skilled labor regularly engaged in this type of work. Install all materials in strict accordance with manufacturer's recommendations, building codes, and industry standards.
- B. Locate insulation and cover seams in the least visible location. Extend all surface finishes in such a manner as to protect all raw edges, ends and surfaces of insulation.
- C. On cold surfaces where a vapor retarder must be maintained, apply insulation with a continuous, unbroken moisture and vapor seal. Insulate and vapor seal all hangers, supports, anchors, or other projections secured to cold surfaces to prevent condensation.
- D. Install insulation neatly, accurately and without voids, in accordance with manufacturer's instructions and NIAC National Commercial and Industrial Insulation Standards.
- E. Install ductwork hanger supports on the outside of the insulation. Where vertical ducts are supported to the building structure, insulate the ductwork supports to prevent condensation.

- F. Insulate ductwork using insulation of the type and thickness scheduled at the end of this Section.
- G. If specified insulation board thickness does not cover ductwork standing seams and reinforcing angles, insulate them by adhering a grooved strip of fiberglass board with a thickness at least 1 ½ inches greater than the height of the seam or angle covered over the standing seam or angle.

3.04 FIBERGLASS INTERNAL DUCT LINING

- A. Apply Duct Lining in strict accordance with the latest edition of SMACNA's "HVAC Duct Construction Standard Metal & Flexible" and NAIMA's "Fibrous Glass Duct Liner Standard".
- B. Select length of mechanical fasteners in accordance with the manufacturer's recommendation as listed on each product. Install mechanical fasteners perpendicular to the duct surface, and such that the pin does not compress the liner more than 25% relative to the nominal thickness of the insulation.
- C. Adhesive shall conform to ASTM C 916. Apply adhesive to the sheet metal with a 90% minimum coverage. Coat all exposed edges of the duct liner with the same adhesive. Repair all rips and tears using an adhesive that conforms to ASTM C 916.
- D. Cover all internal duct areas with duct liner. Firmly butt transverse joints with no gaps and coat with adhesive. Overlap and compress longitudinal corner joints.
- E. When air velocities are 4000 to 6000 FPM, apply metal nosing to all upstream transverse edges to additionally secure the insulation.

3.05 FIBERGLASS BOARD INSULATION

- A. Fit insulation by scoring, cutting and mitering to fit the contour of the ductwork.
- B. Attach insulation to ductwork in thickness scheduled by brushing adhesive uniformly on all sides of ductwork covering 100 percent of ductwork surface. Press insulation into place, making complete contact with adhesive. Butt edges of insulation board tightly together without gaps.
- C. Additionally, hold insulation in place by impaling on pins welded to all four sides of the ductwork. Locate and weld pins a minimum 12 inch on center with a minimum of 2 rows per side of duct and no less than 3 inches from the edges of the ductwork. Secure insulation to pins with 1 inch diameter hold-down washers. As an alternate to welded pins, provide "Gripnail" mechanical surface fasteners by Gripnail Corporation using pneumatic hammer designed for this work.
- D. Seal all joints, seams, breaks, and punctures in facing with adhesive and cover with 3 inch wide sealing tape. Flash supports with vapor barrier coating.
- E. For rectangular ducts and plenums exposed to weather, pitch ductwork or insulation board minimum ¼ inch per foot to prevent rainwater from accumulating on top of duct or plenum. Cover insulation board with Sheet Waterproofing Membrane.

3.06 SHEET WATERPROOFING MEMBRANE

- A. Surface Preparation:
 - 1. Prepare surfaces in accordance with manufacturer's instructions.

2. Ensure tops of ducts have sufficient slope to eliminate ponding water.
3. Ensure bottoms of ducts have foil-faced rigid insulation boards installed.
4. Ensure surfaces are clean and dry.
5. Remove dirt, dust, oil, grease, hand oils, processing lubricants, moisture, frost, and other contaminants that could adversely affect adhesion of waterproofing membrane.
6. Prime metal, concrete, and masonry surfaces with primers approved by waterproofing membrane manufacturer.

B. Application:

1. Apply waterproofing membrane in accordance with manufacturer's instructions on all exterior insulated ductwork and at locations indicated on the Drawings.
2. Apply membrane to clean, dry, primed metal ductwork and foil-faced rigid insulation boards. Do not apply over wet or non-rigid insulation.
3. Apply membrane in accordance with manufacturer's air, material, and surface temperature requirements.
4. Apply firm, uniform pressure with hand roller to entire membrane to ensure proper adhesion. Concentrate pressure at seams and on underside of ductwork.
5. Apply membrane to ducts in accordance with manufacturer's instructions.
6. Apply membrane shingle fashion to shed water over, not against laps.
7. Do not terminate membrane on bottom of duct.
8. Apply minimum 3-inch laps and minimum 6-inch end laps for ductwork applications.
9. Embed membrane to bottom of ducts over 24 inches wide in light continuous layer of adhesive applied to insulation face.
10. Apply membrane to bottom of insulated ducts over 36 inches wide using mechanical attachment, in addition to adhesive, in accordance with manufacturer's instructions. Install pints on 12-inch centers with rows staggered.
11. Apply adhesive to areas where special adhesion requirements exist, including duct bottoms, flashings, transitions, joints, elbows, valves, tees, and other fittings.

C. Protection:

1. Protect applied waterproofing membrane and fabric flexible duct connections from damage during construction.

3.07 DUCTWORK INSULATION SCHEDULE

A. Fiber Glass Insulation Schedule:

Ductwork System	Type	Minimum R-Value
Supply and Return Ducts and Plenums, Exposed in the Space Served	Uninsulated	NA
Ducts Located Outdoors	Fiberglass Rigid Board	8
Ductwork 20 Feet Upstream and Downstream of Air Handling Units and Supply and Return Fans, Located Indoors	Fiberglass Internal Duct Lining	Note 1
Ductwork 20 Feet Upstream and Downstream of Air Handling Units and Supply and Return Fans, Located Outdoors	Fiberglass Internal Duct Lining	Note 1

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NOTE 1 - Ductwork to be provided with 1-inch internal lining in addition to externally applied insulation in accordance with the table above.

END OF SECTION 230719

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PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. The work specified as part of this Section consists of the integration of equipment controls supplied as part of manufactured items, materials and equipment required by the Drawings and under Divisions 23 and 26 to achieve operational and coordinated Sequences of Operation as Specified. Work shall include management of the system start up and operational check out, coordination of functions of controllers supplied as part of equipment packages, sizing of control valves and damper operators for dampers, interconnection of systems, provision and installation of all accessory devices required for complete system operation including dampers, control valves and actuators not provided as part of equipment, coordination of start up and testing and demonstration of the operation of Sequences of Operation to the Owner and his representatives.

1.02 RELATED SECTIONS

- A. The General Conditions of the Contract, Supplementary Conditions, and General Requirements are a part of these Specifications and shall be used in conjunction with this Section as a part of the Contract Documents. Consult them for further instructions pertaining to this work. The Contractor is bound by the provisions of Division 00 and Division 01.
- B. The following Sections constitute related work:
 - 1. Section 230010 - General Mechanical Requirements
 - 2. Equipment and Systems specified under Division 23
 - 3. Division 26

1.03 QUALITY ASSURANCE

- A. System Installer Qualifications
 - 1. The Integrator shall have a minimum of five years experience in the integration of systems of a similar nature to those of this Project.
 - 2. The Integrator shall have an office within 50 miles of the project site and provide 24-hour response in the event of a customer call.
- B. Codes and Standards: Meet requirements of all applicable standards and codes, except when more detailed or stringent requirements are indicated by the Contract Documents, including requirements of this Section.
 - 1. Underwriters Laboratories: Products shall be UL-916-PAZX listed.
 - 2. National Electrical Code - NFPA 70.
- C. All products used in this installation shall be new, currently under manufacture, and shall have been applied in similar installations for a minimum of 2 years. This installation shall not be used as a test site for any new products unless explicitly approved by the Owner's representative in writing prior to bid date. Spare parts shall be available for at least 5 years after completion of this Contract.

1.04 SUBMITTALS

- A. Submit at the time of bid the name and qualifications of the firm that will be responsible for the Integration function along with the qualifications of the specific personnel proposed. The Owner and Architect/Engineer may choose to interview the personnel proposed for the project.

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- B. Contractor shall provide shop drawings and manufacturer's standard specification data sheets on all materials and hardware to be provided. No work may begin on any segment of this project until the Architect/Engineer and Owner have reviewed submittals for conformity with the Drawings and Specifications. All shop drawings shall be provided to the Owner electronically as .dwg or .dxf file formats.
- C. Submit a written sequence of operation for each system indicating which functions are to be controlled by controls provided as part of manufactured equipment and which functions will be under control of devices provided as part of this Section.
- D. Submit interconnecting wiring diagrams for all systems. These diagrams may rely on diagrams for controls of manufactured equipment provided that the interface points are clearly identified and copies of the manufactured item's control diagrams are submitted for information as part of the submittal package.
- E. Submit any additional information or data which is deemed necessary to determine compliance with these specifications or which is deemed valuable in documenting the system to be installed.
- F. Submit the following within 30 days of contract award:
 - 1. A work plan and schedule for the start up and check out of all systems including time requirements and resources required from all Sub-Contractors involved.
 - 2. A complete list of equipment to be used indicating quantity, manufacturer and model number.
 - 3. A schedule of all control valves including the valve size, model number (including pattern and connections), flow, CV, pressure rating, and location.
 - 4. A schedule of all control dampers. This shall include the damper size, pressure drop, manufacturer and model number.
 - 5. Provide manufacturers cut sheets for major system components. When manufacturer's cut sheets apply to a product series rather than a specific product, the data specifically applicable to the project shall be highlighted or clearly indicated by other means. Each submitted piece of literature and drawings shall clearly reference the specification and/or drawing that the submittal is being submitted to cover.
 - 6. The submittals required under this Section shall be considered as For Information Only. Review by the Architect/Engineer shall not relieve the Contractor from the responsibility of providing fully operational systems.

1.05 WARRANTY

- A. Warrant all work as follows:
 - 1. Labor & materials for control system specified shall be warranted free from defects for a period of twelve (12) months after final completion acceptance by the Owner. Control System failures during the warranty period shall be adjusted, repaired, or replaced at no charge or reduction in service to the Owner. The Contractor shall respond to the Owner's request for warranty service within 24 hours during customary business hours.
 - 2. At the end of the final start-up/testing, if equipment and systems are operating in a manner satisfactory to the Owner and Architect/Engineer, the Owner shall sign certificates certifying that the control system's operation has been tested and accepted in accordance with the terms of this Specification. The date of Owner's acceptance shall be the start of warranty.

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PART 2 - PRODUCTS

2.01 STANDARD OF QUALITY AND PERFORMANCE

- A. Products specified are not intended to form a complete scope of supply. They are intended to set a level of quality for items that the Contractor may need to supply to implement a complete Sequence of Operation. Products of a comparable quality and performance may be submitted for approval by the Architect/Engineer.

2.02 TEMPERATURE SENSORS

- A. Temperature sensors shall be Resistance Temperature Device (RTD) or Thermistor.
- B. Duct sensors shall be rigid or averaging as required. Averaging sensors shall be a minimum of 5 feet in length.
- C. Immersion sensors shall be provided with a separable stainless steel well. Pressure rating of well is to be consistent with the system pressure in which it is to be installed.
- D. Space sensors shall be equipped with set-point adjustment, override switch, display, and communication port.
- E. Provide matched temperature sensors for differential temperature measurement. Differential accuracy shall be within 0.2 degrees F.
- F. The space temperature, setpoint, and override confirmation shall be annunciated by a digital display for each zone sensor. The setpoint shall be selectable utilizing buttons.

2.03 HUMIDITY SENSORS

- A. Room Humidity sensors shall have an accuracy of $\pm 1\%$ 25°C from 10% to 80% RH with One-point adjustment calibration. The operating temperature range shall be -10° to 150°F max.
- B. Duct sensors shall have a sensing range of 20% to 80% with accuracy of $\pm 1\%$ R.H. Duct sensors shall be provided with a sampling chamber.
- C. Outdoor air humidity sensors shall have a sensing range of 20% to 95% R.H. and shall be suitable for ambient conditions of -40 degrees F to 170 degrees F.
- D. Humidity sensor's drift shall not exceed 1% of full scale per year.

2.04 STATIC PRESSURE SENSORS

- A. Sensor shall have linear output signal. Zero and span shall be field-adjustable.
- B. Sensor sensing elements shall withstand continuous operating conditions plus or minus 50% greater than calibrated span without damage.
- C. Water pressure sensor shall have stainless steel diaphragm construction, proof pressure of 150 psi minimum. Sensor shall be complete with 4-20 ma output, required mounting brackets, and block and bleed valves. Mount in location accessible for service.

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- D. Water differential pressure sensor shall have stainless steel diaphragm construction, proof pressure of 150 psi minimum. Over-range limit (DP) and maximum static pressure shall be 3,000 psi. Transmitter shall be complete with 4-20 ma output, required mounting brackets, and five-valve manifold. Mount in a location accessible for service.

2.05 RELAYS

- A. Control relays shall be UL listed plug-in type with dust cover. Contact rating, configuration, and coil voltage suitable for application.
- B. Time delay relays shall be UL listed solid-state plug-in type with adjustable time delay. Delay shall be adjustable plus or minus 200% (minimum) from set-point shown on plans. Contact rating, configuration, and coil voltage suitable for application. Provide NEMA 1 Type enclosure when not installed in local control panel.

2.06 TRANSFORMERS AND POWER SUPPLIES

- A. Control transformers shall be UL listed, Class 2 current-limiting type, or shall be furnished with over-current protection in both primary and secondary circuits for Class 2 service.
- B. Unit output shall match the required output current and voltage requirements. Current output shall allow for a 50% safety factor. Output ripple shall be 3.0 mV maximum Peak-to-Peak. Regulation shall be 0.10% line and load combined, with 50 microsecond response time for 50% load changes. Unit shall have built-in over-voltage protection.
- C. Unit shall operate between 0 degrees C and 50 degrees C.
- D. Unit shall be UL recognized.

2.07 CURRENT SWITCHES

- A. 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 control system.

2.08 LOCAL CONTROL PANELS

- A. All indoor control cabinets shall be fully enclosed NEMA 1 or NEMA 4 rating as required. Provide cabinet with hinged door, key-lock latch, and removable sub-panels. A single key shall be common to all field panels and sub-panels.
- B. Interconnections between internal and face-mounted devices pre-wired with color-coded stranded conductors neatly installed in plastic troughs and/or tie-wrapped. Terminals for field connections shall be UL listed for 600-volt service, individually identified per control/interlock drawings, with adequate clearance for field wiring. Control terminations for field connection shall be individually identified per control drawings.
- C. Provide on/off power switch with over-current protection and main air gauge for control power sources to each local panel.

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2.09 AIR FLOW MEASURING STATIONS

- A. Air flow measuring stations shall be multi-point, multi-axis flow ring or cross sensor. Single point or flow bar sensors are not acceptable. The airflow measurement station shall measure from 15 percent to 100 percent of unit nominal airflow. The air flow measuring station shall adjust for temperature variations and shall provide a 2 to 10 Vdc signal that corresponds to actual airflow for controlling and documenting airflow. The accuracy of the airflow measurement station shall be ± 5 percent.
- B. Air flow measuring stations shall be provided by the air handler manufacturer or the VAV box manufacturer. See air handler or VAV box specification section for more details.

2.10 WALL MOUNTED CARBON DIOXIDE SENSORS

- A. Carbon dioxide sensors shall be of the wall mounted type.
- B. Sensors shall be of the auto-calibrated type designed to operate from 24VAC or 24VDC power.
- C. Range: 0-2000 ppm CO₂
- D. Accuracy: ± 30 ppm CO₂ + 3% of reading
- E. Annual Zero Drift: ± 10 ppm
- F. Response Time: < 3 minutes
- G. Output Signals:
 - 1. 0-10 VDC
 - 2. 4-10 mA or 2-10 VDC
- H. Resolution of Analog Outputs: 2 ppm CO₂
- I. Housing Material: Polycarbonate/ABS blend
- J. The space temperature, setpoint, and override confirmation shall be annunciated by a digital display for each zone sensor. The setpoint shall be selectable utilizing buttons.

PART 3 - EXECUTION

3.01 GENERAL WORKMANSHIP

- A. Install equipment, piping, wiring/conduit parallel to building lines (i.e. horizontal, vertical, and parallel to walls) wherever possible.
- B. Provide sufficient slack and flexible connections to allow for vibration of piping and equipment.
- C. Install all equipment in readily accessible location as defined by Chapter 1 Article 100 part A of the NEC. Control panels shall be attached to structural walls unless mounted in equipment enclosure specifically designed for that purpose. Panels shall be mounted to allow for unobstructed access for service.

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- D. Verify integrity of all wiring to ensure continuity and freedom from shorts and grounds.
- E. All equipment, installation, and wiring shall comply with acceptable industry specifications and standards for performance, reliability, and compatibility and be executed in strict adherence to local codes and standard practices.

3.02 WIRING

- A. All control and interlock wiring shall comply with the national and local electrical codes and Division 26 of these Specifications. Where the requirements of this Section differ with those in Division 26, the requirements of this Section shall take precedence.
- B. Do not install Class 2 wiring in conduit containing Class 1 wiring. Do not use boxes and panels containing high voltage for low voltage wiring except for the purpose of interfacing the two (e.g. relays and transformers).
- C. Control wiring located in a plenum space that is not installed in a conduit shall be plenum rated.
- D. All wire-to-device connections shall be made at a terminal block or terminal strip. All wire-to-wire connections shall be at a terminal blocks, or with a crimped connector. All wiring within enclosures shall be neatly bundled and anchored to permit access and prevent restriction to devices and terminals.
- E. Maximum allowable voltage for control wiring shall be 120V. Provide and install step down transformers.
- F. All wiring shall be installed as continuous lengths, where possible. Any required splices shall be made only within an approved junction box or other approved protective device.
- G. Maintain fire rating at all penetrations in accordance with other Sections of this Specification and local codes.
- H. Size of conduit and size and type of wire shall be the design responsibility of the Contractor, in keeping with the manufacturer's recommendations and the NEC.
- I. Locate control and status relays in designated enclosures only. These relays may also be located within packaged equipment control panel enclosures. These relays shall not be located within Class 1 starter enclosures.
- J. Follow manufacturer's installation recommendations for all communication and network cabling. Network or communication cabling shall be run separately from other wiring.
- K. Adhere to Division 26 requirements for installation of raceway.
- L. Maintain an updated (as-built) wiring diagram with terminations identified at the job site.
- M. Flexible metal conduits and liquid-tight, flexible metal conduits shall not exceed 3feet in length and shall be supported at each end. Flexible metal conduit less than 1/2" electrical trade size shall not be used. In areas exposed to moisture liquid tight, flexible metal conduits shall be used.

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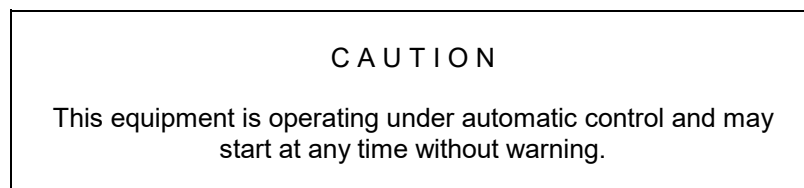
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3.03 INSTALLATION OF SENSORS

- A. Install sensors in accordance with the manufacturer's recommendations.
- B. Mount sensors rigidly and adequate for the environment within which the sensor operates.
- C. Room temperature sensors shall be installed on concealed junction boxes properly supported by the wall framing.
- D. All wires attached to sensors shall be air sealed in their conduits or in the wall to stop air transmitted from other areas affecting sensor readings.
- E. Install duct static pressure tap with tube end facing directly down-stream of air flow.
- F. Sensors used in mixing plenums, and hot and cold decks shall be of the averaging type. Averaging sensors shall be installed in a serpentine manner horizontally across duct. Each bend shall be supported with a capillary clip.
- G. All pipe mounted temperature sensors shall be installed in wells. Install all liquid temperature sensors with heat conducting fluid in thermal wells.
- H. Wiring for space sensors shall be concealed in building walls. EMT conduit is acceptable within mechanical and service rooms.
- I. Install outdoor air temperature sensors on north wall complete with sun shield at designated location.

3.04 WARNING LABELS

- A. Affix plastic labels on each starter and equipment automatically controlled. Label shall indicate the following:



3.05 IDENTIFICATION OF HARDWARE AND WIRING

- A. All wiring and cabling, including that within factory-fabricated panels, shall be labeled at each end within 2 inches of termination with a cable identifier and other descriptive information.
- B. Permanently label or code each point of field terminal strips to show the instrument or item served.
- C. Identify control panels with minimum 1-cm letters on laminated plastic nameplates.

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- D. Identify all other control components with permanent labels. Identifiers shall match record documents. All plug-in components shall be labeled such that removal of the component does not remove the label.

3.06 CLEANING

- A. The Contractor shall clean up all debris resulting from his or her activities daily. The contractor shall remove all cartons, containers, crates, etc. under his control as soon as their contents have been removed. Waste shall be collected and placed in a location designated by the Construction Manager or General Contractor.
- B. At the completion of work in any area, the Contractor shall clean all of his/her work, equipment, etc., making 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 metal cabinet or enclosure that has been deformed shall be replaced with new material and repainted to match the adjacent areas.

3.07 PROTECTION

- A. The Contractor shall protect all work and material from damage by his/her work or workers, and shall be liable for all damage thus caused.
- B. The Contractor shall be responsible for his/her work and equipment until finally inspected, tested, and accepted. The Contractor shall protect his/her work against theft or damage, and shall carefully store material and equipment received on site that is not immediately installed. The Contractor shall close all open ends of work with temporary covers or plugs during storage and construction to prevent entry of foreign objects.

3.08 FIELD QUALITY CONTROL

- A. All work, materials and equipment shall comply with the rules and regulations of applicable local, state, and federal codes and ordinances as identified in Part 1 of this Section.
- B. Contractor shall continually monitor the field installation for code compliance and quality of workmanship. All visible piping and or wiring runs shall be installed parallel to building lines and properly supported.
- C. Contractor shall arrange for field inspections by local and/or state authorities having jurisdiction over the work.

3.09 ACCEPTANCE

- A. The control systems will not be accepted as meeting the requirements of completion until all tests described in this Specification have been performed to the satisfaction of both the Engineer and Owner.
- B. The full range of operation for all Sequences of Operation shall be demonstrated. Where sequences are dependent on season or outside conditions these conditions may be simulated for the purpose of demonstration if approved by both the Architect/Engineer and the Owner. If

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simulations cannot be acceptably created the Contractor shall perform the demonstration during the proper period.

- C. 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 Owner's representative. Such tests shall then be performed as part of the warranty.

END OF SECTION 230991

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. The Work specified as part of this Section consists of the work required to achieve operational and coordinated Sequences of Operation as described. Work includes coordination of functions of controllers supplied as part of equipment packages, sizing of control valves, interconnection of systems, provision and installation of all accessory devices required for complete system operation including devices not provided as part of equipment, coordination of start up and testing and demonstration of the operation of Sequences of Operation to the Owner and his representatives.
- B. The control system operation of all equipment shall be subject to the operational modes, conditions and logic described in this Section and the controlled equipment manufacturer's recommendations.
- C. Training of the Owner's personnel in the operation, trouble shooting, adjustment and repair of all system controls.

1.02 RELATED SECTIONS AND WORK

- A. Division 26
- B. Owner's Building Management System (BMS)
- C. Owner's Fire Alarm System (FAS)

PART 2 - PRODUCTS

NOT USED.

PART 3 - EXECUTION

3.01 GENERAL

- A. General
 - 1. Conform to the requirements of the Owner's standards for all electrical work and devices.
 - 2. System and system components shall be BACNet compatible.
 - 3. All set points and operating points shall be able to be transmitted to and set from the BMS system. Specific points to be enabled shall be at the discretion of the Owner.
 - 4. All systems shall be capable of operating independently of the BMS system based on set points and limits either input from the BMS system or manually.
 - 5. Coordinate all work with the requirements and characteristics of the BMS system and the equipment provided for the project under this phase or earlier phases.
 - 6. All space sensors and thermostats shall have an lcd display indicating their set point, the condition sensed and the mode of operation they are responding to

3.02 SEQUENCE OF OPERATION - PACKAGED ROOFTOP UNIT, RTU-1

- A. General Notes:
 - 1. New Packaged Rooftop Unit shall be cooling only.
 - 2. Existing heating and ventilation equipment shall remain. Contractor to modify existing heating controls to provide a 5 degree deadband between the the heating and cooling

setpoints. Existing ventilation units serving the auditorium / stage shall sequence off when the new cooling only rooftop unit is run.

- B. 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 75 degree F (adj.) cooling set point.
 - b. Unoccupied Mode: The unit shall maintain
 - 1) A 85 degree F (adj.) cooling set point.
 - 2. Alarms shall be provided as follows:
 - a. High Zone Temp: If the zone temperature is greater than the cooling set point by a user definable amount (adj.).
 - b. Low Zone Temp: If the zone temperature is less than the heating set point by a user definable amount (adj.).
- C. Zone Set point Adjust:
 - 1. The occupant shall be able to adjust the zone temperatur cooling set point at the zone sensor.
- D. Supply Fan:
 - 1. The supply fan shall run anytime the unit is commanded to run, unless shutdown on safeties. To prevent short cycling, the supply fan shall have a user definable (adj.) minimum runtime.
 - 2. Alarms shall be provided as follows:
 - a. Supply Fan Failure: Commanded on, but the status is off.
- E. Cooling Stages:
 - 1. The controller shall measure the zone temperature and stage the cooling to maintain its cooling set point. To prevent short cycling, there shall be a user definable (adj.) delay between stages, and each stage shall have a user definable (adj.) minimum runtime.
 - 2. The cooling shall be enabled whenever:
 - a. Outside air temperature is greater than 60 degree F (adj.).
 - b. AND the economizer (if present) is disabled or fully open.
 - c. AND the zone temperature is above cooling set point.
 - d. AND the supply fan status is on.
 - e. AND the heating is not active.
- F. Economizer:
 - 1. The controller shall measure the zone temperature and modulate the economizer dampers in sequence to maintain a set point 2 degree F less than the zone cooling set point. The outside air dampers shall maintain a minimum adjustable position required to maintain code required outdoor air flow whenever occupied.
 - 2. The economizer shall be enabled whenever:
 - a. Outside air temperature is less than 65 degree F (adj.).
 - b. AND the outside air enthalpy is less than 22% (adj.).
 - c. AND the outside air temperature is less than the return air temperature.
 - d. AND the outside air enthalpy is less than the return air enthalpy.
 - e. AND the supply fan status is on.
 - 3. The economizer shall close whenever:
 - a. Mixed air temperature drops from 45 degree F to 40 degree F (adj.).
 - b. OR on loss of supply fan status.
 - c. OR Freezestat (if present) is on.

4. The outside and exhaust air dampers shall close and the return air damper shall open when the unit is off. During Optimal Start Up, the mixed air damper shall operate as described in the occupied mode except that the outside air damper shall modulate to fully closed.
- G. Dehumidification:
1. The controller shall measure the return air humidity and override the cooling sequence to maintain return air humidity at or below 60% rh (adj.). Dehumidification shall be enabled whenever the supply fan status is on.
- H. Prefilter Status:
1. The controller shall monitor the prefilter status.
 2. Alarms shall be provided as follows:
 - a. Prefilter Change Required: Prefilter differential pressure exceeds a user definable limit (adj.).
- I. Mixed Air Temperature:
1. The controller shall monitor the mixed air temperature and use as required for economizer control (if present) or preheating control (if present).
 2. Alarms shall be provided as follows:
 - a. High Mixed Air Temp: If the mixed air temperature is greater than 90 degree F (adj.).
 - b. Low Mixed Air Temp: If the mixed air temperature is less than 45 degree F (adj.).
- J. Return Air Humidity:
1. The controller shall monitor the return air humidity and use as required for economizer control (if present) or humidity control (if present).
 2. Alarms shall be provided as follows:
 - a. High Return Air Humidity: If the return air humidity is greater than 70% (adj.).
 - b. Low Return Air Humidity: If the return air humidity is less than 35% (adj.).
- K. Return Air Temperature:
1. The controller shall monitor the return air temperature and use as required for economizer control (if present).
 2. Alarms shall be provided as follows:
 - a. High Return Air Temp: If the return air temperature is greater than 90 degree F adj.).
 - b. Low Return Air Temp: If the return air temperature is less than 45 degree F (adj.).
- L. Supply Air Temperature:
1. The controller shall monitor the supply air temperature.
 2. Alarms shall be provided as follows:
 - a. High Supply Air Temp: If the supply air temperature is greater than 120 degree F (adj.).
 - b. Low Supply Air Temp: If the supply air temperature is less than 45 degree F (adj.).
- M. System Points

	Hardware Points				Software Points						
Point Name	AI	AO	BI	BO	AV	BV	Loop	Sched	Trend	Alarm	Show On Graphic

	Hardware Points				Software Points					
Zone Temp	x								x	x
Zone CO2	x									
Outside Air Humidity (Network)	x								x	x
Outside Air Temp (Network)	x								x	x
Mixed Air Temp	x								x	x
Return Air Humidity	x								x	x
Return Air Temp	x								x	x
Supply Air Temp	x								x	x
Mixed Air Dampers		x							x	x
Supply Fan Status			x						x	x
Prefilter Status			x						x	
Supply Fan Start/Stop				x					x	x
Cooling Stage 1				x					x	x
Cooling Stage 2				x					x	x
Heating Stage 1										
Heating Stage 2										
Economizer Zone Temp Set point					x				x	x
Schedule								x		
Heating Set Point										
Cooling Set point									x	x
High Zone Temp										x
Low Zone Temp										x
Supply Fan Failure										x
High Mixed Air Temp										x

	Hardware Points				Software Points						
Low Mixed Air Temp										x	
High Return Air Humidity										x	
Low Return Air Humidity										x	
High Return Air Temp										x	
Low Return Air Temp										x	
High Supply Air Temp										x	
Low Supply Air Temp										x	
Totals	8	1	2	5	1	0	0	1	18	11	17

N. Outside Air Damper Control:

1. A one-time measurement of the outdoor air CO2 concentration shall be performed at the building site. This value shall serve as the minimum CO2 Concentration (C-s-min). Programmed value shall not exceed 350 PPM.
2. During all occupied modes the outside air damper shall be controlled to the effective minimum airflow operator adjustable with minimum setpoint, unless the economizing mode or mixed air temperature control routines are active. The outside air damper shall be closed during the Unoccupied mode, morning warm-up and pre-cool modes or when the outside air temperature falls below a Low Ambient Damper Lockout Set point (operator adjustable).
3. The RTU outdoor-air damper shall be controlled to deliver required outdoor airflow at all load conditions. The outdoor airflow setpoint shall be determined according to ASHRAE Standard 62-2007, Equation 6. The actual outdoor airflow shall be sensed at the outdoor air intake via an airflow measuring station.
4. During all occupied modes and when the fan is running, the controller shall reset the outdoor air ventilation setpoint from its minimum to maximum, in direct response to the highest individual hardwired CO2 level in the space, regulating the amount of fresh air allowed to enter the space. The CO2 room sensor shall calculate a level of concentration, to be used in the control loop. The ventilation setpoint shall increase as CO2 level rises above the Minimum CO2 Level Setpoint (operator adjustable) noted as "Minimum CO2 Concentration (Cs-min)" on the Demand Controlled Ventilation schedule located below. The outdoor air ventilation setpoint shall be at maximum when the CO2 level reaches the Maximum CO2 Threshold (2000 PPM / operator adjustable) noted as "Design CO2 Concentration (Cs-design)" on the Demand Controlled Ventilation schedule located below. Design airflows and CO2 concentrations are tabulated in the schedule below:

Demand Control Ventilation Schedule

Minimum CO2 Concentration (Cs-min)	Outdoor Airflow at Minimum CO2 Concentration (Vot-min)	Design CO2 Concentration (Cs-design)	Outdoor Airflow at Design CO2 Concentration (Vot-design)
One-time field measurement	20% of Vot-design CFM = 660 CFM	Cs-min + X PPM = 1020 PPM	(Max OA CFM) = 3295 CFM

5. Outside air airflow setpoint shall reset the Supply fan VFD minimum speed setpoint, to assure adequate ventilation.

O. Pre-Occupancy Purge Cycle

1. Prior to entering the occupied mode, the unit shall operate for 30 minutes with the outside air damper open to deliver the design outdoor airflow rate.
2. The supply fan shall operate continuously during the pre-occupancy purge cycle.

P. Post-Occupancy Flush Cycle

1. Prior to entering the unoccupied mode, the unit shall operate with the outside air damper open to deliver the design outdoor airflow rate until the CO2 concentration in the space is reduced to Minimum CO2 Concentration (Cs-min) (field adjustable).
2. The supply fan shall operate continuously during the post-occupancy flush cycle.

Q. Record Keeping

1. CO2 concentration readings from all sensors serving each space must be recorded at not greater than 15-minute intervals. Records of CO2 concentrations must be kept for a minimum of three years.

END OF SECTION 230993

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. This Section describes the galvanized steel, flexible, and aluminum ductwork for HVAC duct systems in accordance with SMACNA Duct Construction Standards, except as otherwise specified.
- B. The construction material for each ductwork system shall be as listed in the "Ductwork Material Schedule" at the end of this Section.
- C. This Section also describes the fittings, access doors, hangers and supports, manual volume dampers and sealants for each ductwork system as required.

1.02 RELATED WORK

- A. Section 230594 - Balancing of Air and Hydronic Systems.

1.03 REFERENCES

- A. ASHRAE - Handbook Fundamentals; Latest Edition.
- B. SMACNA - HVAC Duct Construction Standards Metal And Flexible (latest issue)
- C. ASTM A 653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
- D. ASTM B 209 - Specifications for Aluminum and Aluminum-Alloy Sheet and Plate.
- E. NFPA 90A - Installation of Air Conditioning and Ventilating Systems.
- F. UL 555 S - Fire Dampers & Smoke Dampers.
- G. NFPA 96 - Standard for Commercial Cooking Operations
- H. New York State Mechanical Code.

1.04 REGULATORY REQUIREMENTS

- A. Construct ductwork to NFPA 90A and New York State Mechanical Code standards.

1.05 SUBMITTALS

- A. Ductwork shop drawings for approval:
 - 1. Coordinate layout duct drawings that differ from ductwork shown on the Drawings.
 - 2. The review of deviations will be for pressure drop only. The review will not address clearances or accessibility to maintain or balance the air systems. No dimensional or coordination check of the shop drawings will be made. The Contractor has the sole responsibility to review the Drawings, coordinate ductwork fabrication, and provide clearances and access for installation, maintenance and balancing of this work, and work of other trades. Unless specifically dimensioned, Drawings indicate approximate locations only. The Contractor has the sole responsibility to locate and route the ductwork.

3. Deviations such as changing direction or transforming or dividing ductwork must maintain ductwork cross-sectional area and not exceed transformation taper of 15 degrees.
 4. Plans and section showing all equipment and accessories.
 5. Minimum 3/8 in. scale, double line, showing sizes, transverse joints, transitions, elevations, clearances and accessories; sections where required.
- B. Shop details and catalog cuts of:
1. Ductwork construction, including gauge and bracing schedule.
 2. Supports.
 3. Dampers.
 4. Turning vanes.
 5. Access doors.
 6. Flexible connections.
 7. Other accessories.

1.06 QUALITY ASSURANCE

- A. Construct all ductwork in accordance with referenced SMACNA Standards, except as otherwise stated. Ductwork pressure classifications shall be in accordance with referenced SMACNA Standards, except as otherwise specified.
- B. For all uninsulated ductwork casings and plenums located outdoors, the reinforcement members shall be galvanized steel or stainless steel.
- C. Construction pressure classification of ductwork are shown on the Drawings. If not shown, the pressure classification shall be greater than or equal to the maximum operating static pressure (minimum 2" w.c. pressure classification).
- D. All ductwork shall be free from pulsation, chatter, vibration and objectionable noise. If any of these defects appear after a system is in operation, correct by removing and replacing, or reinforcing the ductwork, at no additional cost to the Owner.
- E. For all galvanized steel ductwork, zinc coating shall be minimum G90 per ASTM A 653.

PART 2 - PRODUCTS

2.01 GALVANIZED STEEL RECTANGULAR DUCTS AND FITTINGS

- A. Construct ducts of galvanized sheet steel meeting ASTM A 653 with G90 coating designation, and in accordance with the latest SMACNA HVAC Duct Construction Standards Metal And Flexible and pressure classifications as stated on the Drawings (minimum 2" w.c. pressure classification).
- B. No ducts shall be less than No. 22 U.S. Gauge.
- C. Piping, conduit and structure shall not penetrate ductwork. Where this condition cannot be avoided and with the written permission of the Architect/Engineer, follow SMACNA HVAC Duct Construction Standards Metal and Flexible, except that sides of transition sections shall slope a maximum of 15 degrees.
- D. Provide 90-degree full-radius elbows with a centerline radius 1.5 times the duct width in the plane of the bend.

- E. For elbows with centerline radius less than 1.5 times the width of the duct in the plane of the bend, provide turning vanes.
- F. Provide square throat elbows with manufactured turning vanes.
- G. All dissimilar metals shall be connected with flanged joints made up with fiber or neoprene gaskets to prevent contact between dissimilar metals. Flanges shall be fastened with bolts protected by ferrules and washers made of the same materials as the gaskets.
- H. For split fittings, the split shall be proportional to the air flow. Construct per SMACNA HVAC Duct Construction Standards- Metal and Flexible.
- I. Transitions and Offsets shall follow SMACNA HVAC Duct Construction Standards Metal and Flexible, except that sides of transitions shall slope a maximum of 15 degrees.
- J. All branch take-offs perpendicular to the main shall be a 45 degree entry.
- K. Longitudinal seams shall be of the Pittsburgh Lock type outlined in the SMACNA HVAC Duct Construction Standards Metal and Flexible.
- L. Duct transverse joints shall be selected and used consistent with the static pressure class, applicable sealing requirements, materials involved, duct support intervals and other provisions for proper assembly of ductwork outlined in the SMACNA HVAC Duct Construction Standards - Metal and Flexible. Transverse joints T-25a, T-25b (Ductmate) shall only be used. Metal clips will only be allowed (NO PVC). Ductmate shall not be used for the following (use transverse joints T-15 through T-24 in these cases):
 - 1. The Ductmate '45' system shall not be used for applications with duct gauges heavier than 10 or lighter than 22.
 - 2. The Ductmate '35' system shall not be used for applications with duct gauges heavier than 16 GA. or lighter than 26 GA.
 - 3. The Ductmate '25' system shall not be used for application with duct gauges heavier than 20 GA. or lighter than 26 GA.

2.02 TURNING VANES

- A. Manufactured with same material as ductwork that it is installed in and to the same pressure classification as ductwork that they are installed in.
- B. Provide turning vanes in all square duct elbows and as noted on the Drawings.
- C. Vanes shall be single thickness Small Vane as detailed in SMACNA HVAC Duct Construction Standards Metal and Flexible.
- D. Where a rectangular duct changes in size at a square-throat elbow fitting, use single thickness turning vanes with trailing edge extensions aligned with the sides of the duct.

2.03 ACCESS DOORS

- A. For access doors for use in ductwork receiving Fire Rated Blanket Insulation see Ductwork Insulation Section for requirements. Fabricate all other access doors in accordance with SMACNA Duct Construction Standards Metal And Flexible and as indicated.

- B. For HVAC duct systems, construct doors of the same material as the ductwork. Minimum size of access doors shall be 8 inches by 8 inches, unless shown otherwise.
- C. Provide walkthrough doors where shown. These doors shall have a minimum clear width of 18 inches. Provide doors with 8 inch square double pane wire glass windows. Locate windows not to exceed 5 feet-6 inches to centerline above finished floor of installed casing. Walk-through doors shall be operable from both sides of the door.
- D. Access doors shall be insulated same as duct.
- E. Provide with continuous neoprene gaskets around perimeter of access doors for airtight seal.
- F. Provide all access doors with cam lock latches.
- G. Provide access doors with watertight gaskets in shower room exhaust ductwork. Doors shall be of extra-heavy stainless construction.
- H. All access doors serving a fire damper shall be painted red and shall have a label with white letters not less than ½ inch high reading "FIRE DAMPER". No external ductwork insulation shall conceal a fire damper access door unless there is a label attached to the insulation indicating the exact location of the access door.
- I. Provide access doors in following locations:
 - 1. Automatic dampers: linkage side.
 - 2. Smoke detection heads.
 - 3. On both sides of ducts where necessary to provide maintenance accessibility to equipment on either side.
 - 4. Fan Plenums.
 - 5. Other items requiring access for service/maintenance
- J. Where duct access doors are concealed the Contractor shall furnish and pay for installation of access doors to be mounted in the fire rated walls and ductwork enclosures. The access doors must be fire resistive and minimum 6" larger on each side then the duct access door for the above mentioned applications.

2.04 MANUAL VOLUME DAMPER

- A. Fabricate in accordance with SMACNA Duct Construction Standards Metal And Flexible, and as indicated.
- B. Fabricate single blade dampers for duct sizes up to 6 inches in height.
- C. Fabricate multi-blade damper of opposed blade pattern with maximum blade sizes of 4 inches for ducts above 6 inches in height. Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.
- D. Except in round ductwork 12 inches and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon or sintered bronze bearings.
- E. Provide locking, indicating quadrant regulators on single and multi-blade dampers. Where rod lengths exceed 30 inches, provide regulator at both ends.

- F. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.
- G. Volume damper shall be provided at each duct branch and also where shown on the Drawings. Volume dampers must be installed at each branch even if they are not shown on the Drawing.
- H. Approved Manufacturers:
 - 1. Ruskin Mfr. Co.
 - 2. Arrow Damper & Louver.
 - 3. Imperial Damper Co.

2.05 BACKDRAFT DAMPERS

- A. Dampers shall be low-leakage, parallel-blade type. Damper sizes shall be suitable for duct sizes noted on the Drawings. The dampers shall be suitable for a minimum 4000 fpm velocity.
- B. Damper frames shall be minimum No. 12 gauge galvanized steel blades shall be minimum No. 16 gauge galvanized steel or Type 6063-T5 aluminum with press-fit ball bearings.
- C. Dampers shall be complete with adjustable counterweights and linkage for duty at .20 inches w.g. and 3500 fpm.
- D. Provide neoprene or silicone rubber blade seals.
- E. Approved manufacturers - Ruskin Manufacturing Company.

2.06 DUCT TEST HOLES

- A. Cut or drill temporary test holes in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.
- B. Permanent test holes shall be factory fabricated, air tight flanged fittings with screw cap. Provide extended neck fittings to clear insulation.

2.07 DUCT HANGERS AND SUPPORTS

- A. Provide trapeze, strap or angle iron hangers meeting SMACNA HVAC Duct Construction Standards Metal and Flexible.
- B. Materials of hangers, supports and fasteners shall conform to the manufacturer's load ratings.
- C. Hangers, supports, upper attachments and inserts shall be hot-dip galvanized steel or stainless steel.
- D. Fasteners for HVAC duct systems shall be hot-dip galvanized steel, cadmium-plated steel or stainless steel.
- E. Secure ductwork hangers attached to concrete structures and slabs with embedded inserts, anchor bolts or concrete fasteners. A safety factor of 5 should be used in selection of all inserts and expansion bolts (if applicable safety factor shall be determined by analysis of seismic loads and the greater safety factor shall be used).

- F. Provide hangers and supports not more than 12 inches from each face of a horizontal elbow.
- G. Plenums shall be supported to permit personnel to enter the plenum. If no structural steel design is shown on the Drawings, it is the responsibility of the Contractor to provide the services of a licensed structural engineer in the in which the project is to be constructed to submit a structural design for review.

2.08 SEALANTS

- A. Where ducts are not continuously welded or soldered, provide sealants and gaskets as required to meet the specified duct leakage allowance.
- B. Provide Gaskets, Sealers, Mastics and Tapes as manufactured by Ductmate.

2.09 STANDARD FLEXIBLE CONNECTIONS

- A. Provide fabric flexible duct connections.
- B. Fabric shall be UL approved, fire-retardant, closely-woven glass, double coated with neoprene, and a minimum of 4 inches wide.
- C. Shall be installed at duct connections to all ceiling hung fans and where vibration will be transmitted through ductwork.
- D. Approved Manufacturers:
 - 1. "Ventglas" by Vent Fabrics, Inc.

2.10 HEAVY DUTY FLEXIBLE CONNECTIONS

- A. Heavy Duty Flexible Connections shall be used in high pressure (greater than 2 in. w.c.), high temperature (greater than 150 degree F) air applications or where the gas is highly corrosive and the duct connector must be leak proof.
- B. Flexible Connectors shall be flanged. If installed outdoors, all metallic components shall be stainless steel construction. Provide flexible connector materials of construction as recommended by the manufacturer for the pressure, temperature, and gas that is being used in air handler system.
- C. Approved Manufacturers:
 - 1. Mercer Rubber Company

2.11 GALVANIZED STEEL ROUND DUCTS AND FITTINGS

- A. Construct ducts of galvanized sheet steel meeting ASTM A 653 with G90 coating designation, and in accordance with the latest SMACNA HVAC Duct Construction Standards Metal and Flexible (Latest Edition), and pressure classifications as stated on the Drawings (minimum 2" w.c. pressure classification). When the ductwork pressure classification of these standards is exceeded, construct galvanized steel round exhaust ductwork in accordance with SMACNA Round Industrial Duct Construction Standards.
- B. For ductwork through 60 inches in diameter, provide ducts of spiral lock-seam construction.

- C. For ductwork over 60 inches in diameter, provide ducts of welded longitudinal seam construction.
- D. For ductwork through 36 inches in diameter, use beaded sleeve transverse joints.
- E. For ductwork over 36 inches in diameter, use gasketed-flanged Van Stone transverse joints. Gasket shall be "440 Gasket Tape" by Ductmate Industries, Inc.
- F. For ductwork under a positive pressure through 96 in. diameter and 10 in. w. g. no reinforcing is required. For ductwork under a negative pressure in exposed areas use duct gauge that will minimize the use of reinforcing as appropriate for the pressures involved.
- G. Draw band joints will not be permitted.
- H. All elbows shall be constructed with a centerline radius equal to 1.5 times the duct diameter.
- I. Provide matching galvanized steel fittings with continuously welded seams and joints.
- J. All take-off connections to duct headers shall be made using tee (90 degrees), lateral (45 degrees), tee cross, lateral cross and "Y" branch fittings of the conical type. All fittings fabricated as separate fittings shall have continuous welds along all seams and joints.
- K. The use of two-piece mitered, vaned elbows will be permitted only with specific written approval from the Architect/Engineer. Provide turning vanes as per SMACNA HVAC Duct Construction Standards Metal and Flexible.

PART 3 - EXECUTION

3.01 INSTALLATION - GENERAL

- A. Install ductwork in accordance with applicable SMACNA Duct Construction Standards Metal And Flexible and approved submittals, and as shown on the Drawings. Duct sizes shown are inside clear dimensions. Where internal duct liners are used, duct sizes shown are inside clear of liner. For ductwork located outside, provide reinforcing sufficient to support wind and snow loads.
- B. The Drawings indicate general locations of ducts. Make additional offsets or changes in direction as required at no additional cost to the Owner.
- C. Wherever ductwork is divided, maintain the cross-sectional area.
- D. Do not exceed 15-degree taper when constructing duct transitions.
- E. Close the open ends of ducts during construction to prevent debris and dirt from entering.
- F. Secure casings and plenums to curbs according to the requirements of the SMACNA HVAC Duct Construction Standards Metal and Flexible.
- G. Make changes in direction with long radius bends.
- H. All unused portions of HVAC supply air and exhaust louvers shall be blanked off with Louver Blank Off Panels, see Ductwork Insulation Section.

- I. All welded and scratched galvanized steel surfaces shall be touched up with zinc-rich paint.
- J. 2 Hr. rated wall penetration: Where small size duct (up to 6 inches x 6 inches) is penetrating a 2 Hr wall the duct shall be constructed of 16 gauge galvanized sheet metal.
- K. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
- L. Patch and repair all wall penetrations.
- M. Insulation: Where Drawings and Specifications indicate that ducts are to be insulated make provisions for neat insulation finish around damper operating quadrants, splitter adjusting clamps, access doors, and similar operating devices. Metal collar equivalent in depth to insulation thickness and of suitable size to which insulation may be finished to be mounted on duct.

3.02 FITTING INSTALLATION

- A. Use minimum of four sheet metal screws per joint.
- B. Apply approved sealant on duct-to-duct joint before assembly. Apply additional sealant after assembly to make joint airtight.

3.03 HANGER AND SUPPORT INSTALLATION

- A. Support ductwork hung from building structure using trapeze, strap or angle iron hangers conforming to SMACNA HVAC Duct Construction Standards Metal and Flexible. Provide supplemental structural steel to span joists where required.
- B. Do not support ductwork from furring, hung ceilings, metal floor deck, metal roof deck or from another duct or pipe.
- C. Do not hang lighting fixtures or piping from ductwork.
- D. Do not use perforated band iron.
- E. Support ductwork at each change in direction.
- F. Where duct connects to or terminates at masonry openings or at floors where concrete curbs are not used, provide a continuous 1 ½ inch by 1 ½ inch by 3/16 inch galvanized steel angle support around the ductwork. Bolt and seal the supports to the building construction using expansion bolts and caulking compound. Seal shall be watertight at floor or wall and duct such that a spill will no pass down through the opening.
- G. Fasten plenums and casings connected to concrete curbs using continuous 1 ½ inch by 1 ½ inch by ¼ inch galvanized steel angle support. Set the angle support in a continuous bead of caulking compound and anchor it to the curb with 3/8 inch diameter anchors on 16 inch centers. Terminate sheet metal at curb and bolt to angle support. Seal sheet metal to curb with a continuous bead of caulking.

- H. For insulated ductwork, install hangers on the outside of the insulation. To maintain the insulation value, inset a piece of 1 inch thick, 6 pcf fiberglass board with a foil/scrim/kraft (FSK) jacket at these supports.

3.04 SEALING

- A. Where ductwork is not continuously welded, soldered or gasketed, make seams and joints airtight with sealants.
- B. Install the sealants in accordance with the sealant manufacturer's instructions and recommendations.
- C. Seal all ductwork seams, joints, fastener penetrations and fittings connections with sealants in accordance with SMACNA Seal Classifications as required by SMACNA Duct Pressure Classification. All ductwork, regardless of pressure classification, shall have a minimum Seal Class B.
- D. Completely fill all voids when liquid sealing ductwork. Several applications may be necessary to fill voids caused by shrinkage or runout of sealant.

3.05 DUCT-MOUNTED DEVICES AND ACCESS DOORS

- A. Install all dampers, coils, airflow measuring stations, humidifiers and other duct-mounted devices, specified in other sections of the specifications or as shown and provide transformations to dimensions as required. Install devices in accordance with manufacturer's recommendations. Install dampers and coils a minimum of 4 feet away from changes in direction or transitions. Allow five (5) equivalent diameters of straight ductwork upstream and one (1) equivalent diameter of straight ductwork downstream of airflow measuring devices.
- B. Install access doors in ductwork, plenums and where specified and as shown. Provide access doors for inspection and cleaning automatic dampers, at fire dampers, and elsewhere as indicated. Provide minimum 18 x 18 inch size for shoulder access and as indicated. Install access doors in the bottom of the ductwork unless they are inaccessible in this location; then install the access doors in either the side or top of the ductwork, whichever is more accessible.
- C. Provide fire damper at locations indicated, and where 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.
- D. Demonstrate re-setting of fire dampers to authorities having jurisdiction and Engineer.
- E. Provide flexible connections immediately adjacent to equipment in ducts associated with motorized equipment. Cover connections to medium pressure fans with leaded vinyl sheet, held in place with metal straps.
- F. Pilot Ports: Locate pilot ports for measuring airflow in each main supply duct at the downstream end of the straightest run of the main and before the first branch take-off. Form pilot ports by drilling 7/16 inches holes in the duct, lined up perpendicular to airflow on maximum 8-inch centers and at least three to a duct, evenly spaced. Holes to be plugged with plastic plugs. Provide access to these for future rebalancing.

3.06 CONTROL DAMPER INSTALLATION

- A. Duct openings shall be free of any obstruction or irregularities that might interfere with blade or linkage rotation or actuator mounting. Duct openings shall measure 1/4" larger than damper dimensions and shall be square, straight, and level.
- B. Individual damper sections, as well as entire multiple section assemblies, must be completely square and free from racking, twisting, or bending. Measure diagonally from upper corners to opposite lower corners of each damper section. Both dimensions must be equal $\pm 1/8"$.
- C. Follow manufacturer's instructions for field installation of control dampers. Unless specifically designed for vertical blade application, dampers must be mounted with blade axis horizontal.
- D. Install extended shaft or jackshaft per manufacturer's instructions. (Typically, a sticker on the damper face shows recommended extended shaft location. Attach shaft on labeled side of damper to that blade.)
- E. Damper blades, axles, and linkage must operate without binding. Before system operation, cycle damper after installation to assure proper operation. On multiple section assemblies, all sections must open and close simultaneously.
- F. Provide a visible and accessible indication of damper position on the drive shaft end.
- G. Support ductwork in area of damper when required to prevent sagging due to damper weight.
- H. After installation of low-leakage dampers with seals, caulk between frame and duct or opening to prevent leakage around perimeter of damper.
- I. Dampers that are to be installed with air flow measuring stations shall be installed in duct runs with a minimum amount of straight duct upstream and downstream of the damper to allow accurate flow readings by the air flow measuring station. The Contractor shall verify with the manufacturer the length of straight duct runs required.

3.07 DUCTWORK AND EQUIPMENT LEAK TESTING

- A. Leak test each ductwork system within ten working days of ductwork installation and before ductwork is insulated and concealed.
- B. All HVAC ductwork shall be tested. Follow general procedures and use apparatus as outlined in the SMACNA HVAC Air Duct Leakage Test Manual.
- C. Test all ductwork at 100 percent of the pressure classifications indicated.
- D. Air testing during erection shall include separate leakage air tests of air riser, horizontal distribution system, and, after all ductwork is installed and the central stations apparatus is erected, leakage testing of the whole system.
- E. Use Appendix C in the SMACNA HVAC Air Duct Leakage Test Manual to determine allowable leakage rates for each duct section tested.
- F. All devices, including access doors, airflow measuring devices, sound attenuators, damper casings, sensors, test ports, etc. that are furnished and/or installed in duct systems shall be

included as part of the duct system leakage allowance. All joints shall be inspected and checked for audible leakage, repaired, if necessary, and retested. Duct leakage shall be limited to the following:

Average Size of Run Diameter or Equivalent	*A/100 ft. Run
12 inches or less	10
20 inches or less	15
30 inches or less	25
40 inches or less	30
50 inches or less	30
* (A) = Permissible loss in cfm	

- G. Total system leakage shall not exceed 10 percent of the scheduled design capacity of the system when tested as per SMACNA testing methods.

3.08 PAINTING

- A. Upon completion of the installation, remove all protecting materials, thoroughly remove all scale and grease and leave in a clean condition for painting. Ductwork to be painted shall be as shown on the Drawings. Painting shall be in accordance with the requirements of the "Painting" Specification Section.

3.09 DUCTWORK MATERIAL SCHEDULE

AIR SYSTEM	DUCTWORK MATERIAL
Supply, Outside Air & Exhaust Ductwork	Galvanized Steel

END OF SECTION 233113

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. This Section describes the air terminals as specified herein, with capacities, distribution patterns and connection sizes as scheduled on the Drawings.
- B. Products listed in Part 2 of this Section include:
 - 1. Ceiling Diffusers.

1.02 RELATED WORK

- A. Section 233113: Sheet Metal Work

1.03 REFERENCES

- A. ADC 1062 GRD - Test Code for Grilles, Registers and Diffusers
- B. ASHRAE 70 - Method of Testing for Rating the Airflow Performance of Outlets and Inlets.
- C. ASHRAE 113 - Method of Testing Room Air Diffusion
- D. ASTM C423 - Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
- E. ARI 880 - Air Terminals
- F. ARI 885 - Procedure for Estimating Occupied Space Sound Levels in the Application of Air Terminals and Air Outlets.
- G. NFPA 90A - Installation of Air Conditioning and Ventilation Systems
- H. SMACNA - HVAC Duct Construction Standards - Metal and Flexible.
- I. Mechanical Code of New York State

1.04 QUALITY ASSURANCE

- A. Air Terminals will not be accepted until acoustical test results have been submitted and approved.

1.05 SUBMITTALS

- A. Product data - Submit catalog cuts and installation instructions for all products specified, including standard color samples.
- B. Submit published manufacturer's performance data for all of the different types of diffusers, registers and grilles, based on testing in accordance with ASHRAE Standard 70, latest edition.
- C. Performance data - For each size and type of air terminal , submit the following:
 - 1. Inlet static pressure in inches w.g.
 - 2. Maximum and minimum airflow in cfm.

DIFFUSERS, REGISTERS AND GRILLES

H2M

Irvington Union Free School District
Main Street School Renovations
Main Street School
SED No.: 66-04-02-02-0-001-016

3. Throw in feet at maximum cfm (and 25 percent of cfm) for terminal velocities of 50 and 100 fpm.
4. Noise Criteria (NC) curve at maximum air terminal cfm rating with blades in full-open and closed positions.

PART 2 - PRODUCTS

2.01 CEILING DIFFUSERS

- A. Round Ceiling Diffusers:
 1. Furnish and install round ceiling diffusers of the sizes and capacities as shown on the Drawings.
 2. Manufacture the diffuser from corrosion-resistant steel or extruded aluminum as indicated on the Drawings.
 3. Round, stamped or spun, multi-core diffuser to discharge air in 360 degree pattern, with sectorizing baffles where indicated. Size diffuser collar to project not more than one inch above ceiling.
 4. Provide a radial opposed blade damper and multi-louvered equalizing grid with damper adjustable from diffuser face.
 5. Manufacture diffusers with trim to allow for recessed mounting into ceiling grids or for surface mount in other ceiling types.
 6. Manufacturer: Nailor Industries Inc. Model Series R-UNI or approved equal.
 7. Coordinate color with Owner.

PART 3 - EXECUTION

3.01 DIFFUSER, REGISTER AND GRILLE APPLICATION

- A. See the Drawings for types, sizes, materials and installation requirements.

3.02 INSTALLATION

- A. Install diffusers in locations shown on the Drawings.
- B. Consult the Drawings for type of ceiling in which the terminals are to be installed and match air outlet edge trim to the requirements of the ceiling type in which they are installed.
- C. Install equalizing grids flush with take-off collar connection to supply duct with vanes perpendicular to air flow approaching diffuser.
- D. Install in accordance with manufacturer's published recommendations as well as applicable sections of SMACNA manual and as specified above.
- E. Coordinate with other work, including ductwork and ductwork accessories, as necessary to interface installation of air outlets and inlets with other work

END OF SECTION 233713

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. Outdoor, roof dunnage mounted, electronically controlled, cooling unit utilizing hermetic scroll compressor(s) with crankcase heaters for cooling duty. Units shall discharge supply air vertically as shown on contract drawings.

1.02 RELATED SECTIONS

- A. Section 233113 - Sheet Metal Work.
- B. Division 26.

1.03 SUBMITTALS

- A. Shop Drawings: Submit drawings for each size of factory fabricated roof curb.
- B. Product Data: Manufacturer's catalog sheets, brochures, performance charts, standard schematic drawings, specifications and installation instructions for each size unit.
- C. Contract Closeout Submittals - Operation and Maintenance Data: Deliver 2 copies, covering the installed products, to the Director's Representative.

1.04 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Unit shall be factory tested and the design, construction and installation shall be in accordance with the following: ARI Standard 210, NFPA, UL, ASHRAE 15, Safety Code for Mechanical Refrigeration, and all State and Local codes or regulations having jurisdiction.
 - 2. Unit shall be listed by ETL as a total package.
 - 3. Unit shall be rated in accordance with AHRI Standard 210/240 and 340/360.
 - 4. Electrical components shall be UL listed.
 - 5. Roof curb shall be designed to NRCA criteria per Bulletin B-1986.
 - 6. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.
 - 7. Unit shall meet ASHRAE 90.1 minimum efficiency requirements.
 - 8. 3 phase units shall be Energy Star certified.

1.05 PRODUCT DELIVERY

- A. Deliver each unit as an integral factory packaged assembly.
- B. Unit shall be stored and handled per manufacturer's recommendations.
- C. Unit shall only be stored or positioned in the upright position.

1.06 MAINTENANCE

- A. Maintenance Service: A fully equipped authorized service organization capable of guaranteeing response within 8 hours to service calls shall be available 24 hours a day, 7 days a week to service the completed Work.

- B. Extra Materials: Provide with each unit, one spare set of air filters. Suitable box and label spare filters as to their usage.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Approved manufacturer shall be Carrier, with pre-approved alternates considered. Manufacturers not pre-approved, must obtain pre-approval in writing from consulting engineer prior to bid day. Alternates must comply with all performance and features as called for in this specification. Job awarded on basis of specified equipment. Alternate will be evaluated and considered after job is awarded.
- B. Manufacturer must clearly define any exceptions made to Plans and Specifications. Any deviation in layout or arrangement shall be submitted to consulting engineer prior to bid date. Acceptance of deviation(s) from specifications shall be in the form of written approval from the consulting engineer. Mechanical Contractor is responsible for expenses that occur due to exceptions made.
- C. Basis of Design:
 - 1. Carrier: 50LC0A26E3M5-1S2C0

2.02 ELECTRIC COOLING PACKAGED ROOFTOP UNITS

- A. General
 - 1. Units shall be manufactured in an ISO 9001 certified facility.
- B. Description
 - 1. Units shall be factory assembled, single package, designed for outdoor installation. They shall have built in field convertible duct connections for down discharge supply/return or horizontal discharge supply/return and be available with factory installed options or field installed accessories. The units shall be factory wired, piped and charged with R-410A refrigerant and factory tested prior to shipment. All unit wiring shall be both numbered and color coded. The cooling performance shall be rated in accordance with DOE and AHRI test procedures. Units shall be CSA certified to ANSI Z21.47 and UL 1995/CAN/CSA No. 236-M90 standards.
- C. Unit Cabinet
 - 1. Unit cabinet shall be constructed of galvanized steel with exterior surfaces coated with a non-chalking, powder paint finish, certified at 1000 hour salt spray test per ASTM-B117 standards. Indoor blower sections shall be insulated with up to 1" thick insulation coated on the airside. Either aluminum foil faced or elastomeric rubber insulation shall be used in the unit's compartments and be fastened to prevent insulation from entering the air stream. Cabinet doors shall be hinged with toolless access for easy servicing and maintenance. Full perimeter base rails shall be provided to assure reliable transit of equipment, overhead rigging, fork truck access and proper sealing on roof curb applications. Disposable 2" filters shall be furnished as standard and be accessible through hinged access door. Fan performance measuring ports shall be provided on the outside of the cabinet to allow accurate air measurements of evaporator fan performance without removing panels or creating bypass of the coils. Condensate pan shall be slide out design, constructed of a non corrosive material, internally sloped and conforming to ASHRAE

62-B9 standards. Condensate connection shall be a minimum of 3/4" I.D. female and be rigid mount connection.

D. Outdoor (Condenser) Fan Assembly

1. The outdoor fans shall be of the direct drive type, discharge air vertically, have aluminum blades riveted to corrosion resistant steel spider brackets and shall be dynamically balanced for smooth operation. The outdoor fan motors shall have permanently lubricated bearings internally protected against overload conditions and staged independently. A cleaning window shall be provided on two sides of the units for coil cleaning.

E. Refrigerant Components

1. Compressors:
 - a. Shall be fully hermetic type, direct drive, internally protected with internal high-pressure relief and over temperature protection. The hermetic motor shall be suction gas cooled and have a voltage range of + or - 10% of the unit nameplate voltage.
 - b. Shall have internal spring isolation and sound muffling to minimize vibration and noise, and be externally isolated on a dedicated, independent mounting.
2. Coils:
 - a. Evaporator coils shall have aluminum plate fins mechanically bonded to seamless internally enhanced copper tubes with all joints brazed. Special Phenolic coating shall be available as a factory option.
 - b. Evaporator coils shall be of the direct expansion, draw-thru design.
 - c. Condenser coils shall have aluminum plate fins mechanically bonded to seamless internally enhanced copper tubes with all joints brazed or Micro-Channel aluminum tube, aluminum fins. Special Phenolic coating shall be available as a factory option.
 - d. Condenser coils shall be of the draw-thru design.
3. Refrigerant Circuit and Refrigerant Safety Components shall include:
 - a. Independent fixed-orifice or thermally operated expansion devices.
 - b. Solid core filter drier/strainer to eliminate any moisture or foreign matter.
 - c. Accessible service gage connections on both suction and discharge lines to charge, evacuate, and measure refrigerant pressure during any necessary servicing or troubleshooting, without losing charge.
 - d. The 6-1/2 through 12-1/2 ton unit shall have two independent refrigerant circuits, equally split in 50% capacity increments.
4. Unit Controls:
 - a. Unit shall be complete with self-contained low-voltage control circuit protected by a resettable circuit breaker on the 24-volt transformer side.
 - b. Unit shall incorporate a lockout circuit which provides reset capability at the space thermostat or base unit should any of the following standard safety devices trip and shut off compressor:
 - 1) Loss-of-charge/Low-pressure switch.
 - 2) High-pressure switch.
 - 3) Freeze-protection thermostat, evaporator coil. If any of the above safety devices trip, an LED (light-emitting diode) indicator shall flash a diagnostic code that indicates which safety switch has tripped.
 - c. Unit shall incorporate "AUTO RESET" compressor over temperature, over current protection.
 - d. Unit shall operate with conventional thermostat designs and have a low voltage terminal strip for easy hook-up.
 - e. Unit control board shall have on-board diagnostics and fault code display.

- f. Standard controls shall include anti-short cycle and low voltage protection, and permit cooling operation down to 0 °F.
 - g. Control board shall monitor each refrigerant safety switch independently.
 - h. Control board shall retain last 5 fault codes in non-volatile memory, which will not be lost in the event of a power loss.
- F. Unit Operating Characteristics
 - 1. 1. Unit shall be capable of starting and running at 125 °F outdoor temperature, exceeding maximum load criteria of AHRI Standard 340/360. The compressor, with standard controls, shall be capable of operation down to 0 °F outdoor temperature. Unit shall be provided with fan time delay to prevent cold air delivery before heat exchanger warms up. (Gas heat only)
- G. Electrical Requirements
 - 1. All unit power wiring shall enter unit cabinet at a single factory provided location and be capable of side or bottom entry to minimize roof penetrations and avoid unit field modifications. Separate side and bottom openings shall be provided for the control wiring.
- H. Standard Limited Warranties
 - 1. Compressor - 5 Years, Heat Exchanger - 10 Years, Stainless Steel Heat Exchanger - 15 Years, Elect. Heat Elem. - 5 Years, Parts - 1 Year.
- I. Factory Installed Options:
 - 1. Demand Control Ventilation
 - 2. Powered Convenience Outlet
 - 3. Variable Speed Compressor
 - 4. Hot Gas Modulating Reheat
 - 5. Vertical Supply/Return
 - 6. Variable Frequency Drive
 - 7. Single Point Power
 - 8. Non-Fused Disconnect
 - 9. Low Voltage Controller
 - 10. Outdoor Air Monitor
 - 11. Low Sound Blanket
 - 12. BACNET Card
 - 13. Powered Exhaust
 - 14. Economizer
 - 15. Provide with two (2) remote space temperature sensors, two (2) remote space CO2 sensors and a remote humidity sensor with all associated control wiring.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Roof Curbs:
 - 1. Install curbs in complete accordance with the manufacturer's printed instructions, and as indicated.
 - 2. Deliver roof curbs to construction contractor for installation.
 - 3. Contractor to provide Seismic/Wind rated roof curb manufactured Thybar or approved equal.

4. Contractor to provide project specific roof curb designed in accordance with wind loads provided on drawings, signed and seal by a licensed Professional Engineer representing the roof curb manufacturer.
 5. Manufacturer to provide all details regarding installation of the roof curb including details of attachment of the rooftop equipment to the curb and the building structure.
- B. Air Conditioners:
1. Install equipment on roof curbs in complete accordance with the manufacturers' printed instructions, and as indicated.
 2. Provide all piping, electrical and ductwork connections to equipment through roof curb openings under units.

3.02 FIELD QUALITY CONTROL

- A. Preliminary Requirements: Employ the services of a Company Field Advisor of the rooftop air conditioner manufacturer for the following:
1. Inspect air conditioner installations prior to start-up.
 2. Supervise initial start-up of machine.
 3. Instruction of State Personnel.
 4. Service.
- B. Pre-Start-Up, Start-Up and Instruction: Upon completion of the installation of the air conditioner, to the satisfaction of the Company Field Advisor, start-up and preliminary testing shall be accomplished under the Company Field Advisor's supervision. When all necessary adjustments have been made and air conditioner is properly operating, the Company Field Advisor shall instruct State Personnel in the operation and maintenance of the air conditioner and accessories.

END OF SECTION 238100

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Excavation and backfill for electrical work.
- B. Demolition of existing electrical systems.
- C. Secondary power wiring and distribution system.
- D. Lighting, including lamps.
- E. Wiring devices.
- F. Distribution panels and switches.

1.02 RELATED WORK

- A. Field painting, except such painting as is required to maintain shop coat painting and factory finish painting.
- B. Flashing and sealing of conduits through outside walls.
- C. Cutting and patching for electrical work, except for errors and omissions under this Division.

1.03 QUALITY ASSURANCE

- A. It is understood that the rights and benefits given the Owner by the guarantees found in the technical specifications are in addition to and not in derogation of any rights or benefits found in the special and general provisions of the contract.
- B. Electrical equipment provided under this Division shall be turned over in operating condition. Instruction on further operation and maintenance shall be included in the operating and maintenance instructions.

1.04 REFERENCES

- A. Perform work in accordance with standards listed below. Where these specifications are more stringent, they take precedence. In case of conflict, obtain a decision from the Engineer.
 - 1. NFPA-70: National Electrical Code
 - 2. NFPA-101: Life Safety Code
 - 3. New York State Energy Code
 - 4. New York State Building Code
 - 5. Applicable New York State Administrative Code
 - 6. Applicable Town Ordinances.
 - 7. Electric utility rules and regulations.
 - 8. Telephone utility rules and regulations.

1.05 PERMITS AND FEES

- A. The Contractor shall obtain and pay for all permits, construction charges, fees, licenses, certificates, inspections and other use charges required in connection with the work.

- B. Such permits include, but are not limited to:
 - 1. Transportation and disposal of debris.
 - 2. Temporary Electrical Services and Permanent Electrical Service.
 - 3. Telephone Service.
 - 4. Electrical Inspectors, Inc., or a pre-approved electrical inspection agency.
 - 5. Road opening permits.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. All materials and equipment used in carrying out these specifications shall have UL listing and label. Specifications and drawings indicate name, type, or catalog numbers of materials and equipment to be used as standards. Proposals shall be based on these standards. Contractor may use materials and equipment equivalent to those specified, subject to Engineer's approval.

PART 3 - EXECUTION

3.01 COORDINATION

- A. Carefully examine specifications, drawings and project site to be thoroughly familiar with items which require electrical connections and coordination. Electrical drawings are diagrammatic and shall not be scaled for exact sizes.
- B. Notify other Contractors of any deviations or special conditions necessary for the installation of work. Interferences between work of various contractors to be resolved prior to installation. Work installed not in compliance with specifications and drawings and without properly checking and coordinating as specified above shall, if necessary, be removed and properly reinstalled without additional cost to the Owner. Engineer to be mediating authority in all disputes arising on project.
- C. Equipment shall be installed in accordance with manufacturer's recommendation. Where conflicts occur between contract documents and these recommendations, a clarification shall be requested of the Engineer for decision before proceeding with such work.
- D. Insofar as it is possible to determine in advance, advise masonry tradesmen to leave proper chases and openings. Place all outlets, anchors, sleeves, and supports prior to pouring concrete or installation of masonry work. Should the Contractor neglect doing this, any cutting and/or patching required to be done is at this Contractor's expense.
- E. FIRE ALARM – For any facilities that utilize an existing fire alarm system, the contractor shall coordinate with the owner and fire alarm monitoring company prior to removing or disabling any devices. It shall be the contractor's responsibility to provide fire watch as per the latest addition of the Fire Code of New York State. The contractor shall provide fire watch for all areas of a facility while occupied and unoccupied when any device or part of the fire alarm system is de-activated or put into "test mode".

3.02 CUTTING AND PATCHING

- A. Repair or replace routine damage caused by cutting in performance of work under this Division.

- B. Correct unnecessary damage caused due to installation of electrical work, brought about through carelessness or lack of coordination.
- C. Holes cut through floor slabs to be core drilled with drill designed for this purpose. All openings, sleeves, and holes in slabs to be properly sealed, fire proofed and waterproofed.
- D. Repairs to be performed with materials which match existing materials and to be installed in accordance with appropriate sections of these specifications.

3.03 TESTS

- A. On completion of work, installation shall be completely operational and entirely free from ground, short circuits, and open circuits. Perform a thorough operational test in presence of the Engineer. Balance all circuits so that feeders to panels are not more than 10% out of balance between phases with all available load energized and operating. Furnish all labor, materials and instruments for above tests.
- B. Furnish Engineer with a copy of such tests including identification of each circuit and readings recorded, also the main service ground resistance test as described in Section 260526 of these specifications. Test information to include ampere readings of all panels and major circuit breakers, isolation resistance reading of motors and transformers.

3.04 IDENTIFICATION OF EQUIPMENT

- A. Properly identify the following:
 - 1. Distribution panels.
 - 2. Disconnect switches.
 - 3. Individually mounted circuit breakers.
 - 4. Service entrance equipment and main circuit breaker.
- B. Use permanently attached black phenolic plates with 1/4-inch white engraved lettering on the face of each, attached with two sheet metal screws.
- C. Panelboard identification plates shall indicate panel by name.

3.05 INSTALLATION

- A. The Contractor shall carefully move and replace existing equipment, appliances and all related items, as required to conduct proposed work.
- B. Install and conduct all work per applicable NEC, State and local codes.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Electrical demolition.

1.02 SUBMITTALS

- A. Submit under provisions of Section 013300.
- B. Shop Drawings: Indicate demolition and removal sequence and location of salvageable items; location and construction of temporary work.

1.03 REGULATORY REQUIREMENTS

- A. Conform to applicable code for demolition work, safety of structure and dust control.
- B. Obtain required permits from authorities.
- C. Notify affected utility companies before starting work and comply with their requirements.
- D. Do not close or obstruct egress width to exits.
- E. Do not turn off electric equipment without authorization from Owner.
- F. Conform to procedures applicable when discovering hazardous or contaminated materials.
- G. Obtain a utilities mark-out of all buried underground utilities for telephone, electric, gas, sewer and water, including all customer owned utilities.

1.04 SCHEDULING

- A. Schedule Work to coincide with new construction.

PART 2 - PRODUCTS

2.01 NOT USED.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify field circuiting arrangements at all Irvington Union Free School District.
- B. Verify that abandoned wiring and equipment serve only abandoned facilities.
- C. Demolition drawings are based on visual field observation. Report discrepancies to the Engineer before disturbing existing installation.
- D. Beginning of demolition means installer accepts existing condition.

3.02 PREPARATION

- A. Coordinate utility service outages with Utility Company.
- B. Provide power, wiring and connections to maintain all existing power, control and telemetry systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.

3.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. Remove, relocate, and extend existing installations to accommodate new construction, as indicated on drawings.
- B. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
- C. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets which are not removed.
- D. Repair adjacent construction and finishes damaged during demolition and extension work.
- E. Provide caps and filler plates/plugs for all openings in equipment and enclosures after removal of conduits.
- F. Maintain access to existing electrical installations which remain active. Modify installation or provide access panel as appropriate.
- G. Remove demolished materials from site as work progresses.
- H. Completely remove and dispose of all electrical power, control, and telemetry feeds including conduits, conductors, boxes and supports not scheduled to remain after new construction is tested and operational.
- I. Where existing devices and equipment are called to be removed, Contractor shall maintain circuit continuity to all existing devices and equipment remaining on that circuit. Contractor shall provide all required conduit, conductors and boxes as required.

3.04 CLEANING AND REPAIR

- A. Clean and repair existing materials and equipment which remain or are to be reused.
- B. Remove temporary work.

END OF SECTION

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PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Wires and cables.
- B. In general, the wires and cables included under this Section shall include, but not be limited to, the following:
 - 1. 600V power and control cable
 - 2. Communication cables
- C. All conductors to be continuous from origin to panel or equipment termination without splices.

1.02 REFERENCES

- A. ANSI/NFPA 70 - National Electric Code.
- B. NECA Standard of Installations.

1.03 SUBMITTALS

- A. Submit product data under provisions of Section 013300.

1.04 QUALITY ASSURANCE

- A. Products used in the work of this Section shall be produced by manufacturers regularly engaged in the manufacturing, installing and servicing of similar items with a history of successful production acceptable to the Engineer as specified herein and in accordance with the General Conditions.
- B. Contractor shall submit the following information pertaining to the manufacturer(s):
 - 1. Complete literature, performance, and technical data describing the proposed equipment and listing of items made by the manufacturer.
 - 2. Location of closest service office from which this equipment shall be serviced.
 - 3. Location of closest parts inventory for item installation.

1.05 COORDINATION

- A. Coordination:
 - 1. Coordinate wire and cable required with the equipment being furnished by others for the satisfactory operation of the equipment or system.
 - 2. Review installation procedures under other sections and contracts and coordinate them with the work specified herein.
 - 3. Notify other prime contractors in advance of the installation of the work included to provide them with sufficient time for installation and coordination of interrelated items that are included in their contracts and that must be installed in conjunction with the work included in this Section.

1.06 PROJECT CONDITIONS

- A. Verify that embedded conduit, in masonry and concrete, is installed as shown on the Drawings prior to the work being enclosed by others.

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- B. The Contractor shall be present at all concrete pours made by the General Contractor.
- C. Conductor sizes are based on copper at 75°C.
- D. Wire and cable routing shown on Drawings is approximate unless dimensioned or specifically called for such as where conduit is to be embedded in concrete or masonry. Route wire and cable as required to meet project conditions and shall be routed above ceilings, directly under joists, in pipe trenches, where available, and in masonry. Where exposed conduit is permitted, it shall be run to maximize wall space.
- E. Field verify destination location to determine cable routing.
- F. Where wire and cable routing is not shown for proposed destination, determine exact routing and lengths required. Routing shall be reviewed with the Engineer.

PART 2 - PRODUCTS

2.01 CONDUCTORS

- A. Install products in accordance with manufacturer's recommendations.
- B. Single copper conductors with 600-volt insulation.
- C. Minimum size of feeder conductors and grounds shall be No. 12 AWG.
- D. Insulation: No. 12 AWG and No. 10 AWG, provide ANSI/NFPA 70, Type THWN-2.
- E. Use solid conductor for feeder and branch circuits, 10 AWG and smaller.
- F. All conductors shall include complete set of manufacturer's markings for insulation and conductor size.
- G. Manufacturers shall be ANACONDA, TRIANGLE, ROME, or approved equal.
- H. Provide white colored neutral conductors; provide black, color coded phase conductors; provide green colored ground conductors.

2.02 4-PAIR CATEGORY 6 UNSHIELDED TWISTED PAIR CABLE

- A. Manufacturers: Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
 - 1. Belden Corporation, Carmel, IN (800) 246-2673.
 - 2. Avaya, Basking Ridge, NJ (800) 344-02232.
 - 3. Berk-Tek, Incorporated, New Holland, PA (800) 237-5835.
 - 4. CommScope, Hickory, NC (800) 982-1708.
 - 5. Draka Comteq, Franklin, MA (888) 541-7100.
 - 6. General Cable, Highland Heights, KY (800) 424-5666.
 - 7. Mohawk/CDT Leominster, MA (978) 537 9961.
 - 8. NORDX/CDT, Worcester, MA (800) 331-0779.
 - 9. Superior Essex, Atlanta, GA. (800) 685-4887.
 - 10. Tyco Electronics, Harrisburg, PA (800) 522-6752.

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- B. Conductors: 4 twisted pair - 24 AWG, solid copper w/ RJ-45 connector ends
 - 1. Individually insulated plenum rated conductors under common plenum rated sheath unless entire cable is installed within conduit/EMT or if area where cable is installed is not considered a return air plenum according to any applicable codes.
 - 2. Complies with individual characteristics established in ANSI/TIA/EIA-568-B, and all addendums for Category 6 cable performance specification.
 - 3. Overall Nominal Diameter: .365 x .165 in.
 - 4. Nominal Impedance: 100 ohms plus or minus 15 percent.
 - 5. Certified capable of performing to minimum 350 MHz.
- C. Mechanical Characteristics
 - 1. Operating temperature: -20°C to +80°C
 - 2. Bulk cable weight: 29 lbs./1000 ft.
 - 3. Maximum recommended pulling tension: 45 lbs.
 - 4. Minimum bend radius: 1 in.
- D. Flame test: UL1666 Riser
- E. Electrical Characteristics:
 - 1. Nom. Mutual Capacitance @ 1 KHz 15.0 pF/ft
 - 2. Maximum Capacitance Unbalance (pF/100 m) 49.2 pF/100 m
 - 3. Nominal Velocity of Propagation 70 %
 - 4. Maximum Delay (ns/100 m) 510 @ 100MHz ns/100 m
 - 5. Maximum Delay Skew (ns/100m) 25 ns/100 m
 - 6. Maximum Conductor DC Resistance @ 20 Deg. C 9 Ohms/100 m
 - 7. Maximum DCR Unbalance @ 20 Deg. C 3 %
 - 8. Max. Operating Voltage - UL 300 V RMS

2.03 MECHANICAL CONNECTORS

- A. Conductor tapping connectors shall be BURNDY Servit split bolt, Series KS and KS3, or approved equal.
- B. Split bolt connectors shall use BURNDY Type SC Servit cover on indoor applications.
- C. Terminal lugs shall be BURNDY Universal Terminal Series. Terminal lugs shall be sized for proper ampacity and proper number of conductor holes. Each conductor shall occupy only one hole on a terminal lug.
- D. Conductor tapping connectors for multiple conductors shall be BURNDY Series V-Tap with V-Tap covers, and V-Blok mounting platforms.

2.04 BELOW GRADE EXTERIOR SPLICES

- A. Manufacturer: 3M or approved equal
- B. Model: 72-N series for inline splices
- C. Model: 90-B1 for WYE splices
- D. Splices shall be weatherproof, made with epoxy resin UL listed for direct burial.

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- E. For use with all exterior pull boxes and hand holes where splices are made.
- F. Provide all connectors and crimp couplings as required.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. General:
 - 1. Make terminations in accordance with cable manufacturers instructions for the particular type of wire and cable.
 - 2. Splices are not allowed in the underground duct and manhole systems. If splices are required, the Contractor shall obtain approval in writing from the Engineer prior to splicing.
 - 3. All splices shall be in made in terminal boxes.
- B. Wire and Cable Sizes: The sizes of wire and cable shall be as shown on the Contract Drawings, or if not shown, as approved by the Engineer. Minimum size wire shall be No. 12 AWG for all power, lighting and receptacle circuits. Wires for control circuits shall be No. 14 AWG minimum. Wire for instrumentation circuits shall not be smaller than No. 16 AWG. If due to field routing the voltage drop exceeds 2.5%, the size of conductors shall be increased such that 2.5% is the maximum voltage drop incurred.
- C. Number of Wires: The number of wires indicated on the Contract Drawings for the various control, indications, and metering circuits were determined for general schemes of control and for particular indication and metering systems. Coordinate wiring schemes with equipment schematics.
- D. Wiring Identification: All wiring shall have a unique wire number and be labeled at both ends. Wire numbers shall correspond with the equipment terminal wire numbers. Where no wire numbers are indicated, the Contractor shall assign wire numbers. Wire numbers shall not be duplicated.
- E. Cable Identification Tags: The Contractor shall furnish all labor and materials and affix in a permanent way to each cable in manholes, cable compartments and vaults, junction boxes, pull boxes and points of termination, a laminated plastic tag, bearing clearly printed, the cable number indicated on the Contract Drawings or some other approved identification number or symbol. All cables shall be temporarily tagged with its full ID number immediately after it has been pulled.
- F. Wiring Supplies: Only electrical wiring supplies manufactured under high standards of production and meeting the approval of the Engineer shall be used. Friction tape shall be in accordance with ASTM D69.
- G. Training of Cable: Furnish all labor and material required to train cables around cable vaults within buildings and in manholes in any outdoor underground duct system. Sufficient length of cable shall be provided in each manhole and vault so that the cable can be trained and racked in an approved manner. In training or racking, the radius of bend of any cable shall be not less than the manufacturer's recommendation. All manhole cables shall be arc and fireproofed.
- H. Connections at Control Panels, Limit Switches and Similar Devices:

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1. Where stranded wires are terminated at panels, and/or devices connections shall be made by solderless lug, crimp type ferrule or solder dipped.
 2. Where enclosure sizes and sizes of terminals at limit switches, solenoid valves, float switches, pressure switches, temperature switches, and other devices make 7-strand, No. 12 AWG, wire terminations impractical, the Contractor shall terminate external circuits in an adjacent junction box of proper size and shall install No. 14 AWG stranded wires to the junction box in a conduit.
- I. Pulling Temperature: Cable shall not be flexed or pulled when the temperature of the insulation or of the jacket is such that damage will occur due to low temperature embrittlement. When cable will be pulled with an ambient temperature within a three day period prior to pulling of 40°F or lower, cable reels shall be stored during the three day period prior to pulling in a protected storage with an ambient temperature not lower than 55 degrees F and pulling shall be completed during the work day for which the cable is removed from the protected storage.
- J. Color Coding:
1. Conductor jacket shall be color coded as follows:

AC POWER

208Y/120 Volt 3 phase (NEC)
Phase A Black
Phase B Red
Phase C Blue
Neutral White
Ground Green

2. Equipment Ground - GREEN

3.02 IDENTIFICATION

- A. Identify wire and cable under provisions of Section 260553.
- B. Identify each conductor with its circuit number.

3.03 FIELD QUALITY CONTROL

- A. Perform field inspection and testing under provisions of Section 014500.
- B. Inspect wire and cable for physical damage and proper connection.
- C. Measure tightness of bolted connections and compare torque measurements with manufacturer's recommended values.

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D. Field Testing:

1. Wires and cables shall be tested before being connected to motors, devices or terminal blocks.
2. If tests reveal defects or deficiencies, the Contractor shall make the necessary repairs or shall replace the cable as directed by the Engineer, without additional cost to the Owner.
3. All tests shall be made by and at the expense of the Contractor who shall supply all testing equipment.

E. Continuity Tests: All cables, wires and shields shall be tested for continuity. Testing for continuity shall be by test light or buzzer.

F. Insulation-Resistance Tests:

1. 600V power and control cables and wires shall be tested for their insulation-resistance values. Test shall utilize a megohmmeter with applied voltage to be 1000VDC for one (1) minute. Insulation-resistance test shall be performed on each conductor with all other conductors grounded. The resistance value shall be 20 megohms or greater.

END OF SECTION

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

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PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Grounding electrodes and conductors.
- B. Equipment grounding conductors.
- C. Bonding.

1.02 REFERENCES

- A. ANSI/NFPA 70 - National Electric Code.

1.03 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc.

PART 2 - PRODUCTS

2.01 COMPONENTS

- A. Ground clamps: OZ ELECTRICAL MANUFACTURING COMPANY, Type "CG", or equal by STEEL CITY or APPLETON.
- B. Raceways, conductors, outlet boxes, pull and junction boxes to be furnished in accordance with applicable sections of these specifications.
- C. Rod Electrode: Copper, 3/4-inch diameter, 10 feet long.
- D. Wire: Copper, sized to meet NFPA 70 requirements.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. General:
 - 1. Clean all conductive surfaces on equipment to be grounded, to assure good electrical continuity.
 - 2. Effectively bond all grounding conductors to grounding rod electrodes, equipment enclosures and ground busses.
 - 3. Locate all grounding attachments away from areas subject to physical damage. Provide protective covering as required.
 - 4. Install service entrance building ground as per NEC and Local Utility requirements.
 - 5. Service entrance shall be bonded to street side of first flange or coupling of incoming main water line with heavy duty ground clamp. Bonding conductor to be sized in accordance with NFPA 70.
 - 6. Building steel shall be bonded to ground bus on main service with a conductor the same size as in B.1 below.

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7. Install new service grounds and grounding systems for new service as per Local Utility and NEC requirements.

B. Feeder/Branch Circuits:

1. All circuits shall have a separate green grounding conductor in conduit sized in accordance with NFPA 70. Minimum size of conductor shall be No. 12 AWG.
2. Flexible conduit will not be approved as achieving continuity of ground. All flexible conduit to have a jumper wire sized to ampacity of branch breaker and to be connected to conduit system on both ends; this applies to fixtures, motors, controls, etc.

3.02 TEST

- A. Test ground on main service. Ground system resistance shall be no greater than 10 ohms using test equipment similar to a "Biddle" test. Test data to be submitted to the Engineer for approval and such approved test data to become a part of the Record Documents.

END OF SECTION

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

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PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. System of supporting devices and hangers for support or bracing for conduit, electrical equipment, safety switches, fixtures, panelboards, outlet boxes, junction boxes and cabinets.

1.02 REFERENCES

- A. ANSI/NFPA 70 - National Electric Code.

1.03 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc.

PART 2 - PRODUCTS

2.01 EQUIPMENT REQUIREMENTS

- A. Provide appropriate corrosion-resistant supporting devices and hangers for electrical equipment, as manufactured by ERICO PRODUCTS, INC., CADDY FASTENERS, STEEL CITY, MINERALLAC or equivalent.
 - 1. "Z" purlin clips.
 - 2. Conduit clips.
 - 3. Beam clamps (universal and vertical flange).
 - 4. Beam clamps (set screw type).
 - 5. Combination push-in conduit clips.
 - 6. Combination conduit hanger clamps.
 - 7. Flexible conduit clips.
 - 8. Special combination conduit clips.
 - 9. One hole steel straps.
 - 10. Conduit hangers.
- B. Provide materials, sizes and types of anchors, fasteners and supports to carry the loads of equipment, wire in conduit and conduit.

2.02 CHANNEL SUPPORT SYSTEM

- A. Channel systems and supports shall be manufactured by KINDORF/THOMAS & BETTS, or approved equal.
- B. Channels shall be 1-1/2" x 1-1/2".
- C. Channels and all associated accessories and bolts shall be hot dipped galvanized.
- D. Channels shall have 9/16" bolt holes on 1-1/2" centers.
- E. Provide end caps for all channels.

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PART 3 - EXECUTION

3.01 INSTALLATION

- A. Secure conduits to within 3 feet of each outlet box, junction box, cabinet, fitting, etc., and at intervals not to exceed 10 feet in accordance with currently effective edition of the National Electric Code.
- B. In seismic zones, support conduits 1 inch and smaller at 6 foot intervals.
- C. Install clamps secured to structure for feeder and other conduits routed against structure. Use drop rods and hangers to support conduits run apart from the structure.
- D. Provide and install suitable angle iron, channel iron or steel metal framing with accessories to support or brace electrical equipment including safety switches, fixtures, panelboards, etc.
- E. Paint all supporting metal not otherwise protected, with rust inhibiting primer and then with a finish coat if appropriate to match the surrounding metal surfaces. Prepainted or galvanized support material is not required to be painted or repainted.
- F. Do not use chains, perforated iron, baling wire or tie wire for supporting conduit runs. Use of clips to support conduit to top of t-bar ceiling grid will not be permit-ted.
- G. Obtain permission from Engineer before drilling or cutting structural members.
- H. Install surface mounted cabinets and panelboards with a minimum of four anchors.
- I. Do not fasten supports to pipes, ducts, mechanical equipment and conduit.
- J. Install products in accordance with manufacturer's instructions.

END OF SECTION

RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

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PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Conduit system with associated couplings, connectors and fittings. Conduits to be mechanically and electrically continuous from outlet to outlet and from outlets to cabinets, pull or junction boxes.
 - 1. Conduit Use - Rigid Galvanized Conduit:
 - a. All exterior circuits above ground.
 - 2. Conduit Use - PVC Sch. 80
 - a. All exterior circuits below ground
 - 3. Conduit Use - Electrical Metallic Tubing (EMT) Conduit:
 - a. All interior circuits above ground.
 - 4. Conduit Use - Metal Clad (MC) Cable:
 - a. All 15 and 20 amp branch circuits concealed in walls or ceilings.
 - 5. Conduit Use - Flexible Liquid-tight Metal Conduit:
 - a. Connecting motors, generators and other equipment subject to vibration, maximum length - 3 feet.
 - b. Passing through building expansion joints.
 - 6. Surface mounted raceway (Wiremold)
 - a. For use in finished areas on block walls and plaster walls, only.
 - 7. J-Hooks
 - a. For use above finished ceilings for telephone, PA, CAT 6 data and fire alarm cable only.
- B. Device Boxes: Provide each fixture switch, receptacle and other wiring device with a box of appropriate size and depth for its particular location use unless indicated otherwise.
- C. Pull boxes, junction boxes and wire troughs

1.02 REFERENCES

- A. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.
- B. ANSI/NFPA 70 - National Electric Code.
- C. NECA Standard of Installation.
- D. ANSI/NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
- E. NEMA TC 3 - PVC Fittings for use with Rigid PVC conduit and tubing.
- F. ANSI C80.3 - Electrical Metallic Tubing, Zinc Coated.
- G. ANSI/NEMA OS1 - Sheet-steel outlet boxes, device boxes, covers and box supports.
- H. NEMA 250 - Enclosures for electrical equipment (1000 volts maximum).

1.03 SUBMITTALS

- A. Submit product data under provisions of Section 013300.

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B. Working Drawings:

1. Prior to equipment submission, submit a list of proposed manufacturers with the products they produce proposed for the contract.
2. Manufacturer's catalog cuts for the conduit, boxes, fittings and supports proposed for use.
3. Construction details of conduit racks and other conduit support systems with seismic restraint details and calculations signed by a licensed Engineer.
4. Scaled working drawings showing proposed routing of all conduits, inclusive of conduits routed above grade on exterior support structures, embedded in structural concrete and conduits directly buried in earth. Drawings shall show locations of pull and junction boxes and all penetrations in walls and floor slabs.

1.04 REGULATORY REQUIREMENTS

- A. Furnish products listed and classified by Underwriters Laboratories, Inc.
- B. Conform to requirements of ANSI/NFPA 70.

1.05 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Section 017839.
- B. Accurately record actual routing of all conduits.

1.06 FIELD SAMPLES

- A. Provide under provisions of Section 014500.
- B. Provide field sample of conduit two each at 2 feet in length.
- C. Provide field sample of expansion/deflection fitting, two each.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store, protect, and handle products in accordance with manufacturers' recommendations.
- B. Accept conduit on site. Inspect for damage.
- C. Protect conduit from corrosion and entrance of debris by storing abovegrade. Provide appropriate covering.

1.08 PROJECT CONDITIONS

- A. Verify all conduit routings by field measurements.
- B. Verify routing and termination locations of conduit prior to rough-in.
- C. Conduit routing is shown on Drawings in approximate locations unless dimensioned. Route as required to complete wiring system. Provide all required sweeps, boxes and fittings.

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PART 2 - PRODUCTS

2.01 RIGID GALVANIZED CONDUIT

- A. Rigid conduit shall be hot dipped, galvanized, or electro-galvanized steel by Wheatland, Triangle, Republic or approved equal.
- B. Associated couplings, connectors and fittings shall be as manufactured by THOMAS & BETTS CORP., O.Z. GEDNEY CO., EFCOR or approved equal. Catalog numbers used below are those of THOMAS & BETTS CORP. based on 3/4-inch size and are considered standards by which equivalents are to be judged.
- C. ERICKSON couplings, Series 676 or approved equal, shall be used where neither length of conduit can be rotated.
- D. Conduit connectors shall be threaded type. Set screw and compression type connections ARE NOT acceptable.
- E. Sealing fitting locknuts shall be Series 142SL.
- F. Steel or malleable iron insulated bullet hub, Series 370-379, complete with sealing "O" ring. DO NOT use "die cast" material.
- G. Entrance ells shall be Series 1491 or approved equal.
- H. Combination coupling shall be Series 531 for connecting rigid galvanized conduit to electrical metallic tubing.

2.02 PVC CONDUIT

- A. PVC conduit shall be manufactured by WHEATLAND, TRIANGLE REPUBLIC or approved equal.
- B. Description: NEMA TC 2; Schedule 80 PVC.
- C. Fittings and Conduit Bodies: NEMA TC3.

2.03 ELECTRICAL METALLIC TUBING (EMT)

- A. Electrical metallic tubing shall be WHEATLAND, TRIANGLE, REPUBLIC, or approved equal.
- B. Associated couplings, connectors and fittings shall be as manufactured by THOMAS & BETTS CORP., O.Z. GEDNEY CO., EFCOR, or approved equal. Catalog numbers used below are those of THOMAS & BETTS CORP. based on 3/4-inch size and are considered standards by which equivalents are to be judged.
- C. EMT connectors shall be TC-2125C compression type with threaded locknut. Set screw connectors will not be acceptable.
- D. EMT couplings shall be TK-2125C compression type. Set screw connectors will not be acceptable.

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2.04 METAL CLAD CABLE (MC)

- A. Metal clad cable shall be manufactured by BICCGENERAL or approved equal.
- B. Associated couplings, connectors and fittings shall be as manufactured by THOMAS & BETTS CORP., O.Z. GEDNEY CO., EFCOR or approved equal.
- C. Conductors shall be types THHN and THWN. Ground wire shall be sized as per NEC with green THHN/THWN insulation. All conductors shall be cabled and wrapped in polyester tape. All conductors shall be rated for 600 VAC.
- D. Armor material shall be Aluminum Interlocked Armor.

2.05 SURFACE MOUNTED RACEWAY (WIREMOLD)

- A. Manufacturer: Wire Mold shall be manufactured by LEGRAND or approved equal.
- B. Model: 700 Series - One-Piece Steel Surface Raceway.
- C. Paint wire mold to match existing wall color.
- D. UL5 and ADA compliant.
- E. UL and cUL Listed.

2.06 DUCT SEAL

- A. RectorSeal or approved equal.
- B. Model #: 81881

2.07 J-HOOKS

- A. TO BE USED ABOVE FINISHED CEILING ONLY. FOR TELEPHONE, PA, CAT 6 DATA AND FIRE ALARM CABLE ONLY. ALL EXPOSED TELEPHONE, PA, CAT 6 DATA AND FIRE ALARM CABLE SHALL BE IN CONDUIT.
- B. Erico Caddy HP J. Hook Series or approved equal.
- C. Provide wire retainers for all.
- D. Provide mounting hardware and accessories as required.
- E. Spacing of J-Hooks and supports shall not exceed 5'-0" on center.

2.08 FLEXIBLE LIQUID-TIGHT METAL CONDUITS AND FITTINGS

- A. Liquid-tight flexible metal conduit shall be ANACONDA or approved equal.
- B. Description: Interlocked steel construction with PVC jacket.

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- C. Provide flexible liquid-tight conduits and fittings as manufactured by THOMAS & BETTS CORP., O.Z. GEDNEY CO. or approved equal. Catalog numbers used below are those of the THOMAS & BETTS CORP., based on 3/4" size and are to be considered as standards by which equivalents are to be judged. All conduit shall be liquid-tight flexible type, UL type UA, or suitable for exposure to continuous or intermittent moisture.
- D. Flexible liquid-tight connectors shall be Series 5333 or approved equal.

2.09 OUTLET AND DEVICE BOXES

- A. Acceptable Manufacturers: Raco, General Electric or approved equal.
- B. Sheet Metal Outlet Boxes - All concealed boxes shall be NEMA OSI, galvanized steel:
 - 1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported. Provide 1/2" male fixture stubs where required.
- C. Concrete Ceiling Boxes: Concrete type.
- D. Cast Boxes: All exposed surface mounted boxes shall be NEMA FB1, Type FD, cast fer alloy. Provide gasketed cover by box manufacturer.

2.10 PULL BOXES

- A. All pull boxes used for this project shall be minimum B-3-6 or specifically approved equal for all customer installed power and control circuits.
- B. Provide H-20 Cast-Iron Traffic Load Cover. Cover shall have 3" high logo "Electric".

2.11 JUNCTION BOXES

- A. Acceptable Manufacturers: RACO, GENERAL ELECTRIC or approved equal.
- B. Sheet metal boxes: NEMA OS1, galvanized steel.
- C. Covers: Galvanized steel.

2.12 WIRE TROUGH

- A. Wireways shall be manufactured by Square D, Class 526, rain tight trough or approved equal.
- B. Wireway shall be completely enclosed with removable covers.
- C. Construction: 16 Gauge Galvanized Steel. 8-inch and 12-inch wire trough shall be 14-gauge galvanized steel.
- D. Finish: ANSI-49 epoxy paint applied by cathodic electro-deposition paint process over a corrosion resistant phosphate preparation.
- E. UL listed.

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2.13 ELECTRICALLY CONDUCTIVE CORROSION-RESISTANT THREAD COMPOUND

- A. KOPR-SHIELD or approved equal.

PART 3 - EXECUTION

3.01 INSTALLATION OF CONDUITS

- A. Minimum size of conduits shall be 3/4-inch.
- B. Minimum conduit depth shall be 24" below grade, measured to the top of the conduit on exterior underground installations.
- C. Conduit joints shall be cut square, threaded, reamed smooth, and drawn up tight so conduit ends will butt in couplings, connectors and fittings.
- D. All threaded conduits and fittings shall have KOPR-SHIELD compound applied to all threads prior to assembly.
- E. Make bends or offsets with standard ells or field bends with an approved bender.
- F. Run concealed conduits in direct line with long sweep bends or offsets. Run exposed conduits parallel to and at right angles to building lines. Group multiple conduit runs in banks.
- G. Secure conduits to all boxes and cabinets with double locknuts and bushings so system will be electrically continuous from service to all outlets.
- H. Install conduit in accordance with NECA Standard of Installation.
- I. Cap ends of conduits to prevent entrance of water and other foreign material during construction.
- J. Complete all conduit systems before pulling conductors.
- K. Support conduits under provisions of Section 260529.
- L. Provide approved expansion joints or fittings and bonding jumpers where conduits in concrete pass through building expansion joints.
- M. Provide cable supports in conduits rising vertically in accordance with the National Electric Code, Article 300-19.
- N. Provide No. 12 AWG copper pull wires or nylon cord in all empty conduits. Steel wire not acceptable as pull wire.
- O. Install conduit to preserve fire resistance rating of partitions and other elements.
- P. Ground and bond conduit under provisions of Section 260526.
- Q. Where neither length of conduit can be rotated, ERICKSON couplings Series 676 shall be used.

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- R. In areas where enclosed and gasketed fixtures and weatherproof devices are specified, where rigid conduit enters a sheet metal enclosure, junction box and outlet box, and not terminated in a threaded hub, a steel, or malleable iron nylon insulated bullet hub, complete with recessed sealing "O" ring, shall be used, Series 370-379 . DO NOT use die cast material.
- S. In concrete slabs block up conduit from forms and securely fasten in place. All conduits in slabs shall be installed below concrete slab.
- T. Where conduits running overhead pass through building expansion joints, install flexible liquid tight conduit of same size with sufficient slack to allow conduits on either side of expansion joint to move a minimum of 3-inches in any direction. Provide supports as required on each side of expansion joint, all in accordance with seismic requirements of specific area.
- U. Failure to route conduit through building without interfering with other equipment and construction shall not constitute a reason for an extra charge. Equipment, conduit and fixtures shall fit into available spaces in building and shall not be introduced into building at such times and manner as to cause damage to structure. Equipment requiring servicing shall be readily accessible.
- V. Arrange supports to prevent misalignment during wiring installation.
- W. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.
- X. Group related conduits; support using conduit rack. Construct rack using steel channel; provide space on each for 25 percent additional conduits.
- Y. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports.
- Z. Do not attach conduit to ceiling support wires.
- AA. Arrange conduit to maintain headroom and present neat appearance.
- AB. Route exposed conduit parallel and perpendicular to walls.
- AC. Route conduit installed above accessible ceilings parallel and perpendicular to walls.
- AD. Route conduit in and under slab from point-to-point.
- AE. Do not cross conduits in slab.
- AF. Maintain adequate clearance between conduit and piping.
- AG. Maintain 12-inch clearance between conduit and surfaces with temperatures exceeding 104°F (40°C).
- AH. Bring conduit to shoulder of fittings; fasten securely.
- AI. Use conduit hubs with sealing locknuts to fasten conduit in damp and wet locations.

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- AJ. Install no more than equivalent of three 90-degree bends on interior locations between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use factory elbows for bends in metal conduit larger than 2-inch size.
- AK. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.
- AL. Do not use dissimilar strap or clamp supports. Provide dielectric tape, fittings, straps, and bushings where dissimilar metals are used.
- AM. Where fittings for liquid-tight flexible conduit are brought into an enclosure with a knockout, a gasket assembly, consisting of one piece "O" ring, with a Buna-R sealing material, Series 5200, shall be installed on outside of box. Fittings shall be made of either steel or malleable iron only, and shall have insulated throats or insulated bushings.
- AN. A copper ground wire sized in accordance with NEC shall be installed on the inside of the conduit as a jumper around flexible conduit to assure a continuity of ground.
- AO. Install a copper jumper across all flexible conduit including lighting fixtures, controls and other utilization equipment.
- AP. Install liquid-tight flexible conduit in such a manner as to prevent liquids from running on surface toward fittings.
- AQ. Allow sufficient slack conduit to reduce the effect of vibration.
- AR. Complete all conduit systems before pulling the conductors.
- AS. Support in accordance with requirements of National Electric Code.

3.02 INSTALLATION OF BOXES

- A. Install boxes concealed in finished walls.
- B. Locate boxes to prevent moisture from entering or accumulating within them.
- C. Support boxes independently of conduit, as required by the National Electric Code.
- D. Provide 4" x 1-1/2" octagonal, 4" x 1-1/2" square or 4" x 2-1/8" square ceiling outlet boxes.
- E. Where required to hang a specific fixture, provide a fixture stud of the no-bolt, self-locking type on ceiling outlets.
- F. Provide 2-1/2" x 3-3/4" one gang masonry boxes for switches and receptacles installed concealed in concrete block walls. For increased cubic capacity, provide 3-1/2" x 3-3/4" one gang masonry boxes. Where more than two conduits enter the box from one direction, provide 4" square boxes with square cut device covers not less than 1" deep specifically designed for this purpose. Use round edge plaster rings only if the block walls are to be plastered. Use sectional or gang-type outlet boxes only in drywall construction.

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- G. Provide 4-11/16" square outlet boxes with square cut device corners for block walls or round edge plaster rings for plastered walls for telephone outlets. Single gang device boxes are not acceptable.
- H. Provide fittings with threaded hubs for screw connections and with the proper type covers for switches and receptacles served by exposed conduit. Use pressed steel outlet only for ceiling fixture outlets.
- I. Provide condulets with threaded hubs and covers and with proper configurations for all changes of direction of exposed conduits. Standard conduit ells may be used if they do not interfere or damage or mar the appearance of the installation.
- J. Use boxes of sufficient cubic capacity to accommodate the number of conductors to be installed, in accordance with the National Electric Code.
- K. Effectively close unused openings in boxes with metal plugs or plates.
- L. Set boxes so that front edges are flush with finished surfaces.
- M. Support boxes from structural members with approved braces.
- N. Install blank device plates on outlet boxes left for future use.
- O. Provide bushings in holes through which cords or conductors pass.
- P. Install boxes so that the covers will be accessible at all times.
- Q. Electrical boxes may be installed in vertical fire resistive assemblies classified as fire/smoke and smoke partitions without affecting the fire classification, provided such openings occur on one side only in each framing space and that openings do not exceed 16 square inches. All clearance between such boxes and the gypsum board shall be completely filled with joint compound or approved fire-resistive compound. The wall shall be built around outlet boxes larger than 16 square inches so as not to interfere with the wall rating.

3.03 INSTALLATION OF PULL BOXES, JUNCTION BOXES AND WIRE TROUGHS

- A. Provide junction boxes as shown on Drawings and otherwise where required, sized according to number of conductors in box or type of service to be provided. Minimum junction box size 4-inch square and 2-1/8-inches deep. Provide screw covers for junction boxes.
- B. Install boxes in conduit runs wherever necessary to avoid long runs or too many bends. Do not exceed 100-foot runs without pull boxes. Install pull boxes at all 90-degree bends.
- C. Rigidly secure boxes to walls or ceilings. Conduit runs will not be considered adequate support.
- D. Install boxes with covers in accessible locations. Size boxes in accordance with the National Electric Code.
- E. Do not install pull boxes or junction boxes for joint use of line voltage and signal or low voltage controls unless all conductors are insulated for the highest voltage being used in the same box.

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- F. Coordinate installation of exterior pull boxes with General contractor to establish elevations of finished grades and pavements. All castings shall have chimney adjustment of + 6".

3.04 CONDUIT LOCATIONS

- A. Route all conduit concealed in walls or above finished ceilings. Provide boxes and conduits concealed in walls for all power and controls.
- B. Surface mounted conduits will only be allowed in electrical and mechanical rooms. Surface mounted conduits shall only be permitted for vertical runs. All horizontal runs shall be installed above finished ceilings.
- C. Surface mounted raceway (wiremold) conduit will only be allowed on finished block walls or on plaster walls, where conduit cannot be run concealed. All horizontal runs shall be installed above finished ceilings, where drop ceilings are located.
- D. All conduit and wiremold shall be primed and painted to match existing adjacent wall color.
- E. J-Hooks are only permitted to be used above finished ceilings for telephone, PA, CAT 6 data and fire alarm cable.

END OF SECTION

IDENTIFICATION FOR ELECTRICAL SYSTEMS

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PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Nameplates and labels.
- B. Wire and cable markers.
- C. Conduit markers.

1.02 REFERENCES

- A. ANSI/NFPA 70 - National Electrical Code.

1.03 SUBMITTALS

- A. Submit under provisions of Section 013300.
- B. Product Data: Provide catalog data for nameplates, labels and markers.
- C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Underwriters Laboratories, Inc. Include instructions for storage, handling, protection, examination, preparation and installation of product.

1.04 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

PART 2 - PRODUCTS

2.01 NAMEPLATES AND LABELS

- A. Nameplates: Engraved three-layer laminated plastic, white letters on black background.
- B. Locations:
 - 1. Distribution panelboards.
- C. Letter Size:
 - 1. Use 1/4 inch (6 mm) letters for identifying all control pilot lights.
- D. Labels: Embossed adhesive tape, with 3/16" (5mm) white letters on black background. Use for identifying existing equipment, distribution panels, switchboards, disconnect switches, and individual electrical devices.

2.02 WIRE MARKERS

- A. Manufacturers:
 - 1. 3M ELECTRICAL SPECIALTY DIV., Product Scotch Code.
 - 2. THOMAS & BETTS CORP., Product E-Z Code.
 - 3. Substitutions shall be permitted only after receiving written approval from the Engineer.

- B. Description: Epoxy film tape type wire markers.
- C. Locations: Each conductor at panelboards, auxiliary gutters, pull boxes, outlet and junction boxes, circuit breakers and each load connection.
- D. Legend:
 - 1. Power and Lighting Circuits: Branch circuit or feeder number indicated on drawings.
 - 2. Control Circuits: Control wire number indicated on interconnection diagrams on drawings.

2.03 CONDUIT MARKERS

- A. Manufacturers:
 - 1. THOMAS & BETTS CORP.
 - 2. Substitutions shall be permitted only after receiving written approval from the Engineer.
- B. Description: Self-sticking vinyl; black letters on orange background.
- C. Location: Furnish markers for each conduit longer than 6 feet (1.8 m).
- D. Spacing: 20 feet (6 m) on center.

2.04 UNDERGROUND WARNING TAPE

- A. Manufacturers:
 - 1. THOMAS & BETTS CORP., Model NAF-0700.
 - 2. Substitutions shall be permitted only after receiving written approval from the Engineer.
- B. Description: 6 inch (150 mm) wide plastic tape, detectable type, colored red with suitable warning legend describing buried electrical lines.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Degrease and clean surfaces to receive nameplates and labels.

3.02 APPLICATION

- A. Install nameplate and label parallel to equipment lines.
- B. Secure nameplate to equipment front using screws, rivets or adhesive.
- C. Secure nameplate to inside surface of door on panelboard that is recessed in finished locations.
- D. Apply conduit markers at 20 foot (6 m) intervals.
- E. Identify underground conduits using underground warning tape. Install one tape per trench at 3 inches (75 mm) below finished grade.

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3.03 ELECTRICAL EQUIPMENT IDENTIFICATION

- A. The Contractor shall identify all existing circuits in existing distribution panels, switchboards and disconnect switches to remain.
- B. Label all circuits identifying the load served including all individual circuit breakers.
- C. Label all new circuit breakers and switches used for new feeder and branch circuits.
- D. Contractor shall furnish a minimum of 5 custom engrave three-layer laminated plastic labels with up to 20 words per label as directed by the engineer/owner in addition to the required labels for all pilot devices, switches, controls and timers.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Surge protection device.

1.02 RELATED SECTIONS

1.03 STANDARDS

- A. The specified suppressor shall be designed, manufactured, tested and installed in compliance with:
 - 1. American National Standards Institute and Institute of Electrical and Electronic Engineers (ANSI/IEEE C62.11, C62.41 and C62.45).
 - 2. Federal Information Processing Standards Publication 94 (FIP PUB 94).
 - 3. National Electrical Manufacturer Association (NEMA LS-1).
 - 4. National Fire Protection Association (NFPA 20, 70, 75 and 78).
 - 5. Underwriters Laboratories (UL 1449).
 - 6. CAN/C22.2 No. 8-M1986; CSA Electrical Certification Notice No. 516.
 - 7. The system individual units shall be UL listed under UL 1449 Standard for Transient Voltage Surge Suppressions (TVSS) and the surge ratings shall be permanently affixed to the TVSS.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. MCG ELECTRONICS, INC., Deer Park, New York.
- B. Approved equal.

2.02 MANUFACTURED UNITS

- A. Surge suppression shall be series Surge Free Model No. 400LS.

2.03 SYSTEM REQUIREMENTS

- A. The specified surge protective device shall provide effective high energy surge diversion for application ANSI/IEEE C62.41-1991 Location Category C3 environments. Testing per ANSI/IEEE C62.45-1992 using ANSI/IEEE C62.41 Category C3 waveforms and amplitudes. UL 1449 listing. The specified surge protective device shall provide:
 - 1. 400,000 transient amps, per phase of surge protection.
 - 2. Peak surge current ratings must be independently tested and verified.
 - 3. All mode protection, L-N, L-G, L-L, N-G.
 - 4. Integral disconnect with safety dead front.
 - 5. Each MOV protected from over-current, thermal overload and monitored individually.
 - 6. Self diagnostics with comprehensive LED bar graph on front panel showing the exact % level of protection available.
 - 7. Audible fault alarm with silence switch.
 - 8. Event counter, indication of time and date of last event (battery backup for time and date).
 - 9. Remote alarm relay contacts (surge protected), Form C.
 - 10. Micro-Z low impedance installation cable.

SURGE PROTECTION

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11. Twenty year warranty on entire system.
12. LIFETIME "NO NONSENSE" WARRANTY ON FIELD REPLACEABLE POWER MODULES AND FUSES.

B. Environmental Requirements:

1. Magnetic Fields: Connection shall be made using low impedance Micro-Z cabling provided with the suppressor for maximum magnetic field cancellation. Unit shall be shunt-installed with no series connected elements.
2. Operating Temperature: Operating temperature range shall be -40° to +71° C (-40° to +160° F).
3. Storage Temperature: Storage temperature range shall be -40° to +85° C.
4. Relative Humidity: Operation shall be reliable in an environment with 0% to 95% non-condensing relative humidity.
5. Operating Altitude: The system shall be capable of operation up to an altitude of 13,000 feet above sea level.
6. Operating Voltage: Maximum continuous operating voltage shall be no less than 115% and no greater than 140% of the nominal rated line voltage.
7. Power Frequency: The power frequency range shall be 47 to 440 Hertz.

C. Electrical Requirements:

1. Unit Operating Voltage Requirements:

Voltage:	Description:	Joules (8/20us):	Vpeak L-N (20kV, 10kA):	Vpeak L-N (6kV, 500A):
120/208 VAC	3phase, 4W + gnd, wye	26,496	600V	505V

2. Unit shall be installed in parallel with the protected equipment. No series connected protective elements shall be used.
3. The maximum surge current capacity per phase of the specified system, based on the standard IEEE 8/20 microsecond waveform, shall be at least: 1 Event at 400 kA. The surge life (8/20us) shall be at least 10,000 @ 19 kA occurrences. The transient suppression capability shall be bi-directional and suppress both positive and negative impulses.
4. The suppressor shall be capable of interrupting a 200 kA, short circuit current delivered from the AC power line. The interrupt capability must be confirmed and documented by a recognized independent testing laboratory.
5. The suppressor shall be designed so as to minimize the internal surge path impedance. Direct point-to-point internal wiring is inherently inductive and not acceptable. Connection to the power service shall be constructed for best performance.
6. Equipment shall be as manufactured by MCG Electronics, Inc.: Model: 400LS-Family or engineering department approved equal with supporting test data.

D. Protection System Components:

1. Replaceable modules: The suppressor shall be constructed using field replaceable protection modules. The suppressor shall have individually fused and monitored 40mm Metal Oxide Varistors (MOV's), including neutral to ground protection mode. Each module will provide five times (5X) redundant protection, with three modules per each phase and five fuses per module. The status of each module shall be locally monitored with a green LED that becomes red in a fault condition. The transient peak rating of the fuse shall be coordinated with the Ipeak handling capability of the MOV so that the surge path capability

- is not limited by the series fusing. In addition, each MOV shall incorporate a thermal disconnect means to remove a shorted MOV safely from the protection system.
2. Self-Diagnostics: Red, green and yellow solid state LED indicators shall be provided on the hinged front cover to indicate protection status. An illuminated green LED indicates power is present at the protector on all phases, and an illuminated red LED shall indicate that one or more of the modules have reduced protection. An illuminated yellow LED shall indicate a suppression event. Both front panel and internal LEDs are required to provide power and fault indications in the event of even the loss of a single fuse or MOV. Relay operation shall be in a fail-safe operating mode (i.e., continuously energized so that power failure, reduced protection, or a break in the remote monitoring line will cause a fault indication at the remote monitor).
 3. Remote Alarm Capability: Relay alarm contacts shall be provided for remote alarm monitoring capability of unit status. Form C normally open and normally closed contacts shall be provided with voltage and current limiting protection.
 4. Audible Alarm: The specified system shall be equipped with an audible alarm which shall be activated when any one or more of the modules has a reduced protection condition. A mute option shall be provided for the audible alarm.
 5. Advanced Diagnostic LED Display: A front panel, microprocessor controlled LED display, in the form of a bar graph, will indicate the protection status of each MOV on each phase including neutral to ground. A event counter will display number of suppressed transient events with a time and date stamp.
 6. Integral Disconnect: Unit shall be provided with dead front disconnect to remove power from protector for maintenance access. The disconnect should not be accessed from the front panel unless the unit meets the minimum clamp voltage requirements.
 7. NEMA 12 Enclosure: 14 gauge steel, with stainless steel hardware.

PART 3 - EXECUTION

3.01 INSTALLATION AND MAINTENANCE

- A. Units shall be installed as close as possible to the load side lugs of the transfer switch to which it is connected using low impedance Micro-Z cabling.
- B. A 3-pole disconnect shall be provided to insure safety of maintenance personnel.

3.02 TWENTY YEAR WARRANTY

- A. Manufacturer to provide twenty (20) year warranty to cover repair or replacement with a new device. Manufacturer to provide no cost replacement of fused protection modules for the life of the suppressor.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Distribution panelboards.

1.02 REFERENCES

- A. ANSI/NFPA 70 - National Electric Code.
- B. NECA Standard of Installation.
- C. NEMA AB1 - Molded Case Circuit Breakers.
- D. NEMA PB1 - Panelboards.
- E. NEMA PB1.1 - Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less.
- F. NEMA ICS2 - Industrial Control Devices, Controllers and Assemblies.
- G. NEMA KS1 - Enclosed Switches.

1.03 SUBMITTALS

- A. Submit product data under provisions of Section 013300.
- B. Indicate outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, and circuit breaker arrangement and sizes.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. New Panelboards
 - 1. Panelboards shall be manufactured by Siemens.
 - 2. Approved equal.

2.02 PANELBOARD REQUIREMENTS

- A. Provide panelboards of circuit breaker, dead-front safety type, UL labeled, and meeting all applicable requirements of the National Electrical Manufacturers Association.
- B. Provide panelboards with lugs (both main lugs and branch circuit lugs) suitable and UL approved for both aluminum and copper conductors.
- C. Provide electrically isolated neutral bars.
- D. Provide separate ground bars complete with lugs or connectors on bar.
- E. Provide key operated door and door lock. Door shall prevent access to operate circuit breakers.

- F. Provide panelboards with sequence phased bus bars or distributed phase bussing for voltage and phase as indicated on drawings.
- G. Refer to drawings for numbers of branch circuits, their ratings, number of poles, arrangements, etc.
- H. Provide typed circuit directory cards.
- I. Provide front filler plates for unused breaker knockouts.
- J. Refer to drawings for Ratings and Features.
- K. All bus bars, including ground bars shall be tin-plated copper.
- L. All circuit breakers shall be bolt-on type.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Ground separate ground bars to panel boxes and to the main service entrance ground bus with a code-sized grounding conductor installed in the same conduit as the phase and neutral conductors under provisions of Section 260526.
- B. Install all circuits using a common neutral bus bay in accordance with the National Electric Code. Balance all circuits to achieve not greater than 7% unbalanced neutral current in panel feeders.
- C. Provide six circuit breaker handle lock-on devices for each lighting and miscellaneous power panelboard for installation by the contractor on circuits as directed by the Engineer to prevent unauthorized personnel from turning off circuits to controls, unit heaters, autodial alarm system, etc. Provide spare lock-on devices over to the Engineer.
- D. Install panelboards in accordance with NEMA PB 1.1.
- E. Install panelboards plumb.
- F. Height: 6 feet (2 m) to top of panel board.
- G. Provide typed circuit directory for each branch circuit panelboard. Handwritten circuit directory cards will not be accepted. Revise directory to reflect circuiting changes required to balance phase loads.
- H. Provide a typed circuit directory in accordance with NEC sections 110.22 and 408.4. Circuits shall be labeled with detailed information describing the switches function and equipment location.
- I. For all existing circuits terminated to a new panelboard, contractor shall trace out and update the circuit directory in accordance with NEC sections 110.22 and 408.4. Include all costs for this work in base bid.
- J. Revise directory to reflect circuiting changes required to balance phase loads.

- K. Provide engraved plastic nameplates under the provisions of Section 260553.

3.02 FIELD QUALITY CONTROL

- A. Maintain proper phasing for multi-wire branch circuits.
- B. Visual and Mechanical Inspection: Inspect for physical damage, proper alignment, anchorage, and grounding. Check proper installation and tightness of connections for circuit breakers, fusible switches, and fuses.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Switches, receptacles, thermostats, device plates and other wiring devices as indicated on Drawings.

1.02 RELATED SECTIONS

- A. Section 260533 - Raceways and Boxes for Electrical Systems.

1.03 REFERENCES

- A. ANSI/NFPA 70 - National Electric Code.
- B. NEMA WD1 - General Purpose Wiring Devices.

1.04 SUBMITTALS

- A. Submit product data under provisions of Section 013300.
- B. Provide manufacturer's catalog information showing dimensions, colors and configuration.

1.05 REGULATORY REQUIREMENTS

- A. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

PART 2 - PRODUCTS

2.01 SWITCHES

- A. Manufacturers: HUBBELL, LEGRAND, GENERAL ELECTRIC.
- B. Single pole, 20 amp, 120/277 VAC, NEMA WD-1, heavy duty, UL20.
- C. Device Plate: Stainless steel.

2.02 RECEPTACLES

- A. Manufacturers: HUBBELL, LEGRAND, GENERAL ELECTRIC.
- B. 20 amp, 125 VAC, NEMA WD-1, heavy duty.
- C. 20 amp, 125 VAC, NEMA WD-1, heavy duty, ground fault circuit interrupter.
- D. 20 AMP, 125 VAC, Combination AC Duplex receptacles with two (2) 5 volt DC USB ports that work with USB 2.0 and USB 3.0 compatible devices.
- E. Duplex type.
- F. Device Plate: Stainless steel.

2.03 MANUAL MOTOR RATED THERMAL SWITCH

- A. Acceptable Manufacturers: SQUARE D, Class 2510, Type KG1A, Type KG2C (3-pole, 600V) or approved equal.
- B. Contractor shall coordinate voltage, phase and current rating with equipment.

2.04 TELEPHONE/DATA OUTLETS

- A. Provide combination telephone/data jacks compatible with RJ-45 and RJ-11 cable connections.
- B. Provide "Decora" type with matching vinyl cover plate.
- C. Colors shall be selected by the Owner.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Mounting:
 - 1. Mount all switches 46-inches above finished floor to center line of switch unless noted otherwise.
 - 2. Mount all receptacles 18-inches above finished floor to center line of receptacle unless noted otherwise.
 - 3. Install switches with OFF position down.
- B. Polarity: Properly wire all receptacles so that the hot wire, the neutral wire and the ground wire connect to the proper terminal on all receptacles.
- C. Grounding: Install all devices in boxes specified under Section 260533 and install a No. 12 green ground wire from device grounding terminal to the outlet box in accordance with the National Electric Code.
- D. Install device plates on switch, receptacle and blank outlets in full contact with wall surface.
- E. Provide new SO cord for all chemical pumps and install plug end to match receptacle.

3.02 FIELD QUALITY CONTROL

- A. Inspect each wiring device for defects.
- B. Operate each wall switch with circuit energized and verify proper operation.
- C. Verify that each receptacle device is energized.
- D. Test each receptacle device for proper polarity.
- E. Test each GFCI receptacle device for proper operation.

END OF SECTION

WIRING DEVICES
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PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Interior and exterior luminaries and accessories.
- B. Emergency lighting and units.

1.02 REFERENCES

- A. ANSI C78.379 - Electric Lamps - Incandescent and High-Intensity Discharge Reflector Lamps - Classification of Beam Patterns.
- B. ANSI C82.1 - Ballasts for Fluorescent Lamps - Specifications.
- C. ANSI C82.4 - Ballasts for High-Intensity Discharge and Low Pressure Sodium Lamps (Multiple Supply Type).
- D. NEMA WD 6 - Wiring Devices - Dimensional Requirements.
- E. NFPA 70 - National Electric Code (2014).
- F. NFPA 101 - Life Safety Code.
- G. LM-79-08, IESNA Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products
- H. LM-80-08, IESNA Approved Method for Measuring Lumen Maintenance of LED Light Sources
- I. NYECC and ASHRAE 90.1.
- J. UL924: Emergency Lighting and Power Equipment; Current Edition. Including All Revisions.

1.03 SUBMITTALS

- A. Submit product data under provisions of Section 013300.
- B. Shop Drawings: Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.
- C. Product Data: Provide dimensions, ratings, performance data and installation instructions.
- D. Submit manufacturer's installation instructions. Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation and installation of Product.
- E. All foot candle calculations and photometrics must be provided with substitute products. Photometrics shall include a room by room analysis showing walls, room names and room numbers. Calculation points shall be 2 feet on center, measured at 30" above the floor. Maintained foot candle levels shall meet or exceed those listed in Section 2.03A of specification 265000. On each drawing, provide a table showing the Room Name, Room Number, Maximum

Light Level, Minimum Light Level, Average Light Level, Min:Max Ratio and, IES File Model Number.

- F. All substitute LED light fixtures and LED retrofit lighting kits must be Design Lights Consortium (DLC) qualified.
- G. All substitute LED replacement lamps must be listed by Energy Star as Certified Light Bulbs.

1.04 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc.

1.05 EXTRA PRODUCTS

- A. Section 017800 - Closeout Submittals.
- B. LED Fixtures: At completion of installation, deliver to Owner.
 - 1. One (1) of each light fixture type as shown on the light fixture schedule.

PART 2 - PRODUCTS

2.01 LIGHTING UNITS

- A. Refer to LIGHTING FIXTURE SCHEDULE on drawings for fixture manufacturer, catalog number, and fixture description.
- B. Provide electronic energy saving drivers. Where dimming is shown on drawings, provide dimmable type drivers.
- C. All fixtures equipped with emergency battery packs shall have test light and switch accessible and visible from the room floor.
- D. Description: Emergency lighting units complying with NFPA 101 and all applicable state and local codes and listed and labeled as complying with UL 924.

2.02 LIGHTING FIXTURE NOTES

- A. MOUNTING: Electrical Contractor is responsible for reviewing all mounting arrangements prior to ordering any products. Electrical Contractor is responsible for ordering all of the proper fixtures, mounting hardware and miscellaneous fasteners to complete project. Fixtures to be secured to the structure from a minimum of two points, at opposing ends of the fixture when ceiling recessed or surface mounted. Four points shall be secured where necessary for the fixture to be parallel and tight to underside of ceiling. All recessed fixtures to fit tight to ceiling to eliminate all light leaks. Trim kits, when not secured internally to fixture, shall be secured to structure at a minimum of two points.
- B. MOUNTING: Prior to submitting and ordering any light fixture, Contractor is responsible for verifying adequate mounting clearances for all light fixtures that are to be recessed into a grid type ceiling. Where new ceilings are to be installed, contractor shall coordinate with ceiling installers for exact mounting heights and required mounting spaces.

- C. FINISHES: All exposed portions (permanent or adjustable) of fixtures to be finished by the manufacturer in a finish as specified.
- D. Fixtures shall come pre-assembled and complete with all sockets (incandescent to be spring supported), lamp ends, ballasts, transformers, fixture ends, trim rings, plates, and low density mounting kits (as required) for a complete installation.
- E. LENSES:
 - 1. Minimum 0.125" thick and to be virgin acrylic.
 - 2. Low voltage - Tempered glass, to enclose lamp.
- F. LAMPS: SYLVANIA, PHILLIPS or GENERAL ELECTRIC, as selected by the Electrical Contractor. Note, all lamps for one project to be furnished by the same manufacturer unless otherwise specified. At the end of the project, the Electrical Contractor shall turn over to the Owner one lamp envelope from each type installed. The Contractor shall be responsible for replacing all lamps which burn out during construction and up to ninety (90) days after Owner occupancy of the building.
- G. VOLTAGE: As noted on the LIGHTING FIXTURE SCHEDULE. Contractor is responsible for field verifying available voltage(s) and ordering fixtures, ballasts, and transformers accordingly.
- H. ORDERING: It is solely the responsibility of the Contractor to order fixtures, lamps, mounting brackets and accessories so that the fixtures will be installed and operating upon Owner Occupancy opening. Contractor is responsible for all delays because of his/her lack of effort to order the products in a timely manner.
- I. SHIPPING: The light fixture manufacturer shall mark the fixture type as indicated on the contract drawings and/or shop drawings on the respective carton when shipping luminaries. The Contractor shall be responsible for checking each carton immediately upon receipt for verification that fixtures are undamaged and no contents are missing. All discrepancies must be reported to shipper and manufacturer immediately; otherwise the Contractor shall be responsible for items which are lacking or damaged.

2.03 SED REQUIRED LIGHT LEVELS

- A. Requirements for maintained horizontal foot-candles for each location within each building are listed below. Confirm designated use of each "Location" with owner and engineer prior to beginning calibration work: **Light levels shall not drop below SED standard guidelines as shown in chart.**

Location	Required Maintained Horizontal Foot-Candles
Classrooms, study halls, and lecture rooms [on desks and tables]	50
Offices [on desks]	50
Libraries [on desks and tables]	30
Libraries [book stacks]	50
Music rooms [on work]	40
Sewing rooms, drafting rooms, home economics [on work]	50
Shops, laboratories, and art rooms [on work]	50

Computer Rooms [on work]	50
Gymnasiums and playrooms	30
Cafeterias	40
Auditoriums	10
Conference Rooms	30
Reception Areas	20
Locker rooms and toilets	10

- B. Contractor shall program all fixtures as per district requirements.
- C. Contractor shall calibrate fixtures as per district requirements.

2.04 EMERGENCY LIGHTING UNITS

- A. Description: Emergency lighting units complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.
- B. Operation: Upon interruption of normal power source or brownout condition exceeding 20 percent voltage drop from nominal, solid-state control automatically switches connected lamps to integral battery power for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.
- C. Battery:
 - 1. Size battery to supply all connected lamps, including emergency remote heads where indicated.
- D. Diagnostics: Provide power status indicator light and accessible integral test switch to manually activate emergency operation.
- E. Provide low-voltage disconnect to prevent battery damage from deep discharge.

2.05 WARRANTY

- A. All light fixtures shall have a 5-year manufacturer's warranty. Warranty shall begin on date of substantial completion.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install fixtures in accordance with manufacturer's instructions.
- B. Mount fixtures in locations as shown on drawings and as called for in schedule on electrical drawings. Determine type of ceiling to be installed in each space from drawings and schedules and furnish fixtures suitable for the exact type.
- C. Joints in fixture wiring shall be made using wire nuts, pre-insulated Scotch locks, or other approved mechanical means of connection.
- D. Adjustable type fixtures shall be adjusted by the Contractor to illuminate intended area to satisfaction of the Engineer.

- E. Surface fixtures in or on plastered or drywall ceilings shall be supported from pieces of support channel spanning across main support channels and shall not depend on ceilings for support.
- F. Coordinate fixture locations to clear diffusers, ductwork, piping, etc.
- G. Maintain integrity of enclosures on all enclosed and gasketed fixtures. Minimize number of enclosure penetrations and make such penetrations water and dust tight with appropriate gasketing and fittings.
- H. Fixtures are to fit tight against construction to eliminate light leaks.
- I. Recessed downlights are to be provided with adjustable mounting bars/frames for drywall or lay-in ceilings as required. Fixtures shall be securely fastened to the ceiling framing member by mechanical means such as bolts, screws, rivets, or listed clips identified for use with the type of ceiling framing members and fixtures.
- J. Support recessed fixtures 2 foot x 2 foot and larger using a minimum of four independent wire hangers, one on each corner, of same gauge as ceiling suspension system supported from building structure independent of ceiling framing. Install earthquake clips to secure recessed grid-suspended luminaires in place.
- K. Wall-mounted fixtures shall be mounted plumb with building lines and installed with proper box and cover hardware.
- L. Surface-mounted fixtures are to cover mounting hardware. Use a canopy that is no longer than the length and width of the fixture and at a height that is no higher than required to mount the fixture absolutely vertical. Fixtures shall be plumb and shall align with building lines and with each other. Support surface mounted luminaires on grid ceiling directly from building structure. Secure to prevent movement.
- M. Stem-mounted fixtures are to be mounted to be absolutely vertical or horizontal. Install suspended luminaires using pendants supported from swivel hangers or in accordance with details shown in drawings. Provide pendant length required to suspend luminaire at indicated height. Support stem-mounted fixtures directly from the building structure.
- N. Install recessed luminaires using accessories and firestopping materials to meet regulatory requirements for fire rating. In fire rated ceilings, recessed luminaires must carry one-hour UL fire rating classification.
- O. Install all accessories specified with each fixture. Install recessed luminaires to permit removal from below.
- P. Bond products and metal accessories to branch circuit equipment grounding conductor.
- Q. At completion of installation and before turning over to owner, clean and remove all dirt and smudges from all lighting fixtures including lenses, louvers and reflectors.
- R. Relamp luminaires that have failed at completion of project.
- S. Battery backup unit equipment emergency lighting shall be circuited in accordance with NEC Article 700.12. Equipment on the same branch circuit as that serving the normal lighting in the area to be connected ahead of any local switches.

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END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Main CB/current transformer/meter cabinet and meter pan.
- B. Secondary conduits, conductors, excavation, concrete and backfill.

1.02 REFERENCES

- A. ANSI/NFPA 70 - National Electric Code.

1.03 SUBMITTALS

- A. Submit product data under provisions of Section 013300.

PART 2 - PRODUCTS

2.01 METERING EQUIPMENT

- A. Meter pans, meter, current transformers and ground fault circuit protection shall be on Local Utility's approved lists of manufacturers and models.
- B. CT Cabinets, Current Transformers and Ground Fault Protection shall be factory installed into motor control center manufacturer's structures as per Local Utility specifications.

2.02 PULL BOXES

- A. Provide pull boxes including property line pull boxes as per Local Utility requirements for both primary and secondary services.
- B. Provide Local Utility approved type TS for all primary services and secondary services above 400 amperes.
- C. Provide Local Utility approved type B-3-6 for secondary services 400 amperes and less.

2.03 CABLE

- A. Install new primary and secondary service conductors in conduit.
- B. Primary service conductors shall be 15 KV, copper size 1/0, type TR-XLPE with 220 mils insulation thickness as per Local Utility requirements.
- C. Secondary service conductors shall be copper type XHHW-2 as per Local Utility requirements.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Coordinate primary and secondary service installation with Local Utility prior to beginning work.
- B. All metering equipment and ground fault protection shall be factory installed in utility CT cabinet.

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- C. Contractor shall file application for new electrical service. Contractor shall coordinate with owner for all information related to the service application.

END OF SECTION

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PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Temporary generators for use during construction.

1.02 REFERENCES

- A. ANSI/NFPA 70 - National Electric Code.

1.03 SUBMITTALS

- A. Submit under provisions of Section 013300.
- B. Shop Drawings: Indicate locations where temporary electric services will be located and routed.

1.04 REGULATORY REQUIREMENTS

- A. Provide temporary power in accordance with National Electric Code.
- B. Obtain required permits from authorities.
- C. Notify affected utility companies before starting work and comply with their requirements.
- D. Do not close or obstruct egress width to exits.
- E. Do not turn off electric equipment without authorization from Owner and Engineer. Provide 72 hours advance notification.

1.05 SCHEDULING

- A. Provide temporary electric generators as shown on the contract drawings before removing or temporarily disabling existing electrical service.

PART 2 - PRODUCTS

2.01 TEMPORARY GENERATOR

- A. Minimum of one (1) Temporary generator shall be available during the entire contract period when existing electrical service is disabled until new electrical service and distribution is permanently on-line and in service.
- B. Temporary generators shall be installed and maintained per NEC, OSHA, N.Y. State Uniform Building Code and local code requirements.
- C. Temporary generator shall be a minimum of 100KW @ 120/208 Volt 3Ø, 4 wire.
- D. All existing equipment shall be protected against damage caused by the installation, operation and removal of the temporary generator service. Any equipment or items damaged shall be replaced at no cost to the Owner.
- E. Provide portable sound-attenuated generators system for temporary electric services.

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- F. Provide all necessary wire, cables and conduit for connection between portable gen-erators and equipment listed in the temporary generator plan on the contract drawings and deemed necessary by the owner. Generators shall be configured to be automatically started and stopped.
 - 1. Provide all necessary fuel for operation. Generators shall be diesel powered.
 - 2. Provide and install a lockable fence enclosure to protect and secure generators from vandalism and theft.
 - 3. Upon completion of the project, remove all temporary electric light and power work and restore all affected finishes, connections and site work.
- G. Review the contract drawings for alternate temprary generator size and additional requirements.

2.02 MINIMUM SYSTEM REQUIREMENTS

- A. The temporary engine generators shall start and provide continuous power to all of the existing site loads as shown on the contract drawings and loads required for construction purposes with 100 percent block loading at the time of transfer.
- B. The genset shall be trailer mounted with an integral sub base tank:
- C. The 100KW Genset shall be provided with a minimum of a 150 gallon diesel fuel tank. Review the contract drawings for alternate temprary generator size and additional requirements.
- D. All gensets to be provided with an electronic governor.
- E. The fuel storage tank shall utilize double wall sub base containment.
- F. Strobe light to indicate low fuel level alarm
- G. Provide portable sound-attenuated generator system for temporary electric service. Sound level must not exceed 65 dBA at 50'.
- H. 110 VAC receptacle for use at low voltages
- I. Voltage: 120/208V
- J. Trailer shall be provided with out-riggers to provide security and remove load from trailer tires when genset is in stationary position.
- K. AC voltage and frequency meters, digital display panel, panel backlighting, Run-off-auto switch, self diagnostics, idle mode control, and voltmeter/ammeter phase selector switch.
- L. Overcurrent sensing, Voltage adjustment potentiometer.
- M. Provide all necessary wire, cables and conduit for connection between portable gen-erator and all electrical equipment.
- N. Provide a full tank of fuel with delivery of unit. Generator shall be diesel powered.

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PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify existing system voltage characteristics and match to existing system voltage characteristics.
- B. Verify that the temporary service is sized to accommodate all loads.
- C. Determine locations and routings for temporary electric wires, cables and conduits with Engineer and Owner.

3.02 TEMPORARY POWER

- A. Temporary wiring and power shall be installed so as not to be a hazard and shall be protected from damage. Separate circuits shall be provided for light and power. Over-current protective devices and switches shall be provided. All equipment, tools, metal cabinets and boxes shall be grounded.
- B. Disable existing power only to make final connections or when new service is to be installed.
- C. Temporary electric service shall not be obtained from other existing electrical systems located on the site.
- D. Temporary wires, cables and conduits shall be protected from damage and accessibility by unauthorized persons.
- E. Pay for all fuel and maintenance of unit during course of project. Power shall not be interrupted during any course of construction, except when transferring from utility to temporary generator and back to new utility power. Power interruptions shall be limited to two (2) 20 minute durations and owner shall be notified a minimum of 72 hours before any power interruptions.

END OF SECTION

PART 1 -GENERAL

1.01 SECTION INCLUDES

- A. Visual Devices.
- B. Audio/Visuals.
- C. Addressable Smoke Detectors.
- D. Addressable Carbon Monoxide Detection and Alarm.
- E. Addressable Heat Detectors.
- F. Pull Stations.
- G. Voice Command.

1.02 REFERENCES

- A. NFPA 70 - National Electrical Code.
- B. NFPA 72, 72G, 72H - National Fire Alarm Code.
- C. NFPA 101 - Life safety code.

1.03 WORK INCLUDED

- A. Furnish and install as described in these specifications and as indicated on the drawings, fire alarm and smoke detection equipment with battery backup. New fire alarm system shall be voice command. Contractor shall provide all new devices as required for a fully functioning voice command system for the new addition and existing cafeteria.
 - 1. All equipment shall be UL listed under category UOJZ as an integrated control system; equipment listed under category UOXX as a control unit accessory shall not be acceptable. The installation shall meet the applicable requirements of NFPA 72 and New York State Code, as well as those standards set by the authorities having jurisdiction.
 - 2. All panels and peripheral devices shall be the standard product of a single manufacturer and shall display the manufacturer's name on each component. The catalog numbers specified under this section constitute the type, product quality, material and desired operating features.
 - 3. Provide all labor, materials and services to perform all operations required for the complete installation and related work shown on the drawings and as specified herein.
 - 4. All electrical work and equipment shall meet the requirements of NFPA 70 and 72.
 - 5. **For any facilities that utilize an existing fire alarm system, the contractor shall coordinate with the owner and fire alarm monitoring company prior to removing or disabling any devices. It shall be the contractor's responsibility to provide fire watch as per the latest addition of the Fire Code of New York State. The contractor shall provide fire watch for all areas of a facility while occupied and unoccupied when any device or part of the fire alarm system is de-activated or put into "test mode".**

1.04 SUBMITTALS

- A. **All submittals and as-built drawings shall be reviewed and stamped by a NY State licensed P.E. Non-stamped drawings will be automatically rejected.**
- B. Submit product data as required by Section 013300.
 - 1. Two copies of all submittals shall be submitted to the Architect/Engineer for review.
 - 2. All references to manufacturer's model numbers and other pertinent information herein is intended to establish minimum standards of performance, function and quality.
 - 3. Equivalent equipment (compatible UL-Listed) from other manufacturers may be substituted for the specified equipment as long as the minimum standards are met, and upon approval of the Architect/Engineer.
- C. Shop drawings:
 - 1. Provide a list (bill of materials) of all types of equipment and components provided.
 - 2. Provide annunciator layout and system wiring diagram showing each device and wiring connection required, including existing equipment. Provide a description of operation of the system. Provide system ampere load and time calculations to substantiate compliance with battery back up (24 hours in non-alarm condition followed by 5 minutes in alarm, after normal power loss)
 - 3. Sufficient information, clearly presented shall be included to determine compliance with drawings and specifications.
 - 4. Include manufacturer's printed product data with name(s), model numbers, ratings, power requirements, equipment layout, device arrangement, complete wiring point-to-point diagrams, and conduit layouts.
- D. Manuals:
 - 1. Submit simultaneously with the shop drawings, complete operating and maintenance manual listing the manufacturers name(s) including technical data sheets.
 - 2. Wiring diagrams shall indicate internal wiring for each item of equipment and the interconnections between the items of equipment.
 - 3. Provide a clear and concise description of operation that gives, in detail, the information required to properly operate the equipment and system.
 - 4. Indicate application conditions and limitations of use stipulated by product testing agency.
 - 5. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of products
- E. Test Reports and Certifications:
 - 1. Indicate satisfactory completion of required tests and inspections.
 - 2. Together with the shop drawing submittal, submit a certification from the major equipment manufacturer indicating that the proposed supervisor of installation and the proposed performer of contract maintenance is an authorized representative of the major equipment manufacturer. Include names and addresses in the certification.

1.05 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Section 017839.
- B. On as-built installation drawings: Record actual locations of initiating devices, signaling appliances, and end-of-line devices, including those that are existing.
- C. Provide a written sequence of operation to the owner.

- D. Provide site specific software and program, including all addressable points.
- E. A completed NFPA 72 Inspection and Testing form shall be submitted to the owner, prior to system acceptance.

1.06 OPERATION AND MAINTENANCE DATA

- A. Submit under provisions of Section 017839.
- B. Maintenance and testing shall be on a semiannual basis or as required by the Authority Having Jurisdiction (AHJ). A preventive maintenance schedule shall be provided by the Contractor that shall describe the protocol for preventative maintenance. The schedule shall include:
 - 1. Systematic examination, adjustments and cleaning of all detectors, manual fire alarm stations, control panels, power supplies, relays and all accessories of the fire alarm system.
 - 2. Each circuit in the fire alarm system shall be tested semiannually.
 - 3. Each smoke detector shall be tested in accordance with the requirements of NFPA 72 Chapter 7.

1.07 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum ten (10) years documented experience, and with service facilities within fifty (50) miles of project location.
- B. Installer: Company specializing in installing the products specified in this section with minimum three (3) years documented experience, and certified by the State of New York as fire alarm installer.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Siemens

2.02 GENERAL

- A. All equipment and components shall be new, and the manufacturer's current model. The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized approval agency for use as part of a protected premises protective signaling (fire alarm) system.
- B. All equipment and components shall be installed in strict compliance with manufacturers' recommendations. Consult the manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc., before beginning equipment installation.
- C. All equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place (e.g., detectors shall not be supported solely by suspended ceilings). Fasteners and supports shall be adequate to support the required load.

2.03 CONDUIT AND WIRE

A. Conduit:

1. Conduit shall be in accordance with the National Electric Code (NEC), local and state requirements.
2. All wiring shall be installed using plenum rated cable.
3. Cable must be separated from any open conductors, as per NEC Article 760-29.
4. Wiring for 24 volt control, alarm notification, emergency communication and similar power-limited auxiliary functions may be run in the same conduit as initiating and signaling line circuits. All circuits shall be provided with transient suppression devices and the system shall be designed to permit simultaneous operation of all circuits without interference or loss of signals
5. Conduit shall enter the Fire Alarm Control Panel, Remote Annunciator Panel and/or backboxes where conduit entry is designated and permitted by the FACP manufacturer.
6. Conduit shall be ¾ inch (19.1 mm) minimum.
7. In finished areas where conduit cannot be concealed, surface mounted raceway is to be used.

B. Wire:

1. All fire alarm system wiring shall be new.
2. Wiring shall be in accordance with local, state and national codes (e.g., NEC Article 760), and as recommended by the manufacturer of the fire alarm system. Number and size of conductors shall be as recommended by the fire alarm system manufacturer, but not less than 18 AWG (1.02 mm) for Initiating Device Circuits and Signaling Line Circuits, and not less than 14 AWG (1.63mm) for Notification Appliance Circuits. All wiring shall be of the type recommended by the manufacturer.
3. All wire and cable shall be listed and/or approved by a recognized testing agency for use with a protective signaling system.
4. All wire and cable shall have a fire resistance rating suitable for the installation as indicated in NFPA 70, and shall test free from grounds or crosses between conductors.
5. Wiring used for the multiplex communication loop shall be twisted and shielded and installed in conduit unless specifically excepted by the fire alarm equipment manufacturer. The system shall permit use of IDC and NAC wiring in the same conduit with the communication loop
6. All field wiring shall be completely supervised.

C. Terminal Boxes, Junction Boxes and Cabinets:

1. All boxes and cabinets shall be UL listed for their use and purpose.

D. Circuits shall be arranged to serve like categories (manual, smoke, horn, strobe). Mixed category circuitry shall not be permitted except on signaling line circuits connected to addressable reporting devices.

2.04 SEQUENCE OF OPERATIONS

A. Fire Alarm System Sequence of Operation

1. Operation of any manual fire alarm station or activation of any smoke sensor, area smoke detector, duct smoke detector, or heat detector throughout the building shall automatically:
 - a. Sound all horns throughout the building with an individual Temporal '3' Code. The alarm signals may be silenced during the alarm condition by operation of the FACP

- alarm silence switch. Subsequent alarm conditions shall re-sound the alarm horns/speakers.
- b. Flash all alarm strobe lights throughout the building. The alarm strobe lights shall be turned off when the system is reset.
 - c. Display a general alarm indication and system status summary (numbers of alarm, supervisory and/or trouble conditions) on the FACP liquid crystal display (LCD). Pressing the alarm acknowledge key shall display, for thirty (30) seconds, the individual device or circuit display, to include the "alarm" status and custom label (up to forty characters and spaces) for the addressable device or circuit of alarm initiation on the liquid crystal display (LCD). At the end of the thirty (30) second period, the general alarm indication and system status summary shall again be displayed. The individual device/circuit display may be recalled at any time by repressing the alarm acknowledge key or until the alarm condition is reset to normal.
 - d. Enter the alarm condition custom label with time and date of occurrence into the FACP historical alarm log for future recall.
 - e. Shutdown all fans over 1000 CFM.
 - f. Release Magnetic Door Hold Opens.
 - g. Recall elevator as per existing system programming.
 - h. Activate circuit and initiate alarm to central station. The Central station monitoring shall be furnished by owner.
2. Operation of any carbon monoxide detector the building shall automatically:
- a. Sound the integral sounder base on the carbon monoxide detector in alarm only, with an individual Temporal '4' Code. The alarm signals shall only be silenced when carbon monoxide detector is no longer in alarm.
 - b. Display/sound an alarm indication and system status summary (numbers of alarm, supervisory and/or trouble conditions) on the FACP liquid crystal display (LCD) stating "Carbon Monoxide Alarm". Pressing the alarm acknowledge key shall display, for thirty (30) seconds, the individual device or circuit display, to include the "alarm" status and custom label (up to forty characters and spaces) for the addressable device or circuit of alarm initiation on the liquid crystal display (LCD). At the end of the thirty (30) second period, the general alarm indication and system status summary shall again be displayed. The individual device/circuit display may be recalled at any time by repressing the alarm acknowledge key or until the alarm condition is reset to normal.
 - c. Enter the alarm condition custom label with time and date of occurrence into the FACP historical alarm log for future recall.
 - d. Shutdown all fans over 1000 CFM.
 - e. Release Magnetic Door Hold Opens.
 - f. Recall elevator as per existing system programming.
 - g. Activate circuit and initiate alarm to central station stating "Carbon Monoxide Alarm". The Central station monitoring shall be furnished by owner.

2.05 MAIN FIRE ALARM CONTROL PANEL

- A. The fire alarm system control panel shall be Siemens Cerberus Pro FC922-924

2.06 PERIPHERAL DEVICES

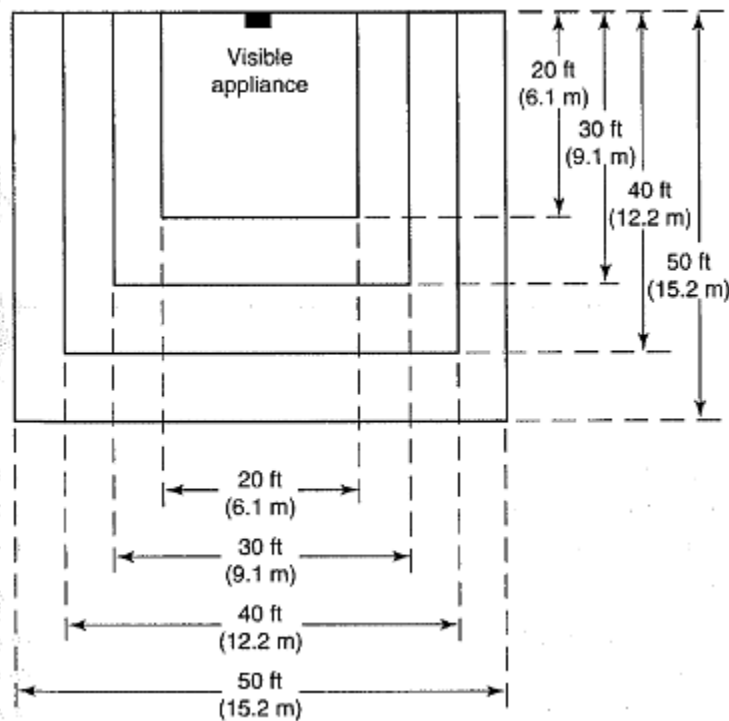
- A. The pull station shall be compatible with existing fire alarm control panel. Red LEXAN or metal, and finished in red with molded raised letter operating instruction of contrasting color. Station will mechanically latch upon operation and remain so until manually reset by openign with a key common with control units.

- B. Lexan Protective Shield shall be STI Stopper II with tamperproof, clear LEXAN shield and red frame that easily fits over manual pull stations. when shield is lifted to gain access to the station. A battery powered piercing warning horn shall be activated. The horn shall be silenced by lowering and realigning the shield. The horn shall provide 85dB at 10 feet and shall be powered by a 9 VDC battery. All manual pull stations in public areas shall be provided with protective shield.

2.07 ANNUNCIATION (NOTIFICATION) DEVICES

- A. The visual and audio/visual signaling devices shall be compatible with the existing fire alarm control panel as stated in the installation manuals and be Listed with Underwriters Laboratories Inc. per UL 1971 and/or 1638.
- B. The visual and audio/visual signaling devices shall be wall mounted to meet ADA requirements.
- C. Each indicating appliance circuit shall be electrically supervised for opens, grounds and short circuit faults, on the circuit wiring, and shall be so arranged that a fault condition on any indicating appliance circuit or group of circuits will not cause an alarm to sound. The occurrence of any fault will light the trouble LED and sound the system trouble sounder, but will not interfere with the proper operation of any circuit which does not have a fault condition.
- D. The notification appliance (combination audio/visual units only) shall produce a peak sound output of 90dba or greater as measured in an anechoic chamber. The contractor shall measure sound levels throughout school and adjust speakers so sound levels are 20dBA above average ambient (during school hours) and less than 110dBA. Contractor shall provide measuring report stating locations, ambient sound levels, and speaker temporal sound levels. Measurements shall be take 5'-0" in front of each audible device and 25'-0" in front of each audible device.
- E. The notification appliance (combination audio/visual units and visual only units) shall provide field selectable flash intensities of 15cd, 30cd, 75cd, 110cd. The appliance shall be capable of meeting the candela requirements of ADA. Provide, adjust and install audio/visual units and visual units to meet the requirements defined in Room Spacing for Wall-Mounted Visible Appliances Table and Figure below:

<i>Maximum Room Size</i>		<i>Minimum Required Light Output [Effective Intensity (cd)]</i>		
		<i>One Light per Room</i>	<i>Two Lights per Room (Located on Opposite Walls)</i>	<i>Four Lights per Room (One Light per Wall)</i>
20 × 20	6.10 × 6.10	15	NA	NA
28 × 28	8.53 × 8.53	30	Unknown	NA
30 × 30	9.14 × 9.14	34	15	NA
40 × 40	12.2 × 12.2	60	30	15
45 × 45	13.7 × 13.7	75	Unknown	19
50 × 50	15.2 × 15.2	94	60	30
54 × 54	16.5 × 16.5	110	Unknown	30
55 × 55	16.8 × 16.8	115	Unknown	28
60 × 60	18.3 × 18.3	135	95	30
63 × 63	19.2 × 19.2	150	Unknown	37
68 × 68	20.7 × 20.7	177	Unknown	43
70 × 70	21.3 × 21.3	184	95	60
80 × 80	24.4 × 24.4	240	135	60
90 × 90	27.4 × 27.4	304	185	95
100 × 100	30.5 × 30.5	375	240	95
110 × 110	33.5 × 33.5	455	240	135
120 × 120	36.6 × 36.6	540	305	135
130 × 130	39.6 × 39.6	635	375	185



- F. The appliance shall be polarized to allow for electrical supervision of the system wiring. The unit shall be provided with terminals with barriers for input/output wiring and be able to mount a single gang or double gang box or double workbox with the use of an adapter plate.
- G. Power supplies and batteries shall be sized to accommodate 110cd at all strobes.

2.08 SMOKE SENSORS

- A. Shall be compatible with existing fire alarm control panel as stated in the installation manual and comply with UL 268, "Smoke Detectors for Fire Protective Signaling Systems," Include the following features:
 - 1. Operating Voltage: 24 VDC, nominal,
 - 2. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore normal operation,
 - 3. Plug-In Arrangement: Sensor and associated electronic components are mounted in a module that connects to a fixed base with a twist-Locking plug connection. Base shall provide break-off plastic tab that can be removed to engage the head/base locking mechanism. No special tools shall be required to remove head once it has been locked. Removal of the detector head shall interrupt the supervisory circuit of the fire alarm detection loop and cause a trouble signal at the control unit,
 - 4. Each sensor base shall contain) LED that will flash each time it is scanned by the Control Unit (once every 4 seconds). In alarm condition, the [detector head][sensor base] LED shall be on steady.
 - 5. Each sensor base shall contain a magnetically actuated test switch to provide for easy alarm testing at the sensor location,
 - 6. Each sensor shall be scanned by the Control Unit for its type identification to prevent inadvertent substitution of another sensor type, Upon detection of a "wrong device", the control unit shall operate with the installed device at the default alarm settings for that sensor; 2.5% obscuration for photoelectric sensor, 135-deg F and 15-deg F rate-of-rise for the heat sensor, but shall indicate a "Wrong Device" trouble condition.
 - 7. The sensor's electronics shall be immune from false alarms caused by EMI and RFI.
 - 8. Addressability. Sensors include a communication transmitter and receiver in the mounting base having a unique identification and capability for status reporting to the FACP. Sensor address shall be located in base to eliminate false addressing when replacing sensors.
 - 9. Removal of the sensor head for cleaning shall not require the setting of addresses.
- B. Type: Smoke sensors shall be of the photoelectric type where acceptable per manufacturer specifications ionization type sensors may be used.

2.09 HEAT DETECTOR

- A. Heat Detector shall be compatible with the existing fire alarm control panel.
- B. Thermal sensor shall be the epoxy encapsulated electronic design. It shall be thermostat-based, rate-compensated, self- restoring and shall not be affected by thermal lag.
- C. Sensor shall have the capability to be programmed as a utility monitoring device to monitor for temperature extremes in the range from 32-deg F to 155-deg F.

2.10 COMBINATION SMOKE AND CARBON MONOXIDE DETECTOR WITH SOUNDER BASE

- A. Combination Smoke and Carbon Monoxide Detector with sounder base shall be compatible with the existing fire alarm control panel as stated in the installation manuals and shall be addressable with integral sounder base.
- B. New devices shall be provided with a sounder base.
- C. Carbon monoxide detector shall be provided an individual addressable module as required to interface with the FACP.
- D. When carbon monoxide detector has reached the end of its usable life a trouble condition shall be signaled at the FACP / remote annunciators.
- E. When a carbon monoxide sensor is in alarm, that carbon monoxide sounder base only shall sound a 'Temporal 4' code pattern, an alarm shall sound at the panel, and central station shall be notified.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. No installation shall begin without approved plans from the fire marshal or AHJ.
- B. The entire system shall be installed in a workmanlike manner, in accordance with approved manufacturer's wiring diagrams. The Contractor shall furnish all conduit, wiring, outlet boxes, junction boxes, cabinets and similar devices necessary for the complete installation.
- C. All penetrations of floor slabs and fire walls shall be fire stopped in accordance with all local fire codes.
- D. End of Line Devices (Resistors/Diodes/Capacitors): Shall be furnished as required for mounting as directed by the manufacturer.
- E. All wiring shall be color coded throughout, to National Electrical Code standards and a minimum of No. 18 AWG., unless otherwise noted. All wiring shall be of the type recommended by the manufacturer.
- F. All wires shall test free from grounds or crosses between conductors.
- G. Fire alarm system terminal and junction locations shall be identified in accordance with NFPA Standard 70, Section 760-3. Terminal and junction boxes shall be painted red and stenciled in white letters "FIRE ALARM", preventing unintentional interference with the fire alarm system wiring during testing, servicing and additional modifications to the system.
- H. All final connections between system equipment and the wiring shall be made under the supervision of a trained manufacturer's technical representative.
- I. The contractor shall submit to the Authority Having Jurisdiction (AHJ), all necessary drawings and equipment specifications required for a complete AHJ approved system. Drawings shall be prepared by the Contractor.

- J. The Contractor shall have a licensed New York State Professional Engineer Stamp all drawings and applications. Pay for all fees to obtain all necessary permits.
- K. All junction boxes housing relays must be labeled with P-Touch type labeler with relay point number and device it serves, i.e. (0001-Flow Switch 1).
- L. Contractor to review points list prior to programming with Owner. Contractor only to program approved points list. Any changes to program not previously approved by Owner will be done at Contractor's expense.

3.02 CLEAN UP

- A. Upon completion of the installation, all debris created by the installation shall be removed from the premises or disposed of as directed by the Owner.
- B. It shall be the responsibility of the installing contractor to assure that construction debris does not adversely affect any sensing devices installed as part of this project. Should it be deemed necessary by the engineer, owner or AHJ, the installing contractor shall be responsible for the clearing of all devices prior to final acceptance.

3.03 TESTS

- A. Prior to the final acceptance test, the Contractor and a trained manufacturer's technical representative shall test the completed system for proper operation. The system shall be demonstrated to perform all of the functions as below listed in 3.04 C. Any system, equipment or wiring failures discovered during said test shall be repaired or replaced before requesting scheduling of the final acceptance test.
- B. The system shall be tested for final acceptance in the presence of the Owner's representative, Architect's representative, Engineer's representative, the local Code enforcement official, Contractor's representative and the Manufacturer's representative.
- C. During the final acceptance test:
 - 1. Every smoke detector, heat detector and carbon monoxide detector shall be tested.
 - 2. Every audible alarm signaling device shall be sounded.
 - 3. Every visual alarm signaling device shall be lit or flashed.
 - 4. Confirm central station alarm monitoring receives signal.
- D. Upon successful completion of all final acceptance tests, the Contractor's and Manufacturer's representatives shall each author and sign a letter confirming the successful completion of testing. Two (2) copies of each letter shall be forwarded to the Owner's representative, the Architect's representative, the Engineer's representative and the local Code enforcement official.
- E. All final acceptance testing shall be done at a time convenient to the local Code enforcement official and the Owner's representatives and all testing costs shall be born by the Contractor as part of this Contract.

3.04 DOCUMENTATION AND TRAINING

- A. The Contractor shall provide the services of a trained manufacturer's employee for a period of two (2) hours, during normal business hours, to instruct the Owner's designated personnel on the operation and maintenance of the entire system.

3.05 MAINTENANCE AND TESTING AGREEMENT

- A. The equipment manufacturer shall provide to the Owner a price quotation for a one (1) year fire alarm system maintenance and testing agreement to begin upon final acceptance of the system. System Supplier shall have a local service organization with a minimum of 20 factory trained technicians. Technicians shall be NICET Level 2 certified.

3.06 SERVICE AND MAINTENANCE

- A. The equipment manufacturer shall make available a fully equipped service organization, capable of guaranteeing an on-site service response time within eight (8) hours to a service request call. Said service shall be available twenty-four (24) hours per day and seven (7) days per week.
- B. The equipment manufacturer shall make available, to the Owner, a price quotation for a one (1) year maintenance and testing agreement, to take effect on the date of final acceptance

3.07 GUARANTEE

- A. The Contractor shall guarantee all wiring and equipment to be free from inherent mechanical and electrical defects for one (1) year. Manufacturer shall make available to the Owner a local service department, which shall stock standard parts on the premises. Maintenance is to be provided during normal working hours, at no cost to the owner, for a period of twelve (12) months from the date of acceptance of the installation, unless damage is caused by misuse, abuse or accident.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Remove and dispose of surface debris as required.
- B. Remove and dispose of paving, sidewalk, curbs, etc.
- C. Clear site or designated areas of the site of plant life and grass as required, and dispose of as required.
- D. Removal and storage of topsoil.

1.02 RELATED SECTIONS

- A. Section 312213 - Rough Grading.
- B. Section 329119.13 - Topsoil Placement and Grading: Placement of stored topsoil.

1.03 REGULATORY REQUIREMENTS

- A. Conform to applicable local code(s) for disposal of debris.
- B. Burning of materials on site is prohibited.
- C. Coordinate clearing work with utility companies.

PART 2 - PRODUCTS

2.01 NOT USED

PART 3 - EXECUTION

3.01 PREPARATION

- A. Verify existing conditions.
- B. Verify limits of clearing.

3.02 PROTECTION

- A. Locate, identify and protect utilities that are to remain from damage.
- B. Protect trees, plant growth and features designated to remain as final landscaping.
- C. Protect benchmarks and existing structures from damage or displacement. Any damage to existing structures is to be promptly repaired at no additional cost to the Owner.

3.03 APPLICATION

- A. Clear areas required for access to site and execution of work.
- B. Remove paving, curbs, debris and sidewalks as required.

SITE CLEARING

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- C. Remove paving, debris, rock and extracted plant life from site and dispose of in accordance with State and local ordinances.
- D. Excavate topsoil from areas to be further excavated, re-landscaped or regraded. Do not excavate wet topsoil.
- E. Stockpile topsoil in area designated on site to a height not exceeding 8 feet. Protect from erosion. Remove excess topsoil not being reused from site. Do not remove any topsoil from the site prior to obtaining the approval of the Engineer.

END OF SECTION 311110

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Removal and storage of subsoil.
- B. Cutting, grading, filling and rough contouring the site prior to placement of topsoil or pavement base for final grading.

1.02 RELATED SECTIONS

- A. Section 311110 – Site Clearing.

1.03 REFERENCES

- A. ANSI/ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb. Rammer and 18 inch Drop.

1.04 SUBMITTALS

- A. Submit under provisions of Section 013300.
- B. Sieve Analysis: Submit a sieve analysis of all types of fill material to be used.

1.05 PROJECT RECORD DOCUMENTS

- A. Accurately record actual locations of utilities remaining, by horizontal dimensions, elevations or inverts, and slope gradients.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Subsoil: Reused excavated material, graded, free of lumps, rocks and gravel larger than 3 inches in size, debris and contaminants.

PART 3 -

EXECUTION

3.01 EXAMINATION

- A. Verify site conditions.
- B. Verify that survey benchmark and intended elevations for the work are as indicated.

3.02 PREPARATION

- A. Identify required lines, levels, contours and datum.
- B. Identify known underground, aboveground and aerial utilities. Stake and flag locations.
- C. Protect above and below-grade utilities that are to remain.
- D. Protect plant life, lawns, rock outcropping and other features remaining as a portion of final landscaping.
- E. Protect benchmarks, existing structures, fences, sidewalks, paving and curbs from excavation equipment and vehicular traffic.

3.03 APPLICATION

- A. Excavate subsoil from areas to be further excavated or regraded. Do not excavate wet subsoil.
- B. Stockpile in area designated on site. Remove excess subsoil not being reused from site.
- C. Stockpile subsoil to a height not exceeding 8 feet. Cover to protect from erosion.
- D. Fill areas to contours and elevations with unfrozen subsoil material with allowances made for topsoil, aggregate base course or paving.
- E. Place and compact subsoil fill material in 12 inch lifts (compacted thickness). Compact to 92 percent maximum dry density in accordance with ANSI/ASTM D1557.
- F. Maintain optimum moisture content of fill materials to attain required compaction density.
- G. Make grade changes gradual. Blend slope into level areas.
- H. Remove surplus fill materials from site.

3.04 TOLERANCES

- A. Maximum Variation From Top Surface of Subgrade: 1 inch.

3.05 FIELD QUALITY CONTROL

- A. Perform field inspection and testing under provisions of Section 014500.
- B. Perform tests and analysis of fill material in accordance with ANSI/ASTM D1557.

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C. Perform compaction tests at a rate of one for every 10 cubic yards of material placed.

END OF SECTION 312213

BACKFILLING

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PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Utility connections, conduit and foundation backfilling to subgrade elevations.
- B. Site filling and backfilling.
- C. Fill under sidewalks, border treatment and paving.
- D. Consolidation and compaction.
- E. Fill for over-excavation.

1.02 RELATED SECTIONS

- A. Section 014500 - Quality Control
- B. Section 312318 - Trenching.

1.03 REFERENCES

- A. ANSI/ASTM C136 - Method for Sieve Analysis of Fine and Coarse Aggregates.
- B. ANSI/ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb Rammer and 12 inch Drop.
- C. ANSI/ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort.
- D. ANSI/ASTM D1556 - Standard Test Methods for Density and Unit Weight of Soil in Place by the Sand Cone Method.

PART 2 - PRODUCTS

2.01 FILL MATERIALS

- A. Type A - Coarse Stone, Gravel: Angular, washed natural stone; free of shale, clay, friable material, sand, debris; minimum size 2 inches in diameter, maximum size 3 inches in diameter.
- B. Type C - Sand: Natural river or bank sand; washed, free of silt, clay, loam, friable or soluble materials, or organic matter; graded in accordance with ANSI/ASTM C136, within the following limits:

Sieve Size	% Passing
No. 4	100
No. 14	10 to 100
No. 50	5 to 90
No. 100	4 to 30
No. 200	0 to 1

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- C. Subsoil: Reused, graded, free of lumps larger than 6 inches, rocks larger than 3 inches, and debris.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify fill materials to be reused are acceptable.

3.02 PREPARATION

- A. Compact subgrade to density requirements for subsequent backfill materials.
- B. Cut out soft areas of subgrade not capable of in situ compaction. Backfill with Type C fill and compact to density equal to or greater than requirements for subsequent backfill material.
- C. Prior to placement of controlled fill at building areas and base course material at paved areas, compact subsoil to 95% of its maximum dry density in accordance with ANSI/ASTM D698.

3.03 BACKFILLING

- A. Backfill areas to contours and elevations with unfrozen materials.
- B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.
- C. Granular Fill: Place and compact materials in continuous layers not exceeding 6 inches compacted depth.
- D. Subsoil Fill: Place and compact material in continuous layers not exceeding 6 inches compacted depth.
- E. Controlled Backfill: Place and compact material in continuous layers, not exceeding 6 inches compacted depth. Contractor shall not proceed with subsequent layer of backfill until compacted layer is tested and backfill is found to be compacted to 95% of its maximum dry density in accordance with ANSI/ASTM D698.
- F. Employ a placement method that does not disturb or damage foundation waterproofing and protective cover, and utilities in trenches.
- G. Maintain optimum moisture content of backfill materials to attain required compaction density.
- H. Backfill against supported foundation walls. Do not backfill against unsupported foundation walls.
- I. Slope grade away from building minimum 1" inch in 10 feet, unless noted otherwise.
- J. Make grade changes gradual. Blend slope into level areas.
- K. Remove surplus backfill materials from site.
- L. Leave fill material stockpile areas completely free of excess fill materials.

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3.04 TOLERANCES

- A. Top Surface of Backfilling Under Paved Areas: \pm 1 inch from required elevations.

3.05 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 014500.
- B. Tests and analysis of fill material will be performed in accordance with ANSI/ASTM D698.
- C. Compaction testing will be performed in accordance with ANSI/ASTM D1556 or D1557.
- D. If tests indicate work does not meet specified requirements, remove work, replace and retest at no cost to Owner.

3.06 PROTECTION OF FINISHED WORK

- A. Protect finished work from damage due to continuing construction activity.
- B. Recompact fills subjected to vehicular traffic.

3.07 SCHEDULE

- A. Fill Under Seed/Sod Areas:
 - 1. Subsoil fill, to 4 inches below finish grade, compacted to 95%.
- B. Fill Under Landscaped Areas:
 - 1. Subsoil fill, to 12 inches below finish grade, compacted to 95%.
- C. Fill Under Asphalt and Concrete Paving:
 - 1. Subsoil fill, to 5-1/2 inches below finish asphalt paving elevation, to 4 inches below concrete sidewalk finish elevation and to 6 inches below concrete driveway apron finish elevation, as shown on plans, compacted to 95%.
- D. Fill to Correct Over-excavation:
 - 1. Type C fill, to proposed subgrade, compacted to 95%.

END OF SECTION 312317

TRENCHING

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PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Excavate trenches for piping and utilities outside building.
- B. Compacted bedding and backfill around and over piping and utilities to subgrade elevations.
- C. Backfilling and compaction.

1.02 REFERENCES

- A. ANSI/ASTM C136 - Method for Sieve Analysis of Fine and Coarse Aggregates.
- B. ANSI/ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb (4.54 kg) Rammer and 18-inch (457 mm) Drop.

1.03 SUBMITTALS

- A. Submit under provisions of Section 013300.
- B. Test Reports: Submit a sieve analysis for bedding to be used.

1.04 QUALITY ASSURANCE

- A. Do not excavate wet or frozen materials without written approval from the Engineer.
- B. Do not backfill over or with wet or frozen materials.
- C. Provide safety barricades around open excavations.

1.05 FIELD MEASUREMENTS

- A. Verify that survey benchmark and intended elevations for the work are as shown on plans.

1.06 COORDINATION

- A. Coordinate trenching with installation of pipe or conduit.
- B. Coordinate trenching with installation and removal of sheeting.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Bedding: Natural river or bank sand; washed; free of silt, clay, loam, friable or soluble materials, or organic matter; graded in accordance with ANSI/ASTM C136; within the following limits:

Sieve Size	Percent Passing
No. 4 (4.75 mm)	100
No. 16 (1.18 mm)	10 - 100

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Sieve Size	Percent Passing
No. 50 (0.30 mm)	5 - 90
No. 100 (0.15 mm)	4 - 30
No. 200 (0.075 mm)	0 - 1

- B. Subsoil: Reused, excavated material, free of lumps, rocks larger than 3 inches (75 mm) in size, debris and contaminants.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify fill materials to be reused are acceptable.
- B. Verify items to be buried during backfilling process have been inspected prior to backfilling.

3.02 PREPARATION

- A. Identify required lines, levels, contours, and datum.
- B. Maintain and protect existing utilities remaining which pass through work area.
- C. Protect bench marks, existing structures, fences, sidewalks, paving and curbs from excavation equipment and vehicular traffic. Any item damaged by the electrical contractor shall be promptly repaired at the electrical contractor's expense.
- D. Protect above and below-grade utilities which are to remain.
- E. Cut out soft areas of subgrade not capable of insitu compaction. Backfill with subsoil fill and compact to density equal to or greater than requirements for subsequent backfill material.

3.03 EXCAVATION

- A. Excavate subsoil required for piping.
- B. Cut trenches to the dimensions shown on the plans.
- C. Excavation shall not interfere with normal 45 degree bearing splay of foundations.
- D. Hand trim excavation. Hand trim for bell and spigot pipe joints. Remove loose matter.
- E. Remove lumped subsoil, boulders, and rock.
- F. For trenches made in solid rock, excavate to a depth of 1 foot (300 mm) below the proposed pipe invert.
- G. Correct unauthorized excavation at no cost to Owner in accordance with Section 312317.
- H. Stockpile excavated material in area designated on site and remove excess material not being used from site. Remove excavated material from site.

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- I. All trenches deeper than 5 ft (1.5 m) shall require sheeting.

3.04 INSTALLATION - BEDDING

- A. Support pipe and conduit during placement and compaction of bedding fill.
- B. For trenches made in solid rock, place an additional 1 foot (300 mm) of bedding under pipe or conduit.
- C. Place bedding to the dimensions and limits as shown on the plans.
- D. Place bedding material against and to 1 foot (300 mm) over the top of the pipe or conduit in 6 inch (150 mm) compacted layers.
- E. All bedding material shall be compacted to 95 percent maximum dry density in accordance with ANSI/ASTM D1557. Maintain optimum moisture content to attain required density.
- F. Place bedding simultaneously on both sides of the pipe or conduit.

3.05 BACKFILLING

- A. Backfill trenches to contours and elevations with unfrozen materials.
- B. Backfill to the dimensions and limits shown on the plans with reused subsoil.
- C. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.
- D. Place and compact material in continuous layers not exceeding 6 inches (150 mm) compacted depth.
- E. Employ a placement method that does not disturb or damage conduit or pipe.
- F. All backfilled materials shall be compacted to 95 percent of maximum dry density in accordance with ANSI/ASTM D1557. Maintain optimum moisture content to attain required density.
- G. Remove temporary sheeting as backfilling progresses.

3.06 TOLERANCES

- A. Maximum Variation From Top Surface of Backfilling Under Paved Areas: 1/4 inch (13 mm).
- B. Maximum Variation From Top Surface of General Backfilling: 1 inch (25 mm).

3.07 FIELD QUALITY CONTROL

- A. Field testing is to be performed under provisions of Section 014500.
- B. Tests and analysis of fill material are to be performed in accordance with ANSI/ASTM D1557.
- C. If tests indicate work does not meet specified requirements, remove work, replace and retest at no cost to Owner.

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- D. Unless additional testing is required by the Engineer, compaction tests shall be taken every 100 feet (30 m), at the springline of the pipe and every 2 vertical feet (610 mm) of backfill.

3.08 CLEANING

- A. Remove surplus backfill materials from site.
- B. Leave fill material stockpile areas completely free of excess fill materials.

3.09 PROTECTION

- A. Recompact fills subjected to vehicular traffic.

END OF SECTION 312318

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Asphaltic concrete paving; wearing, binder or base course.

1.02 REFERENCES

- A. AI MS-2 - Mix Design Methods for Asphalt Concrete and Other Hot Mix Types.
- B. AI MS-8 - Asphalt Paving Manual.
- C. ASTM D242 - Mineral Filler for Bituminous Paving Mixtures.
- D. ASTM D546 - Test Method for Sieve Analysis of Mineral Filler for Road and Paving Materials.

1.03 SUBMITTALS

- A. Submit under provisions of Section 013300.
- B. Supplier: Submit name of asphalt supplier to be used on the project prior to placement of any asphalt on the project.
- C. Design Data: Submit asphalt mix design for each asphalt type to be used.
- D. Testing Firm: Submit name of testing firm to be performing tests on asphalt pavement.

1.04 QUALITY ASSURANCE

- A. Obtain materials from the same supplier throughout the duration of the project.
- B. Do not alter from mix design requirements.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle products to the site under provisions of Section 016500.
- B. Deliver asphalt in sealed, metal containers covered with suitable material to protect the asphalt from the elements.
- C. Lightly lubricate the inside surface of the container with a thin oil or soap solution before loading asphalt.
- D. All containers must be cleaned of all foreign materials prior to loading.

1.06 ENVIRONMENTAL REQUIREMENTS

- A. Do not place asphalt when base surface temperature is less than 40 degrees F, or if surface is wet or frozen.
- B. Do not place asphalt when precipitation is occurring.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Asphalt Cement: AC-20; homogeneous, and shall not foam when heated to 347 degrees F.
- B. Fine Aggregate: Material passing the 1/8 inch sieve; natural sand of hard, strong, durable particles which are free from coatings or injurious amounts of clay, loam or other deleterious substances.
- C. Coarse Aggregate: Material retained on the 1/8 inch sieve; crushed stone or gravel; clean, durable, sharp angled fragments of rock of uniform quality.
- D. Mineral Filler: ASTM D242, finely ground particles of limestone, hydrated lime or other mineral dust, free of foreign matter; 100 percent shall pass the No. 30 sieve; a minimum of 85 percent shall pass the No. 80 sieve; and a minimum of 65 percent shall pass the No. 200 sieve as measured in accordance with ASTM D546.

2.02 EQUIPMENT

- A. Rollers: Minimum weight of 10 tons; equipped with lubricating devices for the roller wheels.
- B. Pavers: Equipped with a vibratory device.

2.03 ACCESSORIES

- A. Tack Coat: Homogeneous, medium curing, liquid asphalt.
- B. Wheel Lubricant: Oil-water mixture containing maximum 10 percent lubricating oil.

2.04 MIXES

- A. Use dry material to avoid foaming. Mix uniformly.
- B. Base Course: NYSDOT Type 1; 4.0 to 6.0 percent of asphalt cement by weight in mixture in accordance with the following gradation:

SIEVE SIZE	PERCENT PASSING
2 INCHES	100
1 ½ INCHES	90-100
1 INCH	78-95
½ INCH	57-84
¼ INCH	40-72
1/8 INCH	26-57
NO. 20	12-36
NO. 40	8-25
NO. 80	4-16
NO. 200	2-8

- A. Binder Course: NYSDOT Type 3; 4.5 to 6.5 percent of asphalt cement by weight in mixture in accordance with the following gradation:

Sieve Size	Percent Passing
1-1/2 inches	100
1 inch	95-100
1/2 inch	70-90
1/4 inch	48-74
1/8 inch	32-62
No. 20	15-39
No. 40	8-27
No. 80	4-16
No. 200	2-8

1. Wearing Course: NYSDOT Type 6; 5.8 to 7.0 percent of asphalt cement by weight in mixture in accordance with the following gradation:

Sieve Size	Percent Passing
1 inch	100
1/2 inch	95-100
1/4 inch	65-85
1/8 inch	36-65
No. 20	15-39
No. 40	8-27
No. 80	4-16
No. 200	3-6

2.05 SOURCE QUALITY CONTROL

- A. Obtain asphalt materials from same source throughout the project.
- B. Provide asphalt in accordance with the approved mix design for each type of asphalt.
- C. Test samples in accordance with AI MS-2.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions and substrate.
- B. Verify that compacted subbase is dry and ready to receive work of this section.
- C. Verify gradients and elevations of base are correct.
- D. Verify that all castings are properly installed and are at the correct elevations.
- E. Beginning of installation means installer accepts existing conditions.

3.02 PREPARATION

- A. Apply tack coat at uniform rate of 0.03 to 0.07 gal/sq. yd. to contact surfaces of castings, curbs, gutters and any asphalt or concrete material.
- B. Do not apply tack coat to wet or frozen surfaces.
- C. Coat top surfaces of castings with oil to prevent bond with asphalt pavement.

3.03 INSTALLATION

- A. Install work in accordance with AI MS-8.
- B. Maintain asphalt temperature between 250 and 325 degrees F during placement.
- C. Place asphalt within 24 hours of applying tack coat.
- D. Place asphalt to compacted thicknesses as identified on plans. If a multiple course pavement is to be used, place top course within 24 hours of placing bottom course. If more than 24 hours elapse, a tack coat will be required to be placed over the entire surface of the bottom course prior to any additional paving.
- E. Utilize the vibratory device on the paver at all times.
- F. Compact pavement by rolling. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.
- G. Compact pavement to a minimum of 94% maximum density.
- H. Develop rolling with consecutive passes to achieve even and smooth finish, without roller marks.
- I. Seal all joints between new pavement and existing pavement with asphalt cement.

3.04 TOLERANCES

- A. Maximum Variation From Flatness: 1/8 inch measured with 10 foot straight edge.
- B. Maximum Variation From Scheduled Compacted Thickness: 1/8 inch.
- C. Maximum Variation from True Elevation: 1/4 inch.

3.05 FIELD QUALITY CONTROL

- A. Perform field inspection and testing under provisions of Section 014500.
- B. Take samples and perform tests in accordance with AI MS-2.
- C. Test are to include percent compaction, gradation and asphalt content.
- D. Provide an asphalt thermometer for determining the asphalt temperature during paving operations.

- E. Frequency of Tests: One test for every 1,000 square feet of each pavement course.

3.06 PROTECTION

- A. Protect finished work under provisions of Section 015000.
- B. Immediately after placement, protect pavement from mechanical injury until project is accepted by the Owner.

END OF SECTION 321216

PORTLAND CEMENT CONCRETE SIDEWALK

H2M

Irvington Union Free School District
Main Street School Renovations
Main Street School
SED No.: 66-04-02-02-0-001-016

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Concrete sidewalks.
- B. Formwork.

1.02 RELATED SECTIONS

- A. Section 312213 - Rough Grading: Preparation of subgrade for sidewalk placement.

1.03 REFERENCES

- A. ACI 301 - Structural Concrete for Buildings.
- B. ANSI/ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement.
- C. ANSI/ASTM D1751 - Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction.
- D. ASTM C33 - Concrete Aggregates.
- E. ASTM C94 - Ready Mix Concrete.
- F. ASTM C150 - Portland Cement
- G. ASTM C260 - Air-Entraining Admixtures for Concrete.
- H. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.
- I. ASTM C494 - Chemical Admixtures for Concrete.

1.04 SUBMITTALS

- A. Submit under provisions of Section 013300.
- B. Product Data: Provide data on joint filler, admixtures and curing compounds.
- C. Supplier: Submit name of concrete supplier prior to the placement of any concrete on the project.
- D. Design Data: Provide a design mix for each type of concrete to be used on the project.
- E. Certificates: Submit receipts of all concrete deliveries, indicating source, date, contractor, amount of concrete, concrete strength, truck number and time load was batched.
- F. Testing Firm: Submit name of testing firm to be performing tests on concrete.

1.05 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Section 017839.

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- B. Accurately record locations of each day's concrete pour.

1.06 QUALITY ASSURANCE

- A. Perform work in accordance with ACI 301.
- B. Obtain concrete only from approved suppliers and maintain the same source throughout the project.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle products to the site under provisions of Section 016500.
- B. Deliver concrete in accordance with ASTM C94, Alternative No. 2.
- C. Place all concrete within 90 minutes of time load was batched.

1.08 ENVIRONMENTAL REQUIREMENTS

- A. Do not place concrete when base surface temperature is less than 40 degrees F, or if surface is wet or frozen.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Cement: ASTM C150, air entraining, Type 1A Portland, gray color.
- B. Aggregates: ASTM C33.
- C. Water: Potable and not detrimental to concrete.
- D. Reinforcement: ANSI/ASTM A185 plain welded steel wire fabric; in flat sheets; uncoated finish.

2.02 ACCESSORIES

- A. Forms: Douglas Fir plywood type; solid, sound, undamaged sheets.
- B. Joint Filler: ANSI/ASTM D1751; 1/2 inch thick.
- C. Air Entraining Admixture: ASTM C260.
- D. Chemical Admixture: ASTM C494, type as required.
- E. Curing Compound: ASTM C309, Type 1, Class A.
- F. Form Release Agent: Colorless material which will not stain concrete or absorb moisture.
- G. Detectable Warning Surface: SAFTI-TRAX Mats or equal.
- H. Joint Sealant: ASTM C920,,Type M, Grade P; SL-2 by Sonneborn or equal.

2.03 MIXES

- A. Concrete shall be mixed and prepared in accordance with the approved mix design and ASTM C94, Alternative No. 2.
- B. The mix shall be such that the concrete shall attain the following characteristics:
 - 1. Compressive Strength (28 days): 4,000 psi.
 - 2. Slump: 2½ to 3½ inches.
 - 3. Air Entrainment: 6% ±1%.
- C. Use chemical admixtures only when approved by the Engineer. Use of admixtures will not relax placement requirements.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions and substrate.
- B. Verify datum and all elevations are as indicated on the plans.
- C. Verify compacted granular subbase has been properly prepared and is ready to receive work of this section.
- D. Beginning of installation means installer accepts existing conditions.

3.02 PREPARATION

- A. Compact base to minimum 95 percent maximum dry density in accordance with ANSI/ASTM D1557.
- B. Moisten base to a minimum depth of 1/2 inch to minimize absorption of water from fresh concrete.
- C. Coat surfaces of manhole and catch basin frames with oil to prevent bond with concrete pavement.
- D. Place and secure forms to correct location, dimension and profile.
- E. Assemble formwork to permit easy stripping and dismantling without damaging concrete. Coat forms with form release agent.

3.03 INSTALLATION

- A. Place joint filler vertical in position in straight lines. Secure to formwork during concrete placement.
- B. Place reinforcement as indicated on the plans. Interrupt reinforcement at expansion joints.
- C. Place concrete in accordance with ACI 301.

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- D. Ensure reinforcement and formed joints are not disturbed during concrete placement.
- E. Place concrete continuously between predetermined construction joints. Do not break or interrupt successive pours such that joints occur.
- F. Vibrate concrete adjacent to forms.
- G. Place concrete to pattern indicated.
- H. Place expansion joints with joint filler at 20 foot intervals.
- I. Place scored contraction joints at 4 foot intervals.
- J. Place joint filler between paving components and building or other appurtenances and in expansion joints.
- K. Apply a light broom finish perpendicular to traffic.
- L. Place curing compound on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.

3.04 FIELD QUALITY CONTROL

- A. Field inspection and testing shall be performed under provisions of Section 014500.
- B. Take six concrete test cylinders for every 50 cu. yds. or fraction thereof of each class of concrete placed each day.
- C. Cure test cylinders on site under same conditions as concrete sidewalk.
- D. Take one slump test for each set of test cylinders taken.
- E. Concrete not meeting slump requirements will be rejected.
- F. Concrete represented by cylinders which do not meet required strength will be removed and replaced at no additional cost to the Owner.

3.05 PROTECTION

- A. Protect finished work under provisions of Section 015000.
- B. Immediately after placement, protect sidewalk from premature drying, excessive temperatures and mechanical injury.
- C. Protect sidewalk from damage until project is accepted by the Owner.

END OF SECTION 321313.33

PORTLAND CEMENT CONCRETE CURB

H2M

Irvington Union Free School District
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Main Street School
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PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Reinforced concrete curb.
- B. Formwork.

1.02 RELATED SECTIONS

- A. Section 312213 - Rough Grading.

1.03 REFERENCES

- A. ACI 301 - Structural Concrete for Buildings.
- B. ANSI/ASTM D1751 - Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction.
- C. ASTM A615 - Deformed and Plain Billet Steel for Concrete Reinforcement.
- D. ASTM C33 - Concrete Aggregates.
- E. ASTM C94 - Ready Mix Concrete.
- F. ASTM C150 - Portland Cement
- G. ASTM C260 - Air-Entraining Admixtures for Concrete.
- H. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.
- I. ASTM C494 - Chemical Admixtures for Concrete.

1.04 SUBMITTALS

- A. Submit under provisions of Section 013300.
- B. Product Data: Provide data on joint filler, admixtures and curing compounds.
- C. Supplier: Submit name of concrete supplier prior to the placement of any concrete on the project.
- D. Design Data: Provide a design mix for concrete to be used on the project.
- E. Certificates: Submit receipts of all concrete deliveries, indicating source, date, contractor, amount of concrete, concrete strength, truck number and time truck load was batched.
- F. Testing Firm: Submit name of testing firm to be performing tests on concrete.

1.05 PROJECT RECORD DOCUMENTS

- A. Accurately record locations of each day's concrete pours.

PORTLAND CEMENT CONCRETE CURB

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1.06 QUALITY ASSURANCE

- A. Perform work in accordance with ACI 301.
- B. Obtain concrete only from approved suppliers and maintain the same source throughout the project.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Deliver concrete in accordance with ASTM C94, Alternative No. 2.
- B. Place all concrete within 90 minutes of time load was batched.

1.08 ENVIRONMENTAL REQUIREMENTS

- A. Do not place concrete when base surface temperature is less than 40 degrees, or if surface is wet or frozen.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Cement: ASTM C150, Type 1 Portland, gray color.
- B. Aggregates: ASTM C33.
- C. Water: Potable and not detrimental to concrete.
- D. Reinforcement: ANSI A615 steel; 60 ksi yield grade; deformed billet steel bars; uncoated finish.
- E. Dowels: ASTM A615 steel; 60 ksi yield grade; plain steel, uncoated finish.

2.02 ACCESSORIES

- A. Steel Forms: Minimum 16 gauge thick, stiffened to support weight of concrete with a minimum deflection.
- B. Wood Forms: Douglas Fir species; solid, sound, undamaged sheets; minimum 2 inches (50 mm) thick.
- C. Joint Filler: ANSI/ASTM D1751; 1/2 inch thick.
- D. Air Entraining Admixture: ASTM C260.
- E. Chemical Admixture: ASTM C494, type as required.
- F. Curing Compound: ASTM C309, Type 1, Class A.
- G. Form Release Agent: Colorless material which will not stain concrete or absorb moisture.
- H. Joint Sealant: ASTM C920, Type S, Grade NS; NP-1 by Sonneborn or equal.

2.03 MIXES

- A. Concrete shall be mixed and prepared in accordance with the approved mix design and ASTM C94, Alternative No. 2.
- B. The mix shall be such that the concrete shall attain the following characteristics:
 - 1. Compressive Strength (28 days): 4,000 psi.
 - 2. Slump: 2½ to 3½ inches.
 - 3. Air Entrainment: 6% ±1%.
- C. Use chemical admixtures only when approved by the Engineer. Use of admixtures will not relax placement requirements.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions and substrate.
- B. Verify datum and all elevations are as indicated on the plans.
- C. Verify compacted granular subbase has been properly prepared and is ready to receive work of this section.
- D. Beginning of installation means installer accepts existing conditions.

3.02 PREPARATION

- A. Excavate to the required depth and compact surface.
- B. Place and secure forms to correct location, dimension and profile.
- C. Assemble formwork to permit easy stripping and dismantling without damaging concrete.
- D. Moisten base to a minimum depth of 1/2 inch to minimize absorption of water from fresh concrete.
- E. Coat forms with form release agent.

3.03 INSTALLATION

- A. Place joint filler vertical in position and at equal spaces not exceeding 20 feet. Secure to formwork during concrete placement.
- B. Place dowels through joint filler as indicated on the plans. One end of dowel is to be greased or set in a capped sleeve to allow longitudinal movement.
- C. Place reinforcement as indicated on the plans. Interrupt at expansion joints.
- D. Place concrete in accordance with ACI 301.

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- E. Ensure reinforcement, dowels, joint filler or forms are not disturbed during concrete placement.
- F. Place concrete continuously between construction joints. Do not break or interrupt successive pours such that cold joints occur.
- G. Vibrate concrete adjacent to forms.
- H. After concrete sets, but prior to curing, remove front forms without damaging concrete and apply a light broom finish to the top and face of the curb.
- I. Place curing compound on exposed surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.

3.04 FIELD QUALITY CONTROL

- A. Field inspection and testing shall be performed under provisions of Section 014500.
- B. Take six concrete test cylinders for every 50 cu. yds. or fraction thereof of concrete placed each day.
- C. Cure test cylinders on site under same conditions as curb.
- D. Take one slump test for each set of cylinders taken.
- E. Concrete not meeting slump requirements will be rejected.
- F. Concrete represented by cylinders which do not meet required strength will be removed and replaced at no additional cost to the Owner.

3.05 PROTECTION

- A. Protect finished work under provisions of Section 015000.
- B. Immediately after placement, protect curb from premature drying, excessive temperatures, rain and mechanical injury.
- C. Protect curb from damage until project is accepted by the Owner.

END OF SECTION 321613

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Painted pavement delineation.
- B. Painted pavement symbols.

1.02 RELATED SECTIONS

- A. Section 321216 - Asphaltic Concrete Paving.

1.03 REFERENCES

- A. New York State Department of Transportation Standard Specifications.

1.04 SUBMITTALS

- A. Submit under provisions of Section 013300.
- B. Product Data: Provide data on paint.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle products to the site under provisions of Section 016500.
- B. Deliver all materials to the site in their original containers.
- C. Store all materials in a cool, dry place.
- D. Do not expose paint to open flames or temperatures which may ignite the paint.
- E. Store all materials such that the paint is not contaminated.

1.06 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply paint when the ambient temperature is below 40 degrees F.
- B. Do not apply paint to wet or frozen surfaces or when precipitation is occurring.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Paint: Flexible, non-skinning paint; homogeneous, conforming to the requirements of Section 640 of the New York State Department of Transportation Standard Specifications; color as indicated on the plans.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that pavement is ready to receive work of this section.

PAVEMENT MARKSINGS TRAFFIC PAINT

H2M

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- B. Beginning of application means applicator accepts existing conditions.

3.02 PREPARATION

- A. Remove all dirt, grease, oil or other foreign matter from pavement which might affect the bond between the pavement and the paint.
- B. Remove all temporary pavement markings without causing damage to the pavement.

3.03 APPLICATION

- A. Apply paint with spray type striping machines to achieve a dry film thickness of 14 mils to 16 mils at the locations and to the dimensions as indicated on the plans.
- B. Symbols may be rolled or brushed onto the pavement as long as a dry film thickness of 14 mils to 16 mils is achieved.
- C. All stripes and symbols shall have clean, sharp edges.

3.04 TOLERANCES

- A. Maximum offset from true position: 1 inch.

3.05 CLEANING

- A. Clean adjacent areas which received paint during work of this section.

3.06 PROTECTION

- A. Protect finished work under provisions of Section 015000.
- B. Protect painted markings from damage or discoloration until project is accepted by the Owner.

END OF SECTION 321723.13

DECORATIVE METAL FENCES AND GATES

H2M

Irvington Union Free School District
Main Street School Renovations
Main Street School
SED No.: 66-04-02-02-0-001-016

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Decorative aluminum fences.
 - 2. Swing gates.

1.02 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For gates. Include plans, elevations, sections, details, and attachments to other work.
- C. Manufacturer's Instructions: Indicate special procedures and conditions required for proper preparation and installation.

1.03 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For decorative metallic-coated-steel tubular picket fences, including finish, indicating compliance with referenced standard and other specified requirements.

1.04 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For gate operators to include in maintenance manuals.
- B. Manufacturer's Warranties.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products.

PART 2 - PRODUCTS

2.01 DECORATIVE ALUMINUM FENCES

- A. Decorative Aluminum Fences: Fences made from aluminum extrusions.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide or comparable product by one of the following:
 - a. Ameristar Fence Products. "Echelon II"
 - b. Ultra Aluminum Mfg., Inc. "UAS 100"
 - c. Or approved equal.
- B. Posts: Square extruded tubes.
 - 1. Line Posts: 2-1/2 by 2-1/2 inches (64 by 64 mm) with 0.080-inch (2.03-mm) wall thickness.
 - 2. End and Corner Posts: 3 by 3 inches (76 by 76 mm) with 0.125-inch (3.18-mm) wall thickness.
 - 3. Swing Gate Posts: 4 by 4 inches (102 by 102 mm) with 0.125-inch (3.18-mm) 0.250-inch (6.35-mm) wall thickness.

- C. Post Caps: Aluminum castings that cover entire top of posts project at least 1/4 inch (6 mm) beyond posts.
- D. Rails: Extruded-aluminum channels, "ForeRunner", 1.75" by 1.75 inch with 0.79 inch sidewall thickness and 0.070 inch thick internal cross web with pre-punched picket hole spacing. Picket retaining rods shall be 0.125 inch diameter galvanized steel. High quality PVC grommets shall be provided to seal all picket to rail intersections. .
- E. Pickets: Extruded-aluminum tubes, 1 inch (25 mm) square, with 0.062-inch (1.57-mm) wall thickness.
 - 1. Extend pickets beyond top rail as indicated and press flat and trim to produce spear point shape.
 - 2. Picket Spacing: 4 inches (101.6 mm) clear, maximum.
- F. Fasteners: Manufacturer's standard concealed fastening system.
- G. Fasteners: Manufacturer's standard tamperproof, corrosion-resistant, color-coated fasteners matching fence components with resilient polymer washers.
- H. Fabrication: Assemble fences into sections by welding pickets to rails.
 - 1. Fabricate sections with clips welded to rails for field fastening to posts.
 - 2. Drill clips for fasteners before finishing.
- I. Finish exposed welds to comply with NOMMA Guideline 1, Finish #2 - completely sanded joint, some undercutting and pinholes okay.
- J. Finish: TGIC powder coating meeting AAMA 2603 standards.

2.02 SWING GATES

- A. Gate Configuration: Single leaf.
- B. Gate Frame Height: 72 inches (1830 mm).
- C. Gate Opening Width: 3'-6" clear.
- D. Aluminum Frames and Bracing: Fabricate members from square extruded-aluminum tubes 2-1/2 by 2-1/2 inches (64 by 64 mm) with 0.125-inch (3.18-mm) wall thickness.
- E. Frame Corner Construction: Welded.
- F. Additional Rails: Provide as indicated, complying with requirements for fence rails.
- G. Infill: Comply with requirements for adjacent fence.
- H. Picket Size, Configuration, and Spacing: Comply with requirements for adjacent fence.
- I. Hardware: Secure latches permitting operation from both sides of gate, hinges, and keepers.
Note: This is a secure facility. Contractor shall review final hardware requirements with the Facility Manager prior to submitting shop drawings for approval and fabrication.
- J. Hinges: BHMA A156.1, Grade 1, suitable for exterior use.

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1. Function: 39 - Full surface, triple weight, antifriction bearing.
 2. Material: Wrought steel, forged steel, cast steel or malleable iron; galvanized.
- K. Finish exposed welds to comply with NOMMA Guideline 1, Finish #2 - completely sanded joint, some undercutting and pinholes okay.
- L. Aluminum Finish: TGIC powder coating meeting AAMA 2603 standards.

2.03 ALUMINUM

- A. Aluminum, General: Provide alloys and tempers with not less than the strength and durability properties of alloy and temper designated in paragraphs below for each aluminum form required.
- B. Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063-T5. Posts and Rails: Alloy 6005-T52.
- C. Tubing: ASTM B 429/B 429M, Alloy 6063-T52. (Pickets)
- D. Plate and Sheet: ASTM B 209 (ASTM B 209M), Alloy 6061-T6.
- E. Die and Hand Forgings: ASTM B 247 (ASTM B 247M), Alloy 6061-T6.
- F. Castings: ASTM B 26/B 26M, Alloy A356.0-T6.

2.04 ALUMINUM FINISHES

- A. Baked-Enamel or Powder-Coat Finish: TGIC "no-mar", AAMA 2603 except with a minimum dry film thickness of 2 mils (0.05 mm). Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
1. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, construction layout, and other conditions affecting performance of the Work.
- B. Do not begin installation before final grading is completed unless otherwise permitted by Architect.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet (152.5 m) or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.
1. Construction layout and field engineering are specified in Section 017300 "Execution."

3.03 FABRICATION

- A. Completed panels shall be capable of supporting a 200 lb. load (applied at midspan) without permanent deformation. Panels without rings shall be bias able to a 12.5% change in grade.
- B. Swing gates shall be fabricated using 1-1/4" x 1-7/16" Forerunner rail, 1.75" sq. x .125" gate ends, and 3/4" sq. x .080 pickets. Gates that exceed 6' in width will have a 1.75" sq. x .125" intermediate upright. All rail and upright intersections shall be joined by welding. All picket and rail intersections shall also be joined by welding.
- C. Finish: All fence components shall be subject to a six-stage pretreatment/wash followed by an electrostatic spray application of a "no-mar" TGIC polyester powder coat finish with a minimum thickness of 2-4 mils

3.04 DECORATIVE FENCE INSTALLATION

- A. Install fences according to manufacturer's written instructions.
- B. Install fences by setting posts as indicated and fastening rails and infill panels to posts.
- C. Post Excavation: Drill or hand-excavate holes for posts in firm, undisturbed soil. Excavate holes to a diameter of not less than 4 times post size and a depth of not less than 36 inches (915 mm) plus 3 inches (75 mm) for each foot (300 mm) or fraction of a foot (300 mm) that fence height exceeds 4 feet (1.2 m).
- D. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.
 - 1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
 - 2. Concrete Fill: Place concrete around posts and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.
 - a. Concealed Concrete: Top 6 inches (152 mm) below grade as indicated on Drawings to allow covering with surface material. Slope top surface of concrete to drain water away from post.
 - 3. Posts Set in Concrete: Extend post to within 6 inches (150 mm) of specified excavation depth, but not closer than 3 inches (75 mm) to bottom of concrete.
 - 4. Space posts uniformly at 6 feet (1.83 m) o.c.

3.05 GATE INSTALLATION

- A. Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.

3.06 ADJUSTING

- A. Gates: Adjust gates to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.

DECORATIVE METAL FENCES AND GATES
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B. Lubricate hardware and other moving parts.

END OF SECTION

TOPSOIL PLACEMENT AND GRADING

H2M

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PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Finish grade subsoil.
- B. Place, level and compact topsoil.

1.02 RELATED SECTIONS

- A. A. Section 329219 – Seeding.

1.03 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle products to the site under provisions of Section 016500.
- B. Deliver topsoil to the site in uncontaminated containers.
- C. Do not stockpile topsoil over a height of 8 feet.
- D. Cover stockpiled topsoil to protect from precipitation, erosion and contamination.

1.04 ENVIRONMENTAL REQUIREMENTS

- A. Do not place wet or frozen topsoil.
- B. Do not place topsoil on wet or frozen ground or when precipitation is occurring.

1.05 COORDINATION

- A. Coordinate work under provisions of Section 013100.
- B. Coordinate with all adjacent work and work within areas to receive topsoil.
- C. Coordinate the storage of topsoil under provisions of Section 311110 with the placement of topsoil in this section.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Topsoil: Fertile, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, taken from drained site; friable loam; free of subsoil, clay or impurities, plants, weeds, roots, grass, stone and foreign matter; acidity range (pH) of 5.8 to 6.5; containing a minimum of 2.75 percent and a maximum of 25 percent organic matter. Topsoil may be reused from on-site if it meets these requirements.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify existing substrate and conditions.

TOPSOIL PLACEMENT AND GRADING

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- B. Verify site conditions and note irregularities affecting work of this section.
- C. Beginning work of this section means acceptance of existing conditions.

3.02 PREPARATION

- A. Prepare subsoil in accordance with Section 312213.
- B. Eliminate uneven areas and low spots. Remove and dispose of debris, roots, branches and stones in excess of 1/2 inch in size. Remove and dispose of subsoil contaminated with petroleum products.
- C. Scarify subsoil to depth of 3 inches where topsoil is scheduled to be placed. Scarify in areas where equipment used for hauling and spreading topsoil has compacted subsoil.

3.03 INSTALLATION

- A. Place topsoil in areas where seeding, sodding or planting is scheduled or where shown on the plans.
- B. Place topsoil to the depths as indicated on the plans.
- C. Use topsoil in relatively dry state. Place during dry weather.
- D. Fine grade topsoil eliminating rough or low areas. Maintain levels, profiles and contours of subgrade.
- E. Remove and dispose stone, roots, grass, weeds, debris and foreign material while spreading.
- F. Manually spread topsoil around trees, plants and building to prevent damage.
- G. Lightly roll placed topsoil.
- H. Remove surplus subsoil and topsoil from site. Do not remove surplus topsoil from the site prior to obtaining approval of the Engineer.
- I. Leave stockpile area and site clean and raked, ready to receive landscaping.

3.04 TOLERANCES

- A. Maximum Variation from Proposed Elevation: 1/2 inch.

3.05 PROTECTION

- A. Protect finished work under provisions of Section 016500.
- B. Protect landscaping and other features remaining as final work.

TOPSOIL PLACEMENT AND GRADING

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- C. Protect existing structures, fences, roads, sidewalks, paving and curbs. Any damage caused by the Contractor to any of these items shall be repaired promptly by the Contractor at no additional cost to the Owner.

END OF SECTION 329119.13

SEEDING

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PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Seeding.
- B. Mulch, fertilizer and other accessories.
- C. Maintenance.

1.02 RELATED SECTIONS

- A. Section 329119.13 – Topsoil Placement and Grading.

1.03 REFERENCES

- A. FS O-F-241 - Fertilizers, Mixed, Commercial.

1.04 DEFINITIONS

- A. Weeds: Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel and Brome Grass.

1.05 SUBMITTALS

- A. Product Data: Provide data on seed mixtures, fertilizer and lime.
- B. Certificates: Provide certificates indicating that all fertilizer, pesticides and herbicides comply with all applicable regulatory agency requirements.

1.06 OPERATION AND MAINTENANCE DATA

- A. Maintenance Data: Include maintenance instructions, cutting method and maximum grass height; types, application frequency, and recommended coverage of fertilizer.

1.07 QUALITY ASSURANCE

- A. Seed: Provide seed mixture in containers showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging.

1.08 REGULATORY REQUIREMENTS

- A. Comply with applicable regulatory agencies for fertilizer, pesticide and herbicide composition.
- B. All fertilizer, pesticides and herbicides to be used shall comply with all applicable regulatory agency requirements.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site under provisions of Section 016500.

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- B. Deliver grass seed mixture in original sealed containers. Seed in damaged packaging is not acceptable.
- C. Deliver fertilizer in waterproof bags showing weight, chemical analysis and name of manufacturer.

1.10 ENVIRONMENTAL REQUIREMENTS

- A. Do not sow immediately following rain, during windy periods or if ground is frozen.
- B. Do not sow when the ambient temperature is expected to drop below 40 degrees F or rise above 90 degrees F during the time in which the seed will establish itself.
- C. Planting Season: April 1st through May 15th or September 1st through October 15th.

1.11 COORDINATION

- A. Coordinate with grading and placement of topsoil.
- B. Coordinate with installation of underground sprinkler system piping and watering heads.

1.12 WARRANTY

- A. Include coverage for one continuous growing season; reseed areas of dead or unhealthy grass at no additional cost to the Owner.

1.13 MAINTENANCE SERVICE

- A. Maintain seeded areas immediately after placement until grass is well established and exhibits a vigorous growing condition, as determined by at least two cuttings, or until the job is accepted by the Owner, whichever occurs last.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Seed: Dry, fresh, re-cleaned seed of the latest crops and of the following proportions:

1.	Minimum	Minimum %		
2.	Grass Type	Mixture	% Purity	Germination
3.	Kentucky Bluegrass	45	90	80
4.	Creeping Red Fescue	45	97	80
5.	Perennial Rye Grass	10	95	95

2.02 ACCESSORIES

- A. Mulching Material: Hemlock species wood cellulose fiber, dust form, free of growth or germination inhibiting ingredients.
- B. Fertilizer: FS O-F-241, Type I, Grade A; recommended for grass, with fifty percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies

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of topsoil, to the following proportions: Nitrogen 10 percent, phosphoric acid 6 percent, soluble potash 4 percent.

- C. Limestone: Ground dolomitic limestone containing a minimum of 90 percent calcium and magnesium carbonates. One hundred percent (100%) shall pass a No. 10 mesh screen and a minimum of 50 percent shall pass a No. 100 mesh screen.
- D. Peat Moss: Shredded, loose, sphagnum moss; free of lumps, roots, inorganic material or acidic materials; minimum of 90 percent organic material measured by oven dry weight; pH range of 4 to 5 percent; moisture content of 30 percent; with moisture absorptive capacity of 450 to 500 percent.
- E. Water: Clean, fresh and free of substances or matter which could inhibit vigorous growth of grass.
- F. Stakes: Softwood lumber, chisel pointed.
- G. String: Inorganic fiber.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify existing substrate and site conditions.
- B. Verify that prepared soil base is ready to receive the work of this section.
- C. Beginning of installation means installer accepts existing conditions.

3.02 PREPARATION

- A. Rake topsoil smooth.

3.03 APPLICATION

- A. Apply fertilizer at a rate of 21 lbs per 1,000 square feet.
- B. Do not apply fertilizer at same time or with same machine as will be used to apply seed.
- C. Mix thoroughly into upper 2 inches of topsoil and water lightly to aid the dissipation of fertilizer.
- D. Apply seed at a rate of 4 lbs per 1000 sq ft evenly in two intersecting directions. Rake in lightly.
- E. Do not seed areas in excess of that which can be mulched on same day.
- F. Roll seeded area with roller not exceeding 100 lbs per foot of width.
- G. Immediately following seeding and compacting, apply mulch at a rate of 92 lbs per 1,000 square feet. Maintain clear of shrubs and trees.
- H. Apply water with a fine spray immediately after each area has been mulched. Saturate to 4 inches of soil. Discontinue watering if washing begins to occur.

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- I. Identify seeded areas with stakes and string around area periphery. Set string height to 24 inches. Space stakes at 8 feet on center.
- J. Cover seeded slopes where grade is 30 percent or greater with erosion fabric. Roll fabric onto slopes without stretching or pulling.
- K. Lay fabric smoothly on surface, bury top end of each section in 6 inch deep excavated topsoil trench. Provide 12 inch overlap of adjacent rolls. Backfill trench and rake smooth, level with adjacent soil.
- L. Secure outside edges and overlaps at 36 inch intervals with stakes.
- M. Lightly dress slopes with topsoil to ensure close contact between fabric and soil.
- N. At sides of ditches, lay fabric laps in direction of water flow. Lap ends and edges minimum 12 inches.

3.04 MAINTENANCE

- A. Maintain grass until job is accepted by the Owner or until the grass exhibits a vigorous growing condition, as determined by at least 2 cuttings, whichever occurs last.
- B. Mow grass at regular intervals to maintain at a maximum height of 2-1/2 inches. Do not cut more than 1/3 of grass blade at any one mowing.
- C. Neatly trim edges and hand clip where necessary.
- D. Immediately remove clippings after mowing and trimming.
- E. Water to prevent grass and soil from drying out.
- F. Immediately reseed areas which show bare spots.

3.05 PROTECTION

- A. Protect seeded areas with warning signs during maintenance period.

END OF SECTION 329219

APPENDIX

FINAL REPORT OF ENVIRONMENTAL SERVICES AT MAIN STREET SCHOOL

FINAL REPORT OF ENVIRONMENTAL SERVICES

Performed at:

**MAIN STREET SCHOOL
RENOVATIONS
101 MAIN STREET
IRVINGTON, NY 10533**

Prepared for:



IRVINGTON
UNION FREE SCHOOL DISTRICT

**Irvington Union Free School District
6 Dows Lane
Irvington, NY 10533**

Prepared by:



**WSP USA Solutions, Inc.
500 Summit Lake Drive, Suite 450
Valhalla, NY 10595
Tel. (914) 747-1120**

**Project No. 31402880.011
Final Submission Date: March 08, 2021**



March 08, 2021

Mr. Gary Knowles
Director of Facilities
Irvington Union Free School District
6 Dows Lane
Irvington, NY 10533

**Subject: Final Report of Environmental Services
Main Street School
Renovations
101 Main Street
Irvington, NY 10533**

Dear Mr. Knowles:

WSP USA Solutions, Inc. has completed a material inspection at the Main Street School located at 101 Main Street, Irvington, NY 10533. The inspection included visual observation, material sampling, and laboratory sample analysis of suspect Asbestos-Containing Materials (ACM), Lead Based Paints (LBP) and Polychlorinated Biphenyls (PCBs) as part of the Renovations project at the Main Street School.

The attached report presents descriptions and results of the material sampling procedures and visual analysis. Relevant general project information is provided, followed by our findings, assessments and recommendations. Laboratory analysis data and certifications are provided in the Appendices.

If you have any questions concerning this report or if we may be of further assistance to you, please contact us.

Sincerely,

WSP USA SOLUTIONS, INC.

A handwritten signature in blue ink, appearing to read 'CN', is positioned above the name of the signatory.

Craig Napolitano, CHMM
Vice President, Hazmat & IH Services



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Appendix A: Asbestos Sample Analysis Results in Tabular Form

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Appendix C: Asbestos Bulk Sample Location Drawings

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Appendix F: PCB Bulk Sample Field Data Sheets with Chain of Custody & Laboratory Results

Appendix G: Company License, Personnel Certifications and Laboratory Accreditations

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1.0 EXECUTIVE SUMMARY

WSP USA Solutions, Inc. has performed a material inspection for the presence or absence of Asbestos-Containing Materials (ACM), Lead Based Paints (LBP) and Polychlorinated Biphenyls (PCBs) at the Main Street School located at 101 Main Street, Irvington, NY 10533. The intent of this inspection was to screen for ACM, LBP and PCBs that may be impacted during the Renovations project at the Main Street School.

Josue Garcia, Dmitri Kirnossenko, Stephen Gruber, Jordan Wong and Alexander Smolyar of WSP performed this inspection on February 17, 2021 and March 03, 2021. Mr. Garcia is licensed as a New York State Department of Labor (NYSDOL) Asbestos Inspector (Cert# 01-04292). Mr. Kirnossenko is a licensed New York State EPA as a Lead Risk Assessor (Cert# LBP-R-16279-1). Mr. Casale is licensed as a New York State Department of Labor (NYSDOL) Asbestos Inspector (Cert# 17-25789). Mr. Gruber is licensed as a New York State Department of Labor (NYSDOL) Asbestos Inspector (Cert# 17-42557). Mr. Wong is licensed as a New York State Department of Labor (NYSDOL) Asbestos Inspector (Cert# 09-09397). Mr. Smolyar is licensed as a New York State Department of Labor (NYSDOL) Asbestos Inspector (Cert# 12-07624).

The results of the visual inspection and bulk sample analysis determined that the following suspect ACM, LBP and PCB materials may be impacted by the Renovations project at the Main Street School:

A. ASBESTOS-CONTAINING MATERIAL

Analytical results of the bulk samples collected on 02/17/2021 and 03/03/2021 by WSP indicate that the following materials **contain asbestos** (greater than 1-percent).

- **9"x9" Floor Tile (Brown)**
- **Louver Tar (Black)**

Analytical results of the bulk samples collected on 02/17/2021 and 03/03/2021 by WSP indicate that the following materials **did not contain asbestos** (less than 1-percent);

- Gypsum Board (Gray)
- Joint Compound (White)
- Cinderblock Wall Mortar (Gray)
- Chimney Brick Mortar (Gray)
- Fiberglass Boiler Breeching Canvas (Beige)
- Fiberglass Pipe Edge Cementitious Sealant (Gray)
- Wall Penetration Sealant (Red)
- Roofing Shingles (Brown/Black)-Top Layer
- Roofing Shingles (Gray/Black)-Bottom Layer
- Felt Paper below Shingles (Black)
- Interior Brick Mortar (Gray)
- Wall Plaster (White Coat)



- Wall Plaster (Brown Coat)
- Ceiling Plaster (White Coat)
- Ceiling Plaster (Brown Coat)
- Ceiling Scratch Coat (Beige)-Above 2'x4' Ceiling Tiles
- Cementitious Ceiling Material (Gray)
- Wall Scratch Coat (White)
- Ceramic Wall Tile Grout (White)
- Ceramic Wall Tile Backing (Beige)
- Ceramic Floor Tile Mortar (Dark Gray)
- Fixture Caulking (White)
- 2'x4' (2'x2' Design) Ceiling Tile (White)
- 2'x4' Fissured Ceiling Tile (White)
- Stone Lab Countertop (Black)
- Mastic Associated with 12"x12" Brown & Beige Floor Tiles (Brown)
- 12"x12" Floor Tile (Brown)
- 12"x12" Floor Tile (Beige)
- Mastic Associated with 12"x12" White Floor Tiles (Brown/Yellow)
- 12"x12" Floor Tile (White)
- Felt Paper/Mastic Associated with 9"x9" Brown Floor Tile (Black)-Under Ceramic Floor Tile
- Mastic Associated with 6" Beige Cove Base Molding (Beige)
- 6" Cove Base Molding (Beige)
- Mastic Associated with 4" Black Cove Base Molding (Beige)
- 4" Cove Base Molding (Black)
- Screed (Gray)
- Felt Paper (Black)
- Bottom Layer (Black)
- Perlite Insulation (Brown)
- Top Membrane (Black)

B. LEAD-BASED PAINT

Based upon XRF readings, lead has been confirmed to exist in the following tested combinations:

- **White Paint on Metal Column (GYM)**
- **Gray Paint on Wood Window sash (Mechanical Room by Cafeteria)**
- **Gray Paint on Wood Window frame (Mechanical Room by Cafeteria)**
- **White Paint on Metal Drain Pipe (Basement Bathroom)**
- **White Paint on Plaster Wall (1st Floor Bathroom)**
- **Pink Paint on Plaster Wall (1st Floor Bathroom)**
- **Beige Paint on Plaster Ceiling (1st Floor Bathroom)**
- **White Paint on Plaster Wall (2nd Floor Bathroom)**
- **Yellow Paint on Plaster Wall (2nd Floor Bathroom)**



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- **Beige Paint on Plaster Ceiling (2nd Floor Bathroom)**
- **White Paint on Plaster Wall (Room 406)**
- **White Paint on Wood Louver Frame (Bell Tower)**

Lead was **not detected** in the following tested combinations via XRF readings:

- Black Paint on Wood Panel Board (GYM Boiler Room)
- White Paint on Gypsum Soffit (GYM Boiler Room)
- Blue Paint on Metal Heat Unit (GYM Boiler Room)
- Gray Paint on Metal Door (GYM Boiler Room)
- Gray Paint on Metal Door frame (GYM Boiler Room)
- Green Paint on Metal Door (GYM)
- Green Paint on Metal Door frame (GYM)
- White Paint on Cinder Block Wall (GYM)
- Green Paint on Wood Plank (GYM)
- White Paint on Cinder Block Wall (GYM)
- White Paint on Metal Door frame (GYM)
- Gray Paint on Wood Wall (GYM)
- White Paint on Plaster Soffit (GYM)
- White Paint on Metal Drain Pipe (GYM)
- Green Paint on Metal Support Column (Exterior Walkway)
- Gray Paint on Concrete Retaining wall (Exterior Walkway)
- Green Paint on Metal Hand rail (Exterior Walkway)
- Gray Paint on Wood Door (Mechanical Room by Cafeteria)
- Gray Paint on Wood Door frame (Mechanical Room by Cafeteria)
- White Paint on Brick Wall (Mechanical Room by Cafeteria)
- Gray Paint on Brick Wall (Mechanical Room by Cafeteria)
- Gray Paint on Concrete Floor (Mechanical Room by Cafeteria)
- Gray Paint on Plaster Soffit (Mechanical Room by Cafeteria)
- Gray Paint on Concrete Ceiling (Mechanical Room by Cafeteria)
- Gray Paint on Brick Column (Mechanical Room by Cafeteria)
- L.Gray Paint on Plaster Wall (Mechanical Room by Cafeteria)
- Gray Paint on Wood Window frame (Mechanical Room by Cafeteria)
- L.Gray Paint on Plaster Ceiling (Mechanical Room by Cafeteria)
- Tan Paint on Wood Door (Basement Bathroom)
- Tan Paint on Wood Door frame (Basement Bathroom)
- Pink Paint on Gypsum Wall (Basement Bathroom)
- Pink Paint on Plaster Wall (Basement Bathroom)
- Tan Paint on Wood Window frame (Basement Bathroom)
- Tan Paint on Wood Window sill (Basement Bathroom)
- White Paint on Metal Window frame (Basement Bathroom)
- Tan Paint on Metal Radiator cover (Basement Bathroom)
- White Paint on Wood Ceiling (Basement Bathroom)
- Tan Paint on Plaster Wall (Basement Bathroom)



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- Tan Paint on Plaster Ceiling (Basement Bathroom)
- Beige Paint on Wood Door (1st Floor Bathroom)
- Beige Paint on Wood Door frame (1st Floor Bathroom)
- Beige Paint on Metal Radiator (1st Floor Bathroom)
- Beige Paint on Metal Radiator Pipe (1st Floor Bathroom)
- Beige Paint on Wood Partition-wall (1st Floor Bathroom)
- Beige Paint on Wood Chair rail (1st Floor Bathroom)
- Beige Paint on Metal Duct (1st Floor Bathroom)
- Beige Paint on Metal Drain Pipe (1st Floor Bathroom)
- Beige Paint on Wood Window frame (1st Floor Bathroom)
- Beige Paint on Wood Window sill (1st Floor Bathroom)
- White Paint on Metal Window frame (1st Floor Bathroom)
- White Paint on Metal Vent grille (1st Floor Bathroom)
- Beige Paint on Wood Door (2nd Floor Bathroom)
- Beige Paint on Wood Door frame (2nd Floor Bathroom)
- Beige Paint on Metal Radiator (2nd Floor Bathroom)
- White Paint on Metal Radiator Pipe (2nd Floor Bathroom)
- Yellow Paint on Metal Access panel (2nd Floor Bathroom)
- Beige Paint on Wood Window frame (2nd Floor Bathroom)
- Beige Paint on Wood Window sill (2nd Floor Bathroom)
- White Paint on Metal Window frame (2nd Floor Bathroom)
- Beige Paint on Wood Door (Room 303)
- Beige Paint on Wood Door frame (Room 303)
- Beige Paint on Gypsum Wall (Room 303)
- Beige Paint on Metal Electrical conduit (Room 303)
- Beige Paint on Wood Vent grille (Room 303)
- Beige Paint on Wood Baseboard (Room 303)
- Beige Paint on Wood Board frame (Room 303)
- Beige Paint on Wood Radiator cover (Room 303)
- Beige Paint on Wood Window frame (Room 303)
- Beige Paint on Wood Window sill (Room 303)
- White Paint on Metal Window frame (Room 303)
- White Paint on Concrete Beam (Room 303)
- Beige Paint on Wood Door (Room 406)
- Beige Paint on Wood Door frame (Room 406)
- White Paint on Gypsum Wall (Room 406)
- White Paint on Gypsum Beam (Room 406)
- White Paint on Metal Radiator (Room 406)
- Beige Paint on Wood Baseboard (Room 406)
- Beige Paint on Wood Window frame (Room 406)
- White Paint on Metal Window frame (Room 406)
- White Paint on Metal Electrical conduit (Room 406)
- Beige Paint on Wood Board frame (Room 406)
- Beige Paint on Plaster Ceiling (Room 406)



- Beige Paint on Wood Door (Bathroom in Room 402)
- Beige Paint on Wood Door frame (Bathroom in Room 402)
- Yellow Paint on Gypsum Wall (Bathroom in Room 402)
- White Paint on Gypsum Ceiling (Bathroom in Room 402)
- White Paint on Metal Vent grille (Bathroom in Room 402)

C. PCB-CONTAINING MATERIAL

Analytical results of the bulk samples collected indicate that the following materials **contain PCB** (greater than 50 PPM):

- **None**

Analytical results of the bulk samples collected indicate that the following materials **did not contain PCB** (less than 50 PPM):

- Interior Window Frame Caulking (Beige)
- Interior Door Frame Caulking (Beige)

2.0 FIELD INSPECTION PROCEDURES AND SAMPLE ANALYSIS METHODS

A. ASBESTOS-CONTAINING MATERIAL

Guidelines used for the inspection were established by the Environmental Protection Agency (EPA) in the Guidance for Controlling Asbestos Containing Materials in Buildings, Office of Pesticides and Toxic Substances, Doc 560/5-85-024, and 40 CFR Part 763, Asbestos Hazard Emergency Response Act (AHERA).

Field information was organized in accordance with the AHERA methodology of homogenous area (HA). During the Inspection, reasonable effort was made to identify all locations and types of ACM materials associated with the scope of work. Sampling has included multiple samples of the same materials chosen at random. However, due to inconsistencies of a manufacturer's processes and the contractor's installation methods, materials of similar construction may contain various amounts of asbestos. Furthermore, some materials that were not originally specified to contain asbestos may in fact contain this mineral. For example, cementitious pipe insulation and plaster were frequently mixed with asbestos at the construction site for ease of application. Locating all asbestos materials can only be definitively achieved by conducting exploratory demolition and sampling every section of pipe insulation, fitting or valve covering, fireproofing, and other suspect ACM.

Bulk samples of suspect ACM are analyzed using polarized light microscopy (PLM) coupled with dispersion staining, as described in 40 CFR Part 763 and the National Emissions Standard for Hazardous Air Pollutants (NESHAPS). NESHAPS is the standard industry protocol for the determination of asbestos in building materials. A suspect material is immersed in a solution of known refractive index and subjected to illumination by polarized light. The color displays that result are compared to a standardized atlas whereby the specific variety of asbestos is determined. It should also be recognized that PLM is primarily a qualitative identification



method whereby asbestos percentage, if any, is estimated. While EPA, New York State, and New York City regulations governing ACM consider materials containing greater than 1-percent as asbestos, accurately quantifying asbestos content below 5-percent has been shown to be unreliable.

The New York State Department of Health has recently revised the PLM Stratified Point Counting Method. The March 25th, 2011 method, "Polarized Light Microscopy Methods for Identifying and Quantifying Asbestos in Bulk Samples" can be found as Item 198.1 in the Environmental Laboratory Approval program (ELAP) Certification manual. Whereas the procedure of analysis for bulk samples that fall into the category of "Non-friable Organically Bound" (NOB) can be found in the March 25th 2011 method "Polarized-Light Microscope Method for Identifying and Quantifying Asbestos in Non-Friable Organically Bound Bulk Samples", Item 198.6 in the ELAP Certification Manual. This category includes any sample in a flexible to rigid asphalt or vinyl matrix (floor tiles, mastic, roofing shingles, roofing felt, etc.). These samples must be "ashed" in a muffle furnace at 480-degrees Celsius (to remove organic matrix), treated with acid (to remove any mineral carbonate), and filtered through a 0.4-micron polycarbonate filter before being analyzed by PLM. The sample must be weighted between each of these steps to track the percent loss of organic matrix.

ELAP has determined that analysis of NOB materials is not reliably performed by PLM. Therefore, if PLM analysis yields results of 1-percent asbestos or less, the result must be confirmed by TEM. For bulk samples that undergo TEM analysis, the March 25th, 2011 method "Transmission Electron Microscope Method for Identifying and Quantitating Asbestos in Non-Friable organically Bound Bulk Samples" must be used and can be found as Item 198.4 in the ELAP Certification Manual. ELAP certified laboratories must include the following statement with their PLM analysis results for each "negative" (1-percent or less asbestos) NOB sample: "Polarized-light microscopy is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-ACM, confirmation must be made by quantitative transmission electron microscopy".

All samples are initially analyzed by Polarized Light Microscopy in accordance with Item 198.1 and 198.6 of the ELAP Certification Manual. Samples which yield a negative PLM result and which are classified as a "non-friable" material, are then re-analyzed utilizing TEM methodology in accordance with Item 198.4 of the ELAP Certification Manual. The laboratory performing both these analysis procedures is EMSL located at 307 West 38th Street | New York, NY 10018. The laboratory has received accreditation from the following agencies:

- National Voluntary Laboratory Accreditation Program (Lab Code 101048-10)
- New York State Environmental Laboratory Approval Program (Lab No. 11469)
- American Industrial Hygiene Association Accredited Laboratory (Lab No. 102344)

B. LEAD-BASED PAINT

Painted surfaces within the space equivalents in the scope of work were identified and grouped together by component type, substrate and visible color. In similar fashion, the inspection



continued in each space equivalent with the identification of unique combinations of component, substrate and visible color. A random representative area of each unique combination was sampled and tested. For each of these designated components, an area on the component was chosen which represents the paint on that building component. During the inspection, components that are accessible surfaces, friction surfaces, impact surfaces, or have deteriorated paint was identified.

The readings of paint surfaces were taken using an RMD LPA-1 XRF Lead Paint Spectrum Analyzer. The LPA-1 method of measurement is based on the spectrometric analysis of lead K-shell X-ray fluorescence within a controlled depth of interrogation. The LPA-1 Analyzer uses a Co-57 radioactive source and an advanced, solid-state, room temperature, radiation detector to generate and detect the x-ray fluorescence spectrum of a painted surface. The spectrum is then analyzed by a microprocessor to eliminate the effects of substrate and other factors such as scattering to allow an accurate determination of the amount of lead on a surface. The LPA-1 automatically analyzes spectrometric data in real time and differentiates the lead signal from the spectrum. The x-ray fluorescence properties are determined through calibration process and are used for automatic substrate correction and calculation of the lead content of a painted surface.

The readings of paint surfaces were taken using Heuresis Pb200i XRF Lead Paint Spectrum Analyzer. The Heuresis method of measurement is based on the spectrometric analysis of lead K-shell X-ray fluorescence within a controlled depth of interrogation. The Heuresis Analyzer uses a Co-57 radioactive source and an advanced, solid-state, room temperature, radiation detector to generate and detect the x-ray fluorescence spectrum of a painted surface. The spectrum is then analyzed by a microprocessor to eliminate the effects of substrate and other factors such as scattering to allow an accurate determination of the amount of lead on a surface. The Heuresis automatically analyzes spectrometric data in real time and differentiates the lead signal from the spectrum. The x-ray fluorescence properties are determined through calibration process and are used for automatic substrate correction and calculation of the lead content of a painted surface.

For quality control, the XRF instrument was calibrated using a U.S. Department of Commerce National Institute of Standards and Technology (NIST) Level III 1.0 mg/cm² lead based paint film. For each calibration, three (3) XRF readings were taken on the paint film. The average of these three (3) readings was then subtracted from the known lead content in the paint film. The difference was compared with an Environmental Protection Agency (EPA)-approved tolerance range. Such calibration procedures were conducted at the start and at the end of the workday.

C. POLYCHLORINATED BIPHENYLS (PCBs)

PCBs belong to a broad family of man-made organic chemicals known as chlorinated hydrocarbons. PCBs were domestically manufactured from 1929 until their manufacture was banned in 1979. They have a range of toxicity and vary in consistency from thin, light-colored liquids to yellow or black waxy solids. Due to their non-flammability, chemical stability, high boiling point, and electrical insulating properties, PCBs were used in hundreds of industrial and commercial applications including electrical, heat transfer, and hydraulic equipment; as plasticizers in paints, plastics, and rubber products; in pigments, dyes, and carbonless copy paper; and many other industrial applications.



Although no longer commercially produced in the United States, PCBs may be present in products and materials produced before the 1979 PCB ban. Products that may contain PCBs include: Transformers and capacitors, Oil used in motors and hydraulic systems, Fluorescent light ballasts, Adhesives and tapes, Caulking, Plastics, etc.

The PCBs used in these products were chemical mixtures made up of a variety of individual chlorinated biphenyl components, known as congeners. Most commercial PCB mixtures are known in the United States by their industrial trade names. The most common trade name is aroclor.

Polychlorinated biphenyls (PCBs) are regulated pursuant to the United States Environmental Protection Agency Code of Federal Regulations (40 CFR Part 761) and the Toxic Substances Control Act (TSCA – 15 U.S.C. 2605). These regulations require certain testing and reporting requirements to determine management, recycling and disposal options for PCBs.

3.0 INSPECTION SCOPE AND MATERIAL ASSESSMENT

The areas inspected for ACM materials that may be impacted by the proposed Renovations project at the Main Street School. Locations surveyed include:

- Gym Building First Floor and Roof
- Walkway
- Main Building (Basement, First Floor, Second Floor, Third Floor & Bell Tower)

A. ASBESTOS-CONTAINING MATERIAL

Analytical results of the bulk samples collected on 02/17/2021 and 03/03/2021 by WSP indicate that the following materials **contain asbestos** (greater than 1-percent).

- **9"x9" Floor Tile (Brown)**
- **Louver Tar (Black)**

Analytical results of the bulk samples collected on 02/17/2021 and 03/03/2021 by WSP indicate that the following materials **did not contain asbestos** (less than 1-percent);

- Gypsum Board (Gray)
- Joint Compound (White)
- Cinderblock Wall Mortar (Gray)
- Chimney Brick Mortar (Gray)
- Fiberglass Boiler Breeching Canvas (Beige)
- Fiberglass Pipe Edge Cementitious Sealant (Gray)
- Wall Penetration Sealant (Red)
- Roofing Shingles (Brown/Black)-Top Layer
- Roofing Shingles (Gray/Black)-Bottom Layer
- Felt Paper below Shingles (Black)



- Interior Brick Mortar (Gray)
- Wall Plaster (White Coat)
- Wall Plaster (Brown Coat)
- Ceiling Plaster (White Coat)
- Ceiling Plaster (Brown Coat)
- Ceiling Scratch Coat (Beige)-Above 2'x4' Ceiling Tiles
- Cementitious Ceiling Material (Gray)
- Wall Scratch Coat (White)
- Ceramic Wall Tile Grout (White)
- Ceramic Wall Tile Backing (Beige)
- Ceramic Floor Tile Mortar (Dark Gray)
- Fixture Caulking (White)
- 2'x4' (2'x2' Design) Ceiling Tile (White)
- 2'x4' Fissured Ceiling Tile (White)
- Stone Lab Countertop (Black)
- Mastic Associated with 12"x12" Brown & Beige Floor Tiles (Brown)
- 12"x12" Floor Tile (Brown)
- 12"x12" Floor Tile (Beige)
- Mastic Associated with 12"x12" White Floor Tiles (Brown/Yellow)
- 12"x12" Floor Tile (White)
- Felt Paper/Mastic Associated with 9"x9" Brown Floor Tile (Black)-Under Ceramic Floor Tile
- Mastic Associated with 6" Beige Cove Base Molding (Beige)
- 6" Cove Base Molding (Beige)
- Mastic Associated with 4" Black Cove Base Molding (Beige)
- 4" Cove Base Molding (Black)
- Screed (Gray)
- Felt Paper (Black)
- Bottom Layer (Black)
- Perlite Insulation (Brown)
- Top Membrane (Black)

B. LEAD-BASED PAINT

Based upon XRF readings, lead has been confirmed to exist in the following tested combinations:

- **White Paint on Metal Column (GYM)**
- **Gray Paint on Wood Window sash (Mechanical Room by Cafeteria)**
- **Gray Paint on Wood Window frame (Mechanical Room by Cafeteria)**
- **White Paint on Metal Drain Pipe (Basement Bathroom)**
- **White Paint on Plaster Wall (1st Floor Bathroom)**
- **Pink Paint on Plaster Wall (1st Floor Bathroom)**
- **Beige Paint on Plaster Ceiling (1st Floor Bathroom)**



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- **White Paint on Plaster Wall (2nd Floor Bathroom)**
- **Yellow Paint on Plaster Wall (2nd Floor Bathroom)**
- **Beige Paint on Plaster Ceiling (2nd Floor Bathroom)**
- **White Paint on Plaster Wall (Room 406)**
- **White Paint on Wood Louver Frame (Bell Tower)**

Lead was **not detected** in the following tested combinations via XRF readings:

- Black Paint on Wood Panel Board (GYM Boiler Room)
- White Paint on Gypsum Soffit (GYM Boiler Room)
- Blue Paint on Metal Heat Unit (GYM Boiler Room)
- Gray Paint on Metal Door (GYM Boiler Room)
- Gray Paint on Metal Door frame (GYM Boiler Room)
- Green Paint on Metal Door (GYM)
- Green Paint on Metal Door frame (GYM)
- White Paint on Cinder Block Wall (GYM)
- Green Paint on Wood Plank (GYM)
- White Paint on Cinder Block Wall (GYM)
- White Paint on Metal Door frame (GYM)
- Gray Paint on Wood Wall (GYM)
- White Paint on Plaster Soffit (GYM)
- White Paint on Metal Drain Pipe (GYM)
- Green Paint on Metal Support Column (Exterior Walkway)
- Gray Paint on Concrete Retaining wall (Exterior Walkway)
- Green Paint on Metal Hand rail (Exterior Walkway)
- Gray Paint on Wood Door (Mechanical Room by Cafeteria)
- Gray Paint on Wood Door frame (Mechanical Room by Cafeteria)
- White Paint on Brick Wall (Mechanical Room by Cafeteria)
- Gray Paint on Brick Wall (Mechanical Room by Cafeteria)
- Gray Paint on Concrete Floor (Mechanical Room by Cafeteria)
- Gray Paint on Plaster Soffit (Mechanical Room by Cafeteria)
- Gray Paint on Concrete Ceiling (Mechanical Room by Cafeteria)
- Gray Paint on Brick Column (Mechanical Room by Cafeteria)
- L.Gray Paint on Plaster Wall (Mechanical Room by Cafeteria)
- Gray Paint on Wood Window frame (Mechanical Room by Cafeteria)
- L.Gray Paint on Plaster Ceiling (Mechanical Room by Cafeteria)
- Tan Paint on Wood Door (Basement Bathroom)
- Tan Paint on Wood Door frame (Basement Bathroom)
- Pink Paint on Gypsum Wall (Basement Bathroom)
- Pink Paint on Plaster Wall (Basement Bathroom)
- Tan Paint on Wood Window frame (Basement Bathroom)
- Tan Paint on Wood Window sill (Basement Bathroom)
- White Paint on Metal Window frame (Basement Bathroom)
- Tan Paint on Metal Radiator cover (Basement Bathroom)



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- White Paint on Wood Ceiling (Basement Bathroom)
- Tan Paint on Plaster Wall (Basement Bathroom)
- Tan Paint on Plaster Ceiling (Basement Bathroom)
- Beige Paint on Wood Door (1st Floor Bathroom)
- Beige Paint on Wood Door frame (1st Floor Bathroom)
- Beige Paint on Metal Radiator (1st Floor Bathroom)
- Beige Paint on Metal Radiator Pipe (1st Floor Bathroom)
- Beige Paint on Wood Partition-wall (1st Floor Bathroom)
- Beige Paint on Wood Chair rail (1st Floor Bathroom)
- Beige Paint on Metal Duct (1st Floor Bathroom)
- Beige Paint on Metal Drain Pipe (1st Floor Bathroom)
- Beige Paint on Wood Window frame (1st Floor Bathroom)
- Beige Paint on Wood Window sill (1st Floor Bathroom)
- White Paint on Metal Window frame (1st Floor Bathroom)
- White Paint on Metal Vent grille (1st Floor Bathroom)
- Beige Paint on Wood Door (2nd Floor Bathroom)
- Beige Paint on Wood Door frame (2nd Floor Bathroom)
- Beige Paint on Metal Radiator (2nd Floor Bathroom)
- White Paint on Metal Radiator Pipe (2nd Floor Bathroom)
- Yellow Paint on Metal Access panel (2nd Floor Bathroom)
- Beige Paint on Wood Window frame (2nd Floor Bathroom)
- Beige Paint on Wood Window sill (2nd Floor Bathroom)
- White Paint on Metal Window frame (2nd Floor Bathroom)
- Beige Paint on Wood Door (Room 303)
- Beige Paint on Wood Door frame (Room 303)
- Beige Paint on Gypsum Wall (Room 303)
- Beige Paint on Metal Electrical conduit (Room 303)
- Beige Paint on Wood Vent grille (Room 303)
- Beige Paint on Wood Baseboard (Room 303)
- Beige Paint on Wood Board frame (Room 303)
- Beige Paint on Wood Radiator cover (Room 303)
- Beige Paint on Wood Window frame (Room 303)
- Beige Paint on Wood Window sill (Room 303)
- White Paint on Metal Window frame (Room 303)
- White Paint on Concrete Beam (Room 303)
- Beige Paint on Wood Door (Room 406)
- Beige Paint on Wood Door frame (Room 406)
- White Paint on Gypsum Wall (Room 406)
- White Paint on Gypsum Beam (Room 406)
- White Paint on Metal Radiator (Room 406)
- Beige Paint on Wood Baseboard (Room 406)
- Beige Paint on Wood Window frame (Room 406)
- White Paint on Metal Window frame (Room 406)
- White Paint on Metal Electrical conduit (Room 406)



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- Beige Paint on Wood Board frame (Room 406)
- Beige Paint on Plaster Ceiling (Room 406)
- Beige Paint on Wood Door (Bathroom in Room 402)
- Beige Paint on Wood Door frame (Bathroom in Room 402)
- Yellow Paint on Gypsum Wall (Bathroom in Room 402)
- White Paint on Gypsum Ceiling (Bathroom in Room 402)
- White Paint on Metal Vent grille (Bathroom in Room 402)

D. PCB-CONTAINING MATERIAL

Analytical results of the bulk samples collected indicate that the following materials **contain PCB** (greater than 50 PPM):

- None

Analytical results of the bulk samples collected indicate that the following materials **did not contain PCB** (less than 50 PPM):

- Interior Window Frame Caulking (Beige)
- Interior Door Frame Caulking (Beige)

4.0 INSPECTION RESULTS

A. ASBESTOS-CONTAINING MATERIAL

The asbestos inspection involved a thorough visual examination of all areas that may be impacted by the proposed Renovations project at the Main Street School. The following suspect materials were sampled and analyzed for asbestos content by WSP:

4.1 Table 4.1 – Suspect Materials Inspected

HOMOGENOUS MATERIAL	LOCATION	MATERIAL	ASBESTOS CONTENT
WSP Sampled on 02/17/2021			
01	Gym Building	Gypsum Board (Gray)	NAD
02	Gym Building	Joint Compound (White)	NAD
03	Gym Building	Cinderblock Wall Mortar (Gray)	NAD
04	Gym Building	Chimney Brick Mortar (Gray)	NAD
05	Gym Building	Fiberglass Boiler Breeching Canvas (Beige)	NAD
06	Gym Building	Fiberglass Pipe Edge Cementitious Sealant (Gray)	NAD
07	Gym Building	Wall Penetration Sealant (Red)	NAD



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HOMOGENOUS MATERIAL	LOCATION	MATERIAL	ASBESTOS CONTENT
08	Walkway Roof	Roofing Shingles (Brown/Black)- Top Layer	NAD
09	Walkway Roof	Roofing Shingles (Gray/Black)- Bottom Layer	NAD
10	Walkway Roof	Felt Paper below Shingles (Black)	NAD
11	Main Building	Gypsum Board (Gray)	NAD
12	Main Building	Joint Compound (White)	NAD
13	Main Building	Interior Brick Mortar (Gray)	NAD
14	Main Building	Wall Plaster (White Coat)	NAD
15	Main Building	Wall Plaster (Brown Coat)	NAD
16	Main Building	Ceiling Plaster (White Coat)	NAD
17	Main Building	Ceiling Plaster (Brown Coat)	NAD
18	Main Building	Ceiling Scratch Coat (Beige)- Above 2'x4' Ceiling Tiles	NAD
19	Main Building	Cementitious Ceiling Material (Gray)	NAD
20	Main Building	Wall Scratch Coat (White)	NAD
21	Main Building	Ceramic Wall Tile Grout (White)	NAD
22	Main Building	Ceramic Wall Tile Backing (Beige)	NAD
23	Main Building	Ceramic Floor Tile Mortar (Dark Gray)	NAD
24	Main Building	Fixture Caulking (White)	NAD
25	Main Building	2'x4' (2'x2' Design) Ceiling Tile (White)	NAD
26	Main Building	2'x4' Fissured Ceiling Tile (White)	NAD
27	Main Building	Stone Lab Countertop (Black)	NAD
28	Main Building	Mastic Associated with 12"x12" Brown & Beige Floor Tiles (Brown)	NAD
29	Main Building	12"x12" Floor Tile (Brown)	NAD
30	Main Building	12"x12" Floor Tile (Beige)	NAD
31	Main Building	Mastic Associated with 12"x12" White Floor Tiles (Brown/Yellow)	NAD
32	Main Building	12"x12" Floor Tile (White)	NAD
33	Main Building	Felt Paper/Mastic Associated with 9"x9" Brown Floor Tile (Black)- Under Ceramic Floor Tile	NAD
34	Main Building	9"x9" Floor Tile (Brown)	7.10% Chrysotile
35	Main Building	Mastic Associated with 6" Beige Cove Base Molding (Beige)	NAD
36	Main Building	6" Cove Base Molding (Beige)	NAD
37	Main Building	Mastic Associated with 4" Black Cove Base Molding (Beige)	NAD
38	Main Building	4" Cove Base Molding (Black)	NAD
WSP Sampled on 03/03/2021			
39	Gym Roof	Screed (Gray)	NAD



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HOMOGENOUS MATERIAL	LOCATION	MATERIAL	ASBESTOS CONTENT
40	Gym Roof	Felt Paper (Black)	NAD
41	Gym Roof	Bottom Layer (Black)	NAD
42	Gym Roof	Perlite Insulation (Brown)	NAD
43	Gym Roof	Top Membrane (Black)	NAD
44	Bell Tower	Louver Tar (Black)	11.00% Chrysotile

Bold = Positive for ACM

NAD = No Asbestos Detected

NA/PS = Not analyzed/ positive sample

4.2 CONDITION AND FRIABILITY ASSESSMENT TABLE

For each inspection conducted, the inspector classifies ACM or Assumed ACM materials by friability and condition. This helps to determine the extent of damage in certain areas as well as the potential for further damage and Asbestos release due to disturbance of the material.

Table 4.2 – Condition and Friability Assessment

Location	Material	Quantity	Friability	Condition
Main Building, 3 rd Floor Bathroom	9"x9" Floor Tile (Brown)	29 SF	No	Good
Bell Tower	Louver Tar (Black)	7 SF	No	Good

Condition Definitions:

Good: None/Minimal apparent damage to ACM

Fair: Up to 10% localized damage or up to 25% of the entire ACM is damaged

Poor: Over 10% localized damage or over 25% of the entire ACM is damaged

4.3 SAMPLE ANALYSIS TABLE

Laboratory analysis results, in tabular form, are included in Appendix A.

B. LEAD-BASED PAINT

The lead Inspection involved a thorough visual examination of all accessible areas impacted by the proposed Renovations project at the Main Street School. The following suspect surfaces were tested for lead content:

Test Number	Sample Location	Building Component	Color	Substrate	Condition	Lead Content (mg/cm ²)
WSP Sampled on 02/17/2021						
1	Calibration Check @ 1.0	---	---	---	---	1.2



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Test Number	Sample Location	Building Component	Color	Substrate	Condition	Lead Content (mg/cm2)
2	Calibration Check @ 1.0	---	---	---	---	1.2
3	Calibration Check @ 1.0	---	---	---	---	1.2
4	Calibration Check @ 0.0	---	---	---	---	0.1
5	Calibration Check @ 0.0	---	---	---	---	0.1
6	Calibration Check @ 0.0	---	---	---	---	0.1
7	GYM Boiler Room	Panel Board	Black	Wood	Good	0.1
8	GYM Boiler Room	Soffit	White	Gypsum	Good	-0.1
9	GYM Boiler Room	Heat Unit	Blue	Metal	Good	0.3
10	GYM Boiler Room	Door	Gray	Metal	Good	0.3
11	GYM Boiler Room	Door frame	Gray	Metal	Good	0.6
12	GYM	Door	Green	Metal	Good	-0.3
13	GYM	Door frame	Green	Metal	Good	-0.1
14	GYM	Wall	White	Cinder Block	Good	0.1
15	GYM	Column	White	Metal	Good	2.3
16	GYM	Plank	Green	Wood	Good	0.1
17	GYM	Wall	White	Cinder Block	Good	0
18	GYM	Wall	White	Cinder Block	Good	-0.2
19	GYM	Plank	Green	Wood	Good	0.1
20	GYM	Column	White	Metal	Good	3.2
21	GYM	Door	Green	Metal	Good	0
22	GYM	Door frame	White	Metal	Good	-0.1
23	GYM	Wall	Gray	Wood	Good	-0.2
24	GYM	Soffit	White	Plaster	Good	-0.3
25	GYM	Wall	White	Cinder Block	Good	-0.2
26	GYM	Drain Pipe	White	Metal	Good	0
27	Exterior Walkway	Support Column	Green	Metal	Good	0.2
28	Exterior Walkway	Retaining wall	Gray	Concrete	Good	-0.2
29	Exterior Walkway	Hand rail	Green	Metal	Good	-0.2
30	Mechanical Room by Cafeteria	Door	Gray	Wood	Good	0.1
31	Mechanical Room by Cafeteria	Door frame	Gray	Wood	Good	0.4
32	Mechanical Room by Cafeteria	Wall	White	Brick	Poor	0
33	Mechanical Room by Cafeteria	Wall	Gray	Brick	Poor	0.3



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Test Number	Sample Location	Building Component	Color	Substrate	Condition	Lead Content (mg/cm2)
34	Mechanical Room by Cafeteria	Floor	Gray	Concrete	Poor	0.1
35	Mechanical Room by Cafeteria	Soffit	Gray	Plaster	Poor	0.2
36	Mechanical Room by Cafeteria	Ceiling	Gray	Concrete	Poor	-0.3
37	Mechanical Room by Cafeteria	Wall	White	Brick	Poor	-0.4
38	Mechanical Room by Cafeteria	Wall	Gray	Brick	Poor	0
39	Mechanical Room by Cafeteria	Wall	White	Brick	Poor	0
40	Mechanical Room by Cafeteria	Wall	Gray	Brick	Poor	-0.2
41	Mechanical Room by Cafeteria	Door frame	Gray	Wood	Poor	0.2
42	Mechanical Room by Cafeteria	Column	Gray	Brick	Poor	0.2
43	Mechanical Room by Cafeteria	Wall	White	Brick	Poor	-0.3
44	Mechanical Room by Cafeteria	Wall	Gray	Brick	Poor	0
45	Mechanical Room by Cafeteria	Wall	L.Gray	Plaster	Poor	-0.1
46	Mechanical Room by Cafeteria	Wall	Gray	Plaster	Poor	0.1
47	Mechanical Room by Cafeteria	Window frame	Gray	Wood	Poor	0.3
48	Mechanical Room by Cafeteria	Window sash	Gray	Wood	Poor	5
49	Mechanical Room by Cafeteria	Window frame	Gray	Wood	Poor	5.4
50	Mechanical Room by Cafeteria	Ceiling	L.Gray	Plaster	Poor	-0.2
51	Basement Bathroom	Door	Tan	Wood	Good	-0.1
52	Basement Bathroom	Door frame	Tan	Wood	Good	0
53	Basement Bathroom	Wall	Pink	Gypsum	Good	0
54	Basement Bathroom	Wall	Pink	Gypsum	Good	-0.3
55	Basement Bathroom	Wall	Pink	Gypsum	Good	-0.1
56	Basement Bathroom	Wall	Pink	Plaster	Good	0
57	Basement Bathroom	Window frame	Tan	Wood	Good	-0.2
58	Basement Bathroom	Window sill	Tan	Wood	Good	-0.2
59	Basement Bathroom	Window frame	White	Metal	Good	-0.7
60	Basement Bathroom	Radiator cover	Tan	Metal	Good	0



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Test Number	Sample Location	Building Component	Color	Substrate	Condition	Lead Content (mg/cm2)
61	Basement Bathroom	Ceiling	White	Wood	Good	-0.3
62	Basement Bathroom	Wall	Tan	Plaster	Poor	0.2
63	Basement Bathroom	Drain Pipe	White	Metal	Good	1
64	Basement Bathroom	Ceiling	Tan	Plaster	Poor	0.1
65	1st Floor Bathroom	Door	Beige	Wood	Good	-0.1
66	1st Floor Bathroom	Door frame	Beige	Wood	Good	0.3
67	1st Floor Bathroom	Wall	White	Plaster	Good	>9.9
68	1st Floor Bathroom	Radiator	Beige	Metal	Good	0
69	1st Floor Bathroom	Radiator Pipe	Beige	Metal	Good	0
70	1st Floor Bathroom	Wall	Pink	Plaster	Good	>9.9
71	1st Floor Bathroom	Partition-wall	Beige	Wood	Good	0.1
72	1st Floor Bathroom	Chair rail	Beige	Wood	Good	0
73	1st Floor Bathroom	Ceiling	Beige	Plaster	Good	>9.9
74	1st Floor Bathroom	Duct	Beige	Metal	Good	0
75	1st Floor Bathroom	Drain Pipe	Beige	Metal	Good	0.4
76	1st Floor Bathroom	Window frame	Beige	Wood	Good	0.1
77	1st Floor Bathroom	Window sill	Beige	Wood	Good	-0.2
78	1st Floor Bathroom	Window frame	White	Metal	Good	-0.3
79	1st Floor Bathroom	Vent grille	White	Metal	Good	-0.1
80	2nd Floor Bathroom	Door	Beige	Wood	Good	0.3
81	2nd Floor Bathroom	Door frame	Beige	Wood	Good	-0.1
82	2nd Floor Bathroom	Wall	White	Plaster	Good	>9.9
83	2nd Floor Bathroom	Radiator	Beige	Metal	Good	0.3
84	2nd Floor Bathroom	Radiator Pipe	White	Metal	Good	0.3
85	2nd Floor Bathroom	Wall	Yellow	Plaster	Good	>9.9
86	2nd Floor Bathroom	Access panel	Yellow	Metal	Good	0.1
87	2nd Floor Bathroom	Window frame	Beige	Wood	Good	0
88	2nd Floor Bathroom	Window sill	Beige	Wood	Good	0
89	2nd Floor Bathroom	Window frame	White	Metal	Good	-0.4
90	2nd Floor Bathroom	Ceiling	Beige	Plaster	Poor	>9.9
91	Room 303	Door	Beige	Wood	Good	0.1
92	Room 303	Door frame	Beige	Wood	Good	-0.3
93	Room 303	Wall	Beige	Gypsum	Good	-0.2
94	Room 303	Electrical conduit	Beige	Metal	Good	0.4
95	Room 303	Vent grille	Beige	Wood	Good	0



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Test Number	Sample Location	Building Component	Color	Substrate	Condition	Lead Content (mg/cm ²)
96	Room 303	Baseboard	Beige	Wood	Good	-0.2
97	Room 303	Wall	Beige	Gypsum	Good	-0.3
98	Room 303	Board frame	Beige	Wood	Good	-0.2
99	Room 303	Wall	Beige	Gypsum	Good	-0.1
100	Room 303	Radiator cover	Beige	Wood	Good	-0.2
101	Room 303	Window frame	Beige	Wood	Good	-0.1
102	Room 303	Window sill	Beige	Wood	Good	-0.1
103	Room 303	Window frame	White	Metal	Good	-0.5
104	Room 303	Wall	Beige	Gypsum	Good	-0.1
105	Room 303	Beam	White	Concrete	Good	0.3
106	Room 303	Window frame	Beige	Wood	Good	-0.2
107	Room 406	Door	Beige	Wood	Good	0
108	Room 406	Door frame	Beige	Wood	Good	0
109	Room 406	Wall	White	Gypsum	Good	-0.3
110	Room 406	Wall	White	Gypsum	Good	-0.2
111	Room 406	Wall	White	Plaster	Good	9.6
112	Room 406	Beam	White	Gypsum	Good	-0.2
113	Room 406	Radiator	White	Metal	Good	0
114	Room 406	Baseboard	Beige	Wood	Good	-0.1
115	Room 406	Window frame	Beige	Wood	Good	-0.1
116	Room 406	Window frame	White	Metal	Good	-0.4
117	Room 406	Electrical conduit	White	Metal	Good	0.2
118	Room 406	Wall	White	Gypsum	Good	0.2
119	Room 406	Board frame	Beige	Wood	Good	-0.1
120	Room 406	Ceiling	Beige	Plaster	Good	0.1
121	Bathroom in Room 402	Door	Beige	Wood	Good	0
122	Bathroom in Room 402	Door frame	Beige	Wood	Good	-0.2
123	Bathroom in Room 402	Wall	Yellow	Gypsum	Good	-0.3
124	Bathroom in Room 402	Wall	Yellow	Gypsum	Good	0.1
125	Bathroom in Room 402	Wall	Yellow	Gypsum	Good	0
126	Bathroom in Room 402	Wall	Yellow	Gypsum	Good	0
127	Bathroom in Room 402	Ceiling	White	Gypsum	Good	-0.6
128	Bathroom in Room 402	Vent grille	White	Metal	Good	0.1



Final Report for Environmental Inspection Services

Test Number	Sample Location	Building Component	Color	Substrate	Condition	Lead Content (mg/cm2)
129	Calibration Check @ 1.0	---	---	---	---	1.3
130	Calibration Check @ 1.0	---	---	---	---	1.2
131	Calibration Check @ 1.0	---	---	---	---	1.2
WSP Sampled on 03/03/2021						
1	Calibration Check @ 1.0	---	---	---	---	1.1
2	Calibration Check @ 1.0	---	---	---	---	0.8
3	Calibration Check @ 1.0	---	---	---	---	1.0
4	Calibration Check @ 0.0	---	---	---	---	-0.1
5	Calibration Check @ 0.0	---	---	---	---	-0.1
6	Calibration Check @ 0.0	---	---	---	---	-0.1
7	Calibration Check @ 1.0	---	---	---	---	1.0
8	Calibration Check @ 1.0	---	---	---	---	0.9
9	Calibration Check @ 1.0	---	---	---	---	0.9
10	Bell Tower	Louver Frame	White	Wood	Poor	0.7
11	Bell Tower	Louver Frame	White	Wood	Poor	1.0
12	Calibration Check @ 1.0	---	---	---	---	1.0
13	Calibration Check @ 1.0	---	---	---	---	1.0
14	Calibration Check @ 1.0	---	---	---	---	1.0
15	Calibration Check @ 0.0	---	---	---	---	0.1
16	Calibration Check @ 0.0	---	---	---	---	0.1
17	Calibration Check @ 0.0	---	---	---	---	0.1

C. PCB-CONTAINING MATERIAL

The PCB Inspection involved a thorough visual examination of all areas that may be impacted by



Final Report for Environmental Inspection Services

the proposed Renovations project at the Main Street School. The following suspect materials were tested for PCB content:

HOMOGENOUS MATERIAL	LOCATION	MATERIAL	PCB CONTENT (PPM)
01	Gym Building, Boiler Room	Wall Penetration Sealant (Red)	ND
02	Main Building, Bathrooms	Fixture Caulking (White)	ND

Bold = Positive for PCB ND = No PCB Detected

5.0 AREAS NOT ACCESSIBLE

During the inspection the following areas were not accessible:

Spaces within Walls/Floors/Ceilings: No destructive sampling was performed on concealed spaces in walls to access plenum, chases etc. It should be assumed that asbestos containing materials may exist in these spaces. Any suspect materials encountered during work should be sampled for analysis before work continues.

Building Envelope: No destructive sampling was performed on the building envelope. It should be assumed that asbestos, lead and PCB containing materials may exist in these spaces. Any suspect materials encountered during work should be sampled for analysis before work continues.

6.0 CONCLUSIONS AND RECOMMENDATIONS

ACM and LBP have been identified in this inspection that may be impacted as part of the proposed Renovations project at the Main Street School.

No PCB were identified in this inspection that may be impacted as part of the proposed Renovations project at the Main Street School.

The ACM, LBP & PCB inspection was conducted at the request of Irvington Union Free School District for the proposed Renovations project at the Main Street School. Any change in the scope of work will require further investigation to accurately classify any additional ACM, LBP or PCBs resulting from the modified or updated scope of work.

7.0 ASBESTOS ABATEMENT COST ESTIMATE

This cost estimate is based on compliance with Industrial Code Rule 56 (12 NYCRR Part 56), standard industry practices and projects of similar type and complexity. Performing the work in stages or phases, rather than as one continuous process may result in additional mobilization costs. The following factors have been considered:

This cost estimate is exclusively limited to the Renovations project at the Main Street School. Any



Final Report for Environmental Inspection Services

alteration to the scope of work will require further investigation and may affect the cost estimate presented.

Location	Material Description / Color	Quantity	Unit Rate	Total
Main Building, 3 rd Floor Bathroom	9"x9" Floor Tile (Brown)	29 SF	\$25.00/SF	\$725.00
Bell Tower	Louver Tar (Black)	7 SF	\$100.00/SF	\$700.00
Subtotal				\$1,425.00
Mobilization				\$1,000.00
Total				\$2,425.00

SF = Square Feet

LF = Linear Feet

8.0 REPORT CERTIFICATIONS

This report, and the supporting data, findings, conclusions, opinions, and recommendations it contains represent the result of WSP's efforts for the environmental inspection work for the Main Street School, Renovations project.

Opinions and recommendations presented in this report apply to site conditions and features as they existed at the time of WSP's site visits, and those reasonably foreseeable. They cannot necessarily apply to conditions and features of which WSP is unaware and has not had the opportunity to evaluate.


The conclusions presented in this report are professional opinions solely upon WSP's visual observations of accessible areas, laboratory test data, and current regulatory requirements. These conclusions are intended exclusively for the purpose stated herein and the site indicated for the project indicated.

Prepared by:



Josue Garcia
NYS DOL Inspector

Reviewed by:



Craig Napolitano, CHMM
Vice President, Hazmat & IH Services



**APPENDIX A:
ASBESTOS SAMPLE ANALYSIS RESULTS IN TABULAR FORM**



Final Report for Environmental Inspection Services

APPENDIX A
SAMPLE ANALYSIS RESULTS IN TABULAR FORM
MAIN STREET SCHOOL
RENOVATIONS
101 MAIN STREET
IRVINGTON, NY 10533

Homogeneous Area No.	Sample No.	Location	Material	PLM Result	TEM Result
WSP Sampled on 02/17/2021					
01	01	Gym Bldg., 1 st Floor Boiler Room 101	Gypsum Board (Gray)	NAD	N/A
	02	Gym Bldg., 1 st Floor Boiler Room 101		NAD	N/A
02	03	Gym Bldg., 1 st Floor Boiler Room 101	Joint Compound (White)	NAD	N/A
	04	Gym Bldg., 1 st Floor Boiler Room 101		NAD	N/A
03	05	Gym Bldg., 1 st Floor Boiler Room 101	Cinderblock Wall Mortar (Gray)	NAD	N/A
	06	Gym Bldg., 1 st Floor Gymnasium 102		NAD	N/A
04	07	Gym Bldg., 1 st Floor Boiler Room 101	Chimney Brick Mortar (Gray)	NAD	N/A
	08	Gym Bldg., 1 st Floor Boiler Room 101		NAD	N/A
05	09	Gym Bldg., 1 st Floor Boiler Room 101	Fiberglass Boiler Breeching Canvas (Beige)	NAD	N/A
	10	Gym Bldg., 1 st Floor Boiler Room 101		NAD	N/A
	11	Gym Bldg., 1 st Floor Boiler Room 101		NAD	N/A

Bold = Positive for ACM
NAD = No Asbestos Detected

N/A = Not Applicable
NA/PS = Not analyzed/ positive sample



Final Report for Environmental Inspection Services

Homogeneous Area No.	Sample No.	Location	Material	PLM Result	TEM Result
06	12	Gym Bldg., 1 st Floor Boiler Room 101	Fiberglass Pipe Edge Cementitious Sealant (Gray)	NAD	N/A
	13	Gym Bldg., 1 st Floor Boiler Room 101		NAD	N/A
	14	Gym Bldg., 1 st Floor Boiler Room 101		NAD	N/A
07	15	Gym Bldg., 1 st Floor Boiler Room 101	Wall Penetration Sealant (Red)	NAD	NAD
	16	Gym Bldg., 1 st Floor Boiler Room 101		NAD	NAD
08	17	Walkway Roof	Roofing Shingles (Brown/Black)-Top Layer	NAD	NAD
	18	Walkway Roof		NAD	NAD
09	19	Walkway Roof	Roofing Shingles (Gray/Black)-Bottom Layer	NAD	NAD
	20	Walkway Roof		NAD	NAD
10	21	Walkway Roof	Felt Paper below Shingles (Black)	NAD	NAD
	22	Walkway Roof		NAD	NAD
11	23	Main Bldg., Basement Girl's Bathroom	Gypsum Board (Gray)	NAD	N/A
	24	Main Bldg., 3 rd Floor P.L.T.M. 406		NAD	N/A
12	25	Main Bldg., Basement Girl's Bathroom	Joint Compound (White)	NAD	N/A
	26	Main Bldg., 3 rd Floor P.L.T.M. 406		NAD	N/A
13	27	Main Bldg., Basement Mech. Room	Interior Brick Mortar (Gray)	NAD	N/A
	28	Main Bldg., Basement Mech. Room		NAD	N/A
14	29	Main Bldg., 2 nd Floor Girl's Bathroom	Wall Plaster (White Coat)	NAD	N/A
	30	Main Bldg., 2 nd Floor IT Room		NAD	N/A
	31	Main Bldg., 3 rd Floor P.L.T.M. 406		NAD	N/A

Bold = Positive for ACM
NAD = No Asbestos Detected

N/A = Not Applicable
NA/PS = Not analyzed/ positive sample



Final Report for Environmental Inspection Services

Homogeneous Area No.	Sample No.	Location	Material	PLM Result	TEM Result
15	32	Main Bldg., 2 nd Floor Girl's Bathroom	Wall Plaster (Brown Coat)	NAD	N/A
	33	Main Bldg., 2 nd Floor IT Room		NAD	N/A
	34	Main Bldg., 3 rd Floor P.L.T.M. 406		NAD	N/A
16	35	Main Bldg., 1 st Floor Girl's Bathroom	Ceiling Plaster (White Coat)	NAD	N/A
	36	Main Bldg., 1 st Floor Girl's Bathroom		NAD	N/A
	37	Main Bldg., 3 rd Floor P.L.T.M. 406		NAD	N/A
17	38	Main Bldg., 1 st Floor Girl's Bathroom	Ceiling Plaster (Brown Coat)	NAD	N/A
	39	Main Bldg., 1 st Floor Girl's Bathroom		NAD	N/A
	40	Main Bldg., 3 rd Floor P.L.T.M. 406		NAD	N/A
18	41	Main Bldg., 2 nd Floor Girl's Bathroom	Ceiling Scratch Coat (Beige)- Above 2'x4' Ceiling Tiles	NAD	N/A
	42	Main Bldg., 2 nd Floor Girl's Bathroom		NAD	N/A
	43	Main Bldg., 2 nd Floor Girl's Bathroom		NAD	N/A
19	44	Main Bldg., Basement Mech. Room	Cementitious Ceiling Material (Gray)	NAD	N/A
	45	Main Bldg., Basement Mech. Room		NAD	N/A
	46	Main Bldg., Basement Mech. Room		NAD	N/A

Bold = Positive for ACM
NAD = No Asbestos Detected

N/A = Not Applicable
NA/PS = Not analyzed/ positive sample



Final Report for Environmental Inspection Services

Homogeneous Area No.	Sample No.	Location	Material	PLM Result	TEM Result
20	47	Main Bldg., Basement Mech. Room	Wall Scratch Coat (White)	NAD	N/A
	48	Main Bldg., Basement Mech. Room		NAD	N/A
	49	Main Bldg., Basement Mech. Room		NAD	N/A
21	50	Main Bldg., Basement Girl's Bathroom	Ceramic Wall Tile Grout (White)	NAD	N/A
	51	Main Bldg., 1 st Floor Girl's Bathroom		NAD	N/A
22	52	Main Bldg., Basement Girl's Bathroom	Ceramic Wall Tile Backing (Beige)	NAD	N/A
	53	Main Bldg., 1 st Floor Girl's Bathroom		NAD	N/A
23	54	Main Bldg., Basement Girl's Bathroom	Ceramic Floor Tile Mortar (Dark Gray)	NAD	N/A
	55	Main Bldg., 1 st Floor Girl's Bathroom		NAD	N/A
24	56	Main Bldg., 1 st Floor Girl's Bathroom	Fixture Caulking (White)	NAD	NAD
	57	Main Bldg., 2 nd Floor Girl's Bathroom		NAD	NAD
25	58	Main Bldg., 2 nd Floor Girl's Bathroom	2'x4' (2'x2' Design) Ceiling Tile (White)	NAD	NAD
	59	Main Bldg., 2 nd Floor Computer Lab 303		NAD	NAD
26	60	Main Bldg., Basement Girl's Bathroom	2'x4' Fissured Ceiling Tile (White)	NAD	NAD
	61	Main Bldg., Basement Girl's Bathroom		NAD	NAD

Bold = Positive for ACM
NAD = No Asbestos Detected

N/A = Not Applicable
NA/PS = Not analyzed/ positive sample



Final Report for Environmental Inspection Services

Homogeneous Area No.	Sample No.	Location	Material	PLM Result	TEM Result
27	62	Main Bldg., 3 rd Floor P.L.T.M. 406	Stone Lab Countertop (Black)	NAD	N/A
	63	Main Bldg., 3 rd Floor P.L.T.M. 406		NAD	N/A
28	64	Main Bldg., 2 nd Floor Computer Lab 303	Mastic Associated with 12"x12" Brown & Beige Floor Tiles (Brown)	NAD	NAD
	65	Main Bldg., 3 rd Floor P.L.T.M. 406		NAD	NAD
29	66	Main Bldg., 2 nd Floor Computer Lab 303	12"x12" Floor Tile (Brown)	NAD	NAD
	67	Main Bldg., 3 rd Floor P.L.T.M. 406		NAD	NAD
30	68	Main Bldg., 2 nd Floor Computer Lab 303	12"x12" Floor Tile (Beige)	NAD	NAD
	69	Main Bldg., 3 rd Floor P.L.T.M. 406		NAD	NAD
31	70	Main Bldg., 3 rd Floor P.L.T.M. 406	Mastic Associated with 12"x12" White Floor Tiles (Brown/Yellow)	NAD	NAD
	71	Main Bldg., 3 rd Floor P.L.T.M. 406		NAD	NAD
32	72	Main Bldg., 3 rd Floor P.L.T.M. 406	12"x12" Floor Tile (White)	NAD	NAD
	73	Main Bldg., 3 rd Floor P.L.T.M. 406		NAD	NAD
33	74	Main Bldg., 3 rd Floor Girl's Bathroom	Felt Paper/Mastic Associated with 9"x9" Brown Floor Tile (Black)- Under Ceramic Floor Tile	NAD	NAD
	75	Main Bldg., 3 rd Floor Girl's Bathroom		NAD	NAD
34	76	Main Bldg., 3rd Floor Girl's Bathroom	9"x9" Floor Tile (Brown)	7.10% Chrysotile	NA/PS
	77	Main Bldg., 3rd Floor Girl's Bathroom		NA/PS	NA/PS

Bold = Positive for ACM
NAD = No Asbestos Detected

N/A = Not Applicable
NA/PS = Not analyzed/ positive sample



Final Report for Environmental Inspection Services

Homogeneous Area No.	Sample No.	Location	Material	PLM Result	TEM Result
35	78	Main Bldg., 3 rd Floor P.L.T.M. 406	Mastic Associated with 6” Beige Cove Base Molding (Beige)	NAD	NAD
	79	Main Bldg., 3 rd Floor P.L.T.M. 406		NAD	NAD
36	80	Main Bldg., 3 rd Floor P.L.T.M. 406	6” Cove Base Molding (Beige)	NAD	NAD
	81	Main Bldg., 3 rd Floor P.L.T.M. 406		NAD	NAD
37	82	Main Bldg., 3 rd Floor P.L.T.M. 406	Mastic Associated with 4” Black Cove Base Molding (Beige)	NAD	NAD
	83	Main Bldg., 3 rd Floor P.L.T.M. 406		NAD	NAD
38	84	Main Bldg., 3 rd Floor P.L.T.M. 406	4” Cove Base Molding (Black)	NAD	NAD
	85	Main Bldg., 3 rd Floor P.L.T.M. 406		NAD	NAD
WSP Sampled on 03/03/2021					
39	86	Gym Roof Center	Screed (Gray)	NAD	N/A
	87	Gym Roof North		NAD	N/A
40	88	Gym Roof Center	Felt Paper (Black)	NAD	NAD
	89	Gym Roof North		NAD	NAD
41	90	Gym Roof Center	Bottom Layer (Black)	NAD	NAD
	91	Gym Roof North		NAD	NAD
42	92	Gym Roof Center	Perlite Insulation (Brown)	NAD	N/A
	93	Gym Roof North		NAD	N/A
43	94	Gym Roof Center	Top Membrane (Black)	NAD	NAD
	95	Gym Roof North		NAD	NAD
44	96	Bell Tower	Louver Tar (Black)	11.00% Chrysotile	NA/PS
	97	Bell Tower		NA/PS	NA/PS

Bold = Positive for ACM
 NAD = No Asbestos Detected

N/A = Not Applicable
 NA/PS = Not analyzed/ positive sample



**APPENDIX B:
ASBESTOS BULK SAMPLE FIELD DATA SHEETS WITH
CHAIN OF CUSODY & LABORATORY RESULTS**



EMSL Analytical, Inc.

307 West 38th Street New York, NY 10018

Tel/Fax: (212) 290-0051 / (212) 290-0058

<http://www.EMSL.com / manhattanlab@emsl.com>

EMSL Order: 032102503

Customer ID: LBAP78

Customer PO: 31402880.011

Project ID:

Attention: Alex Smolyar

WSP USA Solutions Inc

96 Morton Street

8th floor

New York, NY 10014

Phone: (212) 612-7900

Fax:

Received Date: 02/19/2021 8:52 AM

Analysis Date: 02/22/2021 - 02/23/2021

Collected Date: 02/17/2021

Project: 31402880.011/ IRVINGTON UFSD/ MAIN STREET, SCHOOL/ INTERIOR & EXTERIOR/ RENOVATIONS

Test Report:Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 01 032102503-0001		Description GYM BLDG. 1ST FL BOILER ROOM 101 - GYPSUM BOARD, GRAY	Homogeneity Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	Brown/ Gray	20.00% Cellulose 3.00% Glass	15.00% Ca Carbonate 35.00% Gypsum 15.00% Non-fibrous (other) 7.00% Perlite 5.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 02 032102503-0002		Description GYM BLDG. 1ST FL BOILER ROOM 101 - GYPSUM BOARD, GRAY	Homogeneity Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	Brown/ Gray	10.00% Cellulose 4.00% Glass	20.00% Ca Carbonate 45.00% Gypsum 21.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 03 032102503-0003		Description GYM BLDG. 1ST FL BOILER ROOM 101 - JOINT COMPOUND, WHITE	Homogeneity Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	White		40.00% Ca Carbonate 5.00% Mica 30.00% Non-fibrous (other) 10.00% Perlite 15.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 04 032102503-0004		Description GYM BLDG. 1ST FL BOILER ROOM 101 - JOINT COMPOUND, WHITE	Homogeneity Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	White		55.00% Ca Carbonate 6.00% Mica 39.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed

Initial report from: 02/23/2021 04:59:17



EMSL Analytical, Inc.

307 West 38th Street New York, NY 10018

Tel/Fax: (212) 290-0051 / (212) 290-0058

<http://www.EMSL.com> / manhattanlab@emsl.com

EMSL Order: 032102503

Customer ID: LBAP78

Customer PO: 31402880.011

Project ID:

Test Report: Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 05 032102503-0005		Description GYM BLDG. 1ST FL BOILER ROOM 101 - CINDERBLOCK WALL, MORTAR, GRAY	Homogeneity Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	Tan	7.00% Min. Wool	35.00% Ca Carbonate 3.00% Mica 40.00% Non-fibrous (other) 15.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 06 032102503-0006		Description GYM BLDG. 1ST FL GYMNASIUM 102 - CINDERBLOCK WALL, MORTAR, GRAY	Homogeneity Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	Brown	3.00% Cellulose	25.00% Ca Carbonate 4.00% Mica 23.00% Non-fibrous (other) 45.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 07 032102503-0007		Description GYM BLDG. 1ST FL BOILER ROOM 101 - CHIMNEY BRICK MORTAR, GRAY	Homogeneity Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	Gray	15.00% Min. Wool	35.00% Ca Carbonate 5.00% Mica 25.00% Non-fibrous (other) 20.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 08 032102503-0008		Description GYM BLDG. 1ST FL BOILER ROOM 101 - CHIMNEY BRICK MORTAR, GRAY	Homogeneity Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	Gray		20.00% Ca Carbonate 35.00% Non-fibrous (other) 45.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 09 032102503-0009		Description GYM BLDG. 1ST FL BOILER ROOM 101 - FIBERGLASS BOILER BREECHING CANVAS, BEIGE	Homogeneity Heterogeneous		
PLM NYS 198.1 Friable	02/23/2021	Various	30.00% Cellulose 5.00% Glass 40.00% Synthetic	25.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed

Initial report from: 02/23/2021 04:59:17



EMSL Analytical, Inc.

307 West 38th Street New York, NY 10018

Tel/Fax: (212) 290-0051 / (212) 290-0058

<http://www.EMSL.com> / manhattanlab@emsl.com

EMSL Order: 032102503

Customer ID: LBAP78

Customer PO: 31402880.011

Project ID:

Test Report: Asbestos Analysis of Bulk Material

		Analyzed Date	Non-Asbestos			
Test		Color	Fibrous	Non-Fibrous	Asbestos	
Sample ID	10		Description	GYM BLDG. 1ST FL BOILER ROOM 101 - FIBERGLASS BOILER BREECHING CANVAS, BEIGE		
	032102503-0010		Homogeneity	Heterogeneous		
PLM NYS 198.1 Friable	02/23/2021	Various	25.00% Cellulose 5.00% Glass 40.00% Synthetic	30.00% Non-fibrous (other)	None Detected	
PLM NYS 198.6 VCM					Not Analyzed	
PLM NYS 198.6 NOB					Not Analyzed	
TEM NYS 198.4 NOB					Not Analyzed	
Sample ID	11		Description	GYM BLDG. 1ST FL BOILER ROOM 101 - FIBERGLASS BOILER BREECHING CANVAS, BEIGE		
	032102503-0011		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	Various	20.00% Cellulose 5.00% Glass 35.00% Synthetic	40.00% Non-fibrous (other)	None Detected	
PLM NYS 198.6 VCM					Not Analyzed	
PLM NYS 198.6 NOB					Not Analyzed	
TEM NYS 198.4 NOB					Not Analyzed	
Sample ID	12		Description	GYM BLDG. 1ST FL BOILER ROOM 101 - FIBERGLASS PIPE EDGE CEMENTITIOUS SEALANT, GRAY		
	032102503-0012		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	Gray	25.00% Glass 15.00% Min. Wool	30.00% Ca Carbonate 20.00% Non-fibrous (other) 10.00% Quartz	None Detected	
PLM NYS 198.6 VCM					Not Analyzed	
PLM NYS 198.6 NOB					Not Analyzed	
TEM NYS 198.4 NOB					Not Analyzed	
Sample ID	13		Description	GYM BLDG. 1ST FL BOILER ROOM 101 - FIBERGLASS PIPE EDGE CEMENTITIOUS SEALANT, GRAY		
	032102503-0013		Homogeneity	Heterogeneous		
PLM NYS 198.1 Friable	02/23/2021	Gray/ Yellow	35.00% Glass 10.00% Min. Wool	30.00% Ca Carbonate 20.00% Non-fibrous (other) 5.00% Quartz	None Detected	
PLM NYS 198.6 VCM					Not Analyzed	
PLM NYS 198.6 NOB					Not Analyzed	
TEM NYS 198.4 NOB					Not Analyzed	
Sample ID	14		Description	GYM BLDG. 1ST FL BOILER ROOM 101 - FIBERGLASS PIPE EDGE CEMENTITIOUS SEALANT, GRAY		
	032102503-0014		Homogeneity	Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	Gray	40.00% Min. Wool	30.00% Ca Carbonate 20.00% Non-fibrous (other) 10.00% Quartz	None Detected	
PLM NYS 198.6 VCM					Not Analyzed	
PLM NYS 198.6 NOB					Not Analyzed	
TEM NYS 198.4 NOB					Not Analyzed	

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EMSL Order: 032102503

Customer ID: LBAP78

Customer PO: 31402880.011

Project ID:

Test Report:Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 15 032102503-0015		Description GYM BLDG. 1ST FL BOILER ROOM 101 - WALL PENETRATION SEALANT, RED	Homogeneity Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	02/22/2021	Red	3.60% Glass	96.40% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	02/23/2021	Red		100.00% Other	None Detected
Sample ID 16 032102503-0016		Description GYM BLDG. 1ST FL BOILER ROOM 101 - WALL PENETRATION SEALANT, RED	Homogeneity Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	02/22/2021	Red	3.30% Glass	96.70% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	02/23/2021	Red		100.00% Other	None Detected
Sample ID 17 032102503-0017		Description WALKWAY ROOF - ROOFING SHINGLES, BROWN/BLACK (TOP LAYER)	Homogeneity Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	02/22/2021	Brown	10.00% Glass	90.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	02/23/2021	Brown		100.00% Other	None Detected
Sample ID 18 032102503-0018		Description WALKWAY ROOF - ROOFING SHINGLES, BROWN/BLACK (TOP LAYER)	Homogeneity Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	02/22/2021	Brown	10.00% Glass	90.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	02/23/2021	Brown		100.00% Other	None Detected
Sample ID 19 032102503-0019		Description WALKWAY ROOF - ROOFING SHINGLES, GRAY/BLACK (BOTTOM LAYER)	Homogeneity Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	02/22/2021	Gray	8.80% Glass	91.20% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	02/23/2021	Gray		100.00% Other	None Detected
Sample ID 20 032102503-0020		Description WALKWAY ROOF - ROOFING SHINGLES, GRAY/BLACK (BOTTOM LAYER)	Homogeneity Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	02/22/2021	Gray	11.00% Glass	89.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	02/23/2021	Gray		100.00% Other	None Detected

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EMSL Order: 032102503

Customer ID: LBAP78

Customer PO: 31402880.011

Project ID:

Test Report: Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 21 032102503-0021		Description Homogeneity	WALKWAY ROOF - FELT PAPER BELOW SHINGLES, BLACK Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	02/22/2021	Black		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	02/23/2021	Black		100.00% Other	None Detected
Sample ID 22 032102503-0022		Description Homogeneity	WALKWAY ROOF - FELT PAPER BELOW SHINGLES, BLACK Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	02/22/2021	Black		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	02/23/2021	Black		100.00% Other	None Detected
Sample ID 23 032102503-0023		Description Homogeneity	MAIN BLDG - BASEMENT GIRLS BATHROOM - GYPSUM BOARD, GRAY Heterogeneous		
PLM NYS 198.1 Friable	02/23/2021	Brown/ Gray	25.00% Cellulose 3.00% Glass	10.00% Ca Carbonate 35.00% Gypsum 20.00% Non-fibrous (other) 7.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 24 032102503-0024		Description Homogeneity	MAIN BLDG - 3RD FLOOR P.L.T.M 406 - GYPSUM BOARD, GRAY Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	Brown/ Gray	10.00% Cellulose 4.00% Glass	15.00% Ca Carbonate 50.00% Gypsum 21.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 25 032102503-0025		Description Homogeneity	MAIN BLDG - BASEMENT GIRLS BATHROOM - JOINT COMPOUND, WHITE Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	White		40.00% Ca Carbonate 10.00% Mica 35.00% Non-fibrous (other) 15.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed

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Customer ID: LBAP78

Customer PO: 31402880.011

Project ID:

Test Report: Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 26 032102503-0026		Description Homogeneity	MAIN BLDG - 3RD FLOOR P.L.T.M 406 - JOINT COMPOUND, WHITE Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	White		55.00% Ca Carbonate 8.00% Mica 37.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 27 032102503-0027		Description Homogeneity	MAIN BLDG - BASEMENT MECH ROOM - INTERIOR BRICK MORTAR, GRAY Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	Brown		40.00% Ca Carbonate 5.00% Mica 25.00% Non-fibrous (other) 30.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 28 032102503-0028		Description Homogeneity	MAIN BLDG - BASEMENT MECH ROOM - INTERIOR BRICK MORTAR, GRAY Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	Brown		20.00% Ca Carbonate 35.00% Non-fibrous (other) 45.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 29 032102503-0029		Description Homogeneity	MAIN BLDG - 2ND FLOOR GIRL'S BATHROOM - WALL PLASTER, WHITE COAT Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	White		35.00% Ca Carbonate 60.00% Non-fibrous (other) 5.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 30 032102503-0030		Description Homogeneity	MAIN BLDG - 2ND FLOOR IT ROOM - WALL PLASTER, WHITE COAT Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	White		35.00% Ca Carbonate 60.00% Non-fibrous (other) 5.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed

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Project ID:

Test Report:Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 31 032102503-0031		Description Homogeneity	MAIN BLDG - 3RD FLOOR P.L.T.M 406 - WALL PLASTER, WHITE COAT Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	White		45.00% Ca Carbonate 50.00% Non-fibrous (other) 5.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 32 032102503-0032		Description Homogeneity	MAIN BLDG - 2ND FLOOR GIRL'S BATHROOM - WALL PLASTER, BROWN COAT Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	Brown		35.00% Ca Carbonate 5.00% Mica 35.00% Non-fibrous (other) 25.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 33 032102503-0033		Description Homogeneity	MAIN BLDG - 2ND FLOOR IT ROOM - WALL PLASTER, BROWN COAT Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	Brown		35.00% Ca Carbonate 5.00% Mica 35.00% Non-fibrous (other) 25.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 34 032102503-0034		Description Homogeneity	MAIN BLDG - 3RD FLOOR P.L.T.M 406 - WALL PLASTER, BROWN COAT Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	Brown	3.00% Cellulose	15.00% Ca Carbonate 37.00% Non-fibrous (other) 45.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 35 032102503-0035		Description Homogeneity	MAIN BLDG - 1ST FLOOR GIRL'S BATHROOM - CEILING PLASTER, WHITE COAT Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	White		35.00% Ca Carbonate 60.00% Non-fibrous (other) 5.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed

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Customer ID: LBAP78

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Project ID:

Test Report:Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 36 032102503-0036		Description Homogeneity	MAIN BLDG - 1ST FLOOR GIRL'S BATHROOM - CEILING PLASTER, WHITE COAT Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	White		35.00% Ca Carbonate 60.00% Non-fibrous (other) 5.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 37 032102503-0037		Description Homogeneity	MAIN BLDG - 3RD FLOOR P.L.T.M 406 - CEILING PLASTER, WHITE COAT Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	White		30.00% Ca Carbonate 60.00% Non-fibrous (other) 10.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 38 032102503-0038		Description Homogeneity	MAIN BLDG - 1ST FLOOR GIRL'S BATHROOM - CEILING PLASTER, BROWN COAT Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	Brown	2.00% Cellulose 3.00% Hair	10.00% Ca Carbonate 5.00% Mica 55.00% Non-fibrous (other) 25.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 39 032102503-0039		Description Homogeneity	MAIN BLDG - 1ST FLOOR GIRL'S BATHROOM - CEILING PLASTER, BROWN COAT Heterogeneous		
PLM NYS 198.1 Friable	02/23/2021	Brown	7.00% Cellulose 3.00% Hair	10.00% Ca Carbonate 5.00% Mica 50.00% Non-fibrous (other) 25.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 40 032102503-0040		Description Homogeneity	MAIN BLDG - 3RD FLOOR P.L.T.M 406 - CEILING PLASTER, BROWN COAT Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	Brown		15.00% Ca Carbonate 3.00% Mica 37.00% Non-fibrous (other) 45.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed

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EMSL Order: 032102503

Customer ID: LBAP78

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Project ID:

Test Report:Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 41 032102503-0041		Description Homogeneity	MAIN BLDG - 2ND FLOOR GIRL'S BATHROOM - CEILING SCRATCH COAT, BEGE (ABOVE 2 X 4 CT) Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	Beige		30.00% Ca Carbonate 65.00% Non-fibrous (other) 5.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 42 032102503-0042		Description Homogeneity	MAIN BLDG - 2ND FLOOR GIRL'S BATHROOM - CEILING SCRATCH COAT, BEGE (ABOVE 2 X 4 CT) Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	Beige		30.00% Ca Carbonate 65.00% Non-fibrous (other) 5.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 43 032102503-0043		Description Homogeneity	MAIN BLDG - 2ND FLOOR GIRL'S BATHROOM - CEILING SCRATCH COAT, BEGE (ABOVE 2 X 4 CT) Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	White/ Beige		25.00% Ca Carbonate 75.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 44 032102503-0044		Description Homogeneity	MAIN BLDG - BASEMENT MECH ROOM - CEMENTITIOUS CELING MATERIAL, GRAY Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	Tan	2.00% Cellulose	35.00% Ca Carbonate 3.00% Mica 40.00% Non-fibrous (other) 20.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 45 032102503-0045		Description Homogeneity	MAIN BLDG - BASEMENT MECH ROOM - CEMENTITIOUS CELING MATERIAL, GRAY Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	Gray	2.00% Cellulose 3.00% Hair	45.00% Ca Carbonate 5.00% Mica 20.00% Non-fibrous (other) 25.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed

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Project ID:

Test Report: Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 46 032102503-0046		Description Homogeneity	MAIN BLDG - BASEMENT MECH ROOM - CEMENTITIOUS CELING MATERIAL, GRAY Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	Gray		20.00% Ca Carbonate 4.00% Mica 26.00% Non-fibrous (other) 50.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 47 032102503-0047		Description Homogeneity	MAIN BLDG - BASEMENT MECH ROOM - WALL SCRATCH COAT, WHITE Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	White	3.00% Cellulose	40.00% Ca Carbonate 50.00% Non-fibrous (other) 7.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 48 032102503-0048		Description Homogeneity	MAIN BLDG - BASEMENT MECH ROOM - WALL SCRATCH COAT, WHITE Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	White	3.00% Cellulose	40.00% Ca Carbonate 50.00% Non-fibrous (other) 7.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 49 032102503-0049		Description Homogeneity	MAIN BLDG - BASEMENT MECH ROOM - WALL SCRATCH COAT, WHITE Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	White		40.00% Ca Carbonate 55.00% Non-fibrous (other) 5.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 50 032102503-0050		Description Homogeneity	MAIN BLDG - BASEMENT GIRL'S BATHROOM - CERAMIC WALL TILE GROUT, WHITE Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	White		45.00% Ca Carbonate 5.00% Mica 40.00% Non-fibrous (other) 10.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed

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Project ID:

Test Report: Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 51 032102503-0051		Description Homogeneity	MAIN BLDG - 1ST FLOOR GIRL'S BATHROOM - CERAMIC WALL TILE GROUT, WHITE Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	White		50.00% Ca Carbonate 6.00% Mica 44.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 52 032102503-0052		Description Homogeneity	MAIN BLDG - BASEMENT GIRL'S BATHROOM - CERAMIC WAL TILE BACKING, BEIGE Heterogeneous		
PLM NYS 198.1 Friable	02/23/2021	Brown/ Beige	7.00% Cellulose	35.00% Ca Carbonate 55.00% Non-fibrous (other) 3.00% Quartz	None Detected
Result includes a small amount of inseparable attached material.					
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 53 032102503-0053		Description Homogeneity	MAIN BLDG - 1ST FLOOR GIRL'S BATHROOM - CERAMIC WAL TILE BACKING, BEIGE Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	Beige	5.00% Cellulose	30.00% Ca Carbonate 65.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 54 032102503-0054		Description Homogeneity	MAIN BLDG - BASEMENT GIRL'S BATHROOM - CERAMIC FLOOR TILE MORTAR, DARK GREY Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	Gray		45.00% Ca Carbonate 25.00% Non-fibrous (other) 30.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 55 032102503-0055		Description Homogeneity	MAIN BLDG - 1ST FLOOR GIRL'S BATHROOM - CERAMIC FLOOR TILE MORTAR, DARK GREY Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	Gray		25.00% Ca Carbonate 40.00% Non-fibrous (other) 35.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed

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Project ID:

Test Report:Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 56 032102503-0056		Description Homogeneity	MAIN BLDG - 1ST FLOOR GIRL'S BATHROOM - FIXTURE CAULKING, WHITE Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	02/22/2021	White	<1.00% Fibrous (other)	100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	02/23/2021	White		100.00% Other	None Detected
Sample ID 57 032102503-0057		Description Homogeneity	MAIN BLDG - 2ND FLOOR GIRL'S BATHROOM - FIXTURE CAULKING, WHITE Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	02/22/2021	White	<1.00% Fibrous (other)	100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	02/23/2021	White		100.00% Other	None Detected
Sample ID 58 032102503-0058		Description Homogeneity	MAIN BLDG - 2ND FLOOR GIRL'S BATHROOM - 2' X 4' (2X2 DESIGN) CEILING TILE, WHITE Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	02/22/2021	White	13.00% Glass	87.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	02/23/2021	White		100.00% Other	None Detected
Sample ID 59 032102503-0059		Description Homogeneity	MAIN BLDG - 2ND FL COMPUTER LAB 303 - 2' X 4' (2X2 DESIGN) CEILING TILE, WHITE Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	02/22/2021	White	14.00% Glass 3.60% Min. Wool	82.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	02/23/2021	White		100.00% Other	None Detected
Sample ID 60 032102503-0060		Description Homogeneity	MAIN BLDG - BASEMENT GIRL'S BATHROOM - 2' X 4' FISSURED CEILING TILE, WHITE Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	02/22/2021	White	13.00% Glass	87.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	02/23/2021	White		100.00% Other	None Detected
Sample ID 61 032102503-0061		Description Homogeneity	MAIN BLDG - BASEMENT GIRL'S BATHROOM - 2' X 4' FISSURED CEILING TILE, WHITE Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	02/22/2021	White	12.00% Glass	88.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	02/23/2021	White		100.00% Other	None Detected

Initial report from: 02/23/2021 04:59:17



EMSL Analytical, Inc.

307 West 38th Street New York, NY 10018

Tel/Fax: (212) 290-0051 / (212) 290-0058

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EMSL Order: 032102503

Customer ID: LBAP78

Customer PO: 31402880.011

Project ID:

Test Report: Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 62 032102503-0062		Description Homogeneity	MAIN BLDG - 3RD FLOOR P.L.T.M 406 - STONE LAB COUNTERTOP, BLACK Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	Black		15.00% Ca Carbonate 55.00% Non-fibrous (other) 30.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 63 032102503-0063		Description Homogeneity	MAIN BLDG - 3RD FLOOR P.L.T.M 406 - STONE LAB COUNTERTOP, BLACK Homogeneous		
PLM NYS 198.1 Friable	02/23/2021	Black		15.00% Ca Carbonate 70.00% Non-fibrous (other) 15.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 64 032102503-0064		Description Homogeneity	MAIN BLDG - 2ND FLOOR COMPUTER LAB 303 - MASTIC ASSOCIATED WITH 12" X 12" BROWN & BEIGE FLOOR TILE, BROWN Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	02/22/2021	Yellow		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	02/23/2021	Yellow		100.00% Other	None Detected
Sample ID 65 032102503-0065		Description Homogeneity	MAIN BLDG - 3RD FLOOR P.L.T.M 406 - MASTIC ASSOCIATED WITH 12" X 12" BROWN & BEIGE FLOOR TILE, BROWN Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	02/22/2021	Brown		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	02/23/2021	Brown		100.00% Other	None Detected
Sample ID 66 032102503-0066		Description Homogeneity	MAIN BLDG - 2ND FLOOR COMPUTER LAB 303 - 12" X 12" FLOOR TILE, BROWN Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	02/22/2021	Brown		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	02/23/2021	Brown		100.00% Other	None Detected
Sample ID 67 032102503-0067		Description Homogeneity	MAIN BLDG - 3RD FLOOR P.L.T.M 406 - 12" X 12" FLOOR TILE, BROWN Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	02/22/2021	Brown		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	02/23/2021	Brown		100.00% Other	None Detected

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EMSL Order: 032102503

Customer ID: LBAP78

Customer PO: 31402880.011

Project ID:

Test Report:Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 68 032102503-0068		Description Homogeneity	MAIN BLDG - 2ND FLOOR COMPUTER LAB 303 - 12" X 12" FLOOR TILE, BEIGE Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	02/22/2021	Beige		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	02/23/2021	Beige		100.00% Other	None Detected
Sample ID 69 032102503-0069		Description Homogeneity	MAIN BLDG - 3RD FLOOR P.L.T.M 406 - 12" X 12" FLOOR TILE, BEIGE Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	02/22/2021	Beige		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	02/23/2021	Beige		100.00% Other	None Detected
Sample ID 70 032102503-0070		Description Homogeneity	MAIN BLDG - 3RD FLOOR P.L.T.M 406 - MASTIC ASSOCIATED WITH 12" X 12" WHITE FLOOR TILE, BROWN, YELLOW Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	02/22/2021	Brown		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	02/23/2021	Brown		100.00% Other	None Detected
Sample ID 71 032102503-0071		Description Homogeneity	MAIN BLDG - 3RD FLOOR P.L.T.M 406 - MASTIC ASSOCIATED WITH 12" X 12" WHITE FLOOR TILE, BROWN, YELLOW Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	02/22/2021	Brown		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	02/23/2021	Brown		100.00% Other	None Detected
Sample ID 72 032102503-0072		Description Homogeneity	MAIN BLDG - 3RD FLOOR P.L.T.M 406 - 12" X 12" FLOOR TILE, WHITE Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	02/22/2021	White		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	02/23/2021	White		100.00% Other	None Detected
Sample ID 73 032102503-0073		Description Homogeneity	MAIN BLDG - 3RD FLOOR P.L.T.M 406 - 12" X 12" FLOOR TILE, WHITE Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	02/22/2021	White		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	02/23/2021	White		100.00% Other	None Detected

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EMSL Order: 032102503

Customer ID: LBAP78

Customer PO: 31402880.011

Project ID:

Test Report:Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 74 032102503-0074		Description Homogeneity	MAIN BLDG - 3RD FLOOR BATHROOM - MASTIC ASSOCIATED WITH 9" X 9" BROWN FLOOR TILE, BLACK (UNDER CERAMIC FLOOR TILE) Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	02/22/2021	Brown		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	02/23/2021	Brown		100.00% Other	None Detected
Sample ID 75 032102503-0075		Description Homogeneity	MAIN BLDG - 3RD FLOOR BATHROOM - MASTIC ASSOCIATED WITH 9" X 9" BROWN FLOOR TILE, BLACK (UNDER CERAMIC FLOOR TILE) Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	02/22/2021	Brown		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	02/23/2021	Brown		100.00% Other	None Detected
Sample ID 76 032102503-0076		Description Homogeneity	MAIN BLDG - 3RD FLOOR BATHROOM - 9" X 9" FLOOR TILE, BROWN Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	02/22/2021	Brown	None	92.90% Other	7.10% Chrysotile
TEM NYS 198.4 NOB	02/22/2021				Positive Stop (Not Analyzed)
Sample ID 77 032102503-0077		Description Homogeneity	MAIN BLDG - 3RD FLOOR BATHROOM - 9" X 9" FLOOR TILE, BROWN		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	02/22/2021				Positive Stop (Not Analyzed)
TEM NYS 198.4 NOB	02/22/2021				Positive Stop (Not Analyzed)
Sample ID 78 032102503-0078		Description Homogeneity	MAIN BLDG - 3RD FLOOR P.L.T.M 406 - MASTIC ASSOCIATED WITH 6" BEIGE COVE BASE MOLDING Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	02/22/2021	Beige		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	02/23/2021	Beige		100.00% Other	None Detected
Sample ID 79 032102503-0079		Description Homogeneity	MAIN BLDG - 3RD FLOOR P.L.T.M 406 - MASTIC ASSOCIATED WITH 6" BEIGE COVE BASE MOLDING Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	02/22/2021	Beige		100.00% Other	Inconclusive: None Detected
Final Residue <1% of original subsample.					
TEM NYS 198.4 NOB	02/23/2021	Beige		100.00% Other	None Detected

Initial report from: 02/23/2021 04:59:17



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EMSL Order: 032102503

Customer ID: LBAP78

Customer PO: 31402880.011

Project ID:

Test Report:Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 80 032102503-0080		Description Homogeneity	MAIN BLDG - 3RD FLOOR P.L.T.M 406 - 6"COVE BASE MOLDING, BEIGE Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	02/22/2021	Beige		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	02/23/2021	Beige		100.00% Other	None Detected
Sample ID 81 032102503-0081		Description Homogeneity	MAIN BLDG - 3RD FLOOR P.L.T.M 406 - 6"COVE BASE MOLDING, BEIGE Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	02/22/2021	Beige		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	02/23/2021	Beige		100.00% Other	None Detected
Sample ID 82 032102503-0082		Description Homogeneity	MAIN BLDG - MASTIC ASSOCIATED WITH 4" BLACK COVE BASE MOLDING, BEIGE Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	02/22/2021	Beige		100.00% Other	Inconclusive: None Detected
Final Residue <1% of original subsample.					
TEM NYS 198.4 NOB	02/23/2021	Beige		100.00% Other	None Detected
Sample ID 83 032102503-0083		Description Homogeneity	MAIN BLDG - MASTIC ASSOCIATED WITH 4" BLACK COVE BASE MOLDING, BEIGE Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	02/22/2021	Beige		100.00% Other	Inconclusive: None Detected
Final Residue <1% of original subsample.					
TEM NYS 198.4 NOB	02/23/2021	Beige		100.00% Other	None Detected
Sample ID 84 032102503-0084		Description Homogeneity	MAIN BLDG - 4" COVE BASE MOLDING, BLACK Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	02/22/2021	Black		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	02/23/2021	Black		100.00% Other	None Detected
Sample ID 85 032102503-0085		Description Homogeneity	MAIN BLDG - 4" COVE BASE MOLDING, BLACK Heterogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	02/22/2021	Black		100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	02/23/2021	Black		100.00% Other	None Detected

Initial report from: 02/23/2021 04:59:17



EMSL Analytical, Inc.

307 West 38th Street New York, NY 10018

Tel/Fax: (212) 290-0051 / (212) 290-0058

<http://www.EMSL.com> / manhattanlab@emsl.com

EMSL Order: 032102503

Customer ID: LBAP78

Customer PO: 31402880.011

Project ID:

Test Report: Asbestos Analysis of Bulk Material

The samples in this report were submitted to EMSL for analysis by Asbestos Analysis of Bulk Materials via NYS ELAP Approved Methods. The reference number for these samples is the EMSL Order ID above. Please use this reference number when calling about these samples.

Report Comments:

Sample Receipt Date: 2/19/2021

Sample Receipt Time: 8:52 AM

Analysis Completed Date: 2/23/2021

Analysis Completed Time: 10:30 AM

Analyst(s):

Kerrie Gibson PLM NYS 198.1 Friable (29)

Migena Shehu PLM NYS 198.1 Friable (20)

Kerrie Gibson PLM NYS 198.6 NOB (35)

Steven Li TEM NYS 198.4 NOB (34)

Samples reviewed and approved by:

James Hall, Laboratory Manager
or Other Approved Signatory

NOB = Non Friable Organically Bound N/A = Not Applicable VCM = Vermiculite Containing Material

-In New York State, TEM is currently the only method that can be used to determine if NOB materials can be considered or treated as non-asbestos containing.

All samples examined for the presence of vermiculite when analyzed via NYS 198.1.

-NYS Guidelines for Vermiculite containing samples are available at http://www.wadsworth.org/labcert/elapcert/forms/VermiculiteInterimGuidance_Rev070913.pdf EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples were received in good condition unless otherwise noted.

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. This report may contain data that is not covered by the NVLAP accreditation.

Samples analyzed by EMSL Analytical, Inc. New York, NY NYS ELAP 11506, NVLAP Lab Code 101048-9

Initial report from: 02/23/2021 04:59:17

ASBESTOS SURVEY DATA SHEET/ CHAIN OF CUSTODYPAGE 1 OF 3**PROJECT NO.:** 31402880.011**CLIENT:** Irvington UFSID**PROJECT SITE:** Main Street School**Project Manager:** A. Smolyar**LOCATION(S) SURVEYED:** Interior & Exterior**PROPOSED PROJECT:** Renovations**DATE(S) OF INSPECTION:** 2/17/21**Inspector(s):** J. Garcia & S. Gruber

WSP

TELEPHONE NO.: (212) 612-7900 FAX NO.: (212) 363-4341

ADDRESS: 96 Morton Street, 8th Floor, New York, NY 10014

RESULTS TO: Lb.Labresults@wsp.comTURNAROUND TIME: ☐ 12 HR. ☐ 24 HR.☐ 48 HR. ☒ 72 HR.

HA	SAMPLE NO.	SAMPLE LOCATION	MATERIAL DESCRIPTION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
01	01	Gym Bldg. 1 st Fl Boiler Room 101	Gypsum Board, Gray		
	02		↓		
02	03		Joint Compound, White		
	04		↓		
03	05		Cinderblock Wall Master, Gray		
	06	Gymnasium 102	↓		
04	07	Boiler Room 101	Chimney Brick Master, Gray		
	08		↓		
05	09		Fiberglass Boiler Breaching Canvas, Beige		
	10		↓		
	11		↓		

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Received by: (print) David Holcomb	(Sign)	2/19/21	852 AM/PM	Received by: (print) K. Gibson	(Sign)	1/1	AM/PM

NOTE: USE STOP AT FIRST POSITIVE METHODOLOGY FOR EVERY HOMOGENEOUS MATERIAL

Order ID: 032102503

ASBESTOS SURVEY DATA SHEET/ CHAIN OF CUSTODYPAGE 2 OF 8**PROJECT NO.:** 31402880.01**CLIENT:** Irvington UFSD**PROJECT SITE:** Main Street School**Project Manager:** A Smolay**LOCATION(S) SURVEYED:** Interior & Exterior**PROPOSED PROJECT:** Renovations**DATE(S) OF INSPECTION:** 2/17/21**Inspector(s):** S. Garcia & S. Grube ✓

WSP

TELEPHONE NO.: (212) 612-7900 FAX NO.: (212) 363-4341

ADDRESS: 96 Morton Street, 8th Floor, New York, NY 10014**RESULTS TO:** Lb.Labresults@wsp.comTURNAROUND TIME: ☐ 12 HR. ☐ 24 HR.☐ 48 HR. ☒ 72 HR.

HA	SAMPLE NO.	SAMPLE LOCATION	MATERIAL DESCRIPTION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
06	12	Gym Bldg. 1 st Fl Boiler Room	Fiberglass Pipe Edge Reinforcements		
	13		Sealant, Gray		
	14				
07	15		Wall Penetration Sealant, Red		
	16				
08	17	Walkway Roof	Roofing Shingles, Brown/Black (Top Layer)		
	18				
09	19		Roofing Shingles, Gray/Black (Bottom Layer)		
	20				
10	21		Felt Paper below Shingles, Black		
	22				

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Received by: (print) David H	(Sign)	2/19/21	(AM/PM)	Received by: (print) S. Grube	(Sign)	2/19/21	(AM/PM)	Received by: (print) S. Grube	(Sign)	2/22/2021	(AM/PM)

NOTE: USE STOP AT FIRST POSITIVE METHODOLOGY FOR EVERY HOMOGENEOUS MATERIAL

032142503

ASBESTOS SURVEY DATA SHEET/ CHAIN OF CUSTODY

PAGE 3 OF 8

PROJECT NO.: 31402880.011
CLIENT: Irvington UFSD
PROJECT SITE: Main Street School
Project Manager: A. Smolyar

LOCATION(S) SURVEYED: Interior & Exterior
PROPOSED PROJECT: Renovations
DATE(S) OF INSPECTION: 2/17/21
Inspector(s): S. Garcia & S. Gruber

WSP
TELEPHONE NO.: (212) 612-7900 FAX NO.: (212) 363-4341
ADDRESS: 96 Morton Street, 8th Floor, New York, NY 10014

RESULTS TO: Lb.Labresults@wsp.com

TURNAROUND TIME: ☐ 12 HR. ☐ 24 HR.
☐ 48 HR. ☒ 72 HR.

HA	SAMPLE NO.	SAMPLE LOCATION	MATERIAL DESCRIPTION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
11	23	Main Bldg. Basement Girl's Bathroom	Gypsum Board, Gray		
	24	3rd Floor P.L.T.M 406	↓		
12	25	Basement Girl's Bathroom	Joint Compound, White		
	26	3rd Floor P.L.T.M 406	↓		
13	27	Basement Mech Room	Interior Brick Mortar, Gray		
	28	↓ ↓	↓		
14	29	2nd Floor Girl's Bathroom	Wall Plaster, White coat		
	30	↓ IT Room	↓		
	31	3rd Floor P.L.T.M. 406	↓		
15	32	2nd Floor Girl's Bathroom	Wall Plaster, Brown coat		
	33	↓ IT Room	↓		
	34	3rd Floor P.L.T.M. 406	↓		

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Received by: (print) David H	(Sign) [Signature]	2/19/21	AMP	Received by: (print) K. Gibson	(Sign) [Signature]	02/22/2021	AMP

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Order ID: 032102503

Page 3 Of 16

ASBESTOS SURVEY DATA SHEET/ CHAIN OF CUSTODY

PAGE 4 OF 8

PROJECT NO.: 31402880.011

CLIENT: Irvington UFSD

PROJECT SITE: Main Street School

Project Manager: A. Smolyov

LOCATION(S) SURVEYED: Interior & Exterior

PROPOSED PROJECT: Renovations

DATE(S) OF INSPECTION: 2/17/21

Inspector(s): J. Garcia & S. Gruber

WSP

TELEPHONE NO.: (212) 612-7900 FAX NO.: (212) 363-4341

ADDRESS: 96 Morton Street, 8th Floor, New York, NY 10014

RESULTS TO: Lb.Labresults@wsp.com

TURNAROUND TIME: ☐ 12 HR. ☐ 24 HR.☐ 48 HR. ☒ 72 HR.

HA	SAMPLE NO.	SAMPLE LOCATION	MATERIAL DESCRIPTION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
16	35	Main Bldg. 1 st Floor Girls Bathroom	Ceiling Plaster, White Coat		
	36	↓ ↓	↓		
	37	3 rd Floor P.L.T.M. 406	↓		
17	38	1 st Floor Girls Bathroom	Ceiling Plaster, Brown Coat		
	39	↓ ↓	↓		
	40	3 rd Floor P.L.T.M. 406	↓		
18	41	2 nd Floor Girl's Bathroom	Ceiling Scratch Coat, Boise (above 2x4 ct)		
	42	↓ ↓	↓		
	43	↓ ↓	↓		
19	44	Basement Mech Room	Cementitious Ceiling Material, Gray		
	45	↓ ↓	↓		
	46	↓ ↓	↓		

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CHAIN OF CUSTODY

Relinquished by: (Int) J. Garcia	(Sign) [Signature]	2/19/21	AM/PM	Relinquished by: (print) K. Gibson	(Sign) [Signature]	02/22/2021	AM/PM
Received by: (Int) David H	(Sign) [Signature]	2/19/21	852 AM/PM	Received by: (print) K. Gibson	(Sign) [Signature]	1/1	AM/PM

NOTE: USE STOP AT FIRST POSITIVE METHODOLOGY FOR EVERY HOMOGENEOUS MATERIAL

Order ID: 032102503

ASBESTOS SURVEY DATA SHEET/ CHAIN OF CUSTODY

PAGE 5 OF 8

PROJECT NO.: 31402880.011

CLIENT: Irvington UFSD

PROJECT SITE: Main Street School

Project Manager: A. Smolyar

LOCATION(S) SURVEYED: Interior & Exterior

PROPOSED PROJECT: Renovations

DATE(S) OF INSPECTION: 2/17/21

Inspector(s): S. Garcia & S. Gruber

WSP

TELEPHONE NO.: (212) 612-7900 FAX NO.: (212) 363-4341

ADDRESS: 96 Morton Street, 8th Floor, New York, NY 10014

RESULTS TO: Lb.Labresults@wsp.com

TURNAROUND TIME: ☐ 12 HR. ☐ 24 HR.☐ 48 HR. ☒ 72 HR.

HA	SAMPLE NO.	SAMPLE LOCATION	MATERIAL DESCRIPTION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
20	47	Main Bldg. Basement Mech Room	Wall Scratch Coat, White		
	48				
	49				
21	50	Basement Girls Bathroom	Ceramic Wall Tile Grout, White		
	51	1st floor Girls Bathroom			
22	52	Basement Girls Bathroom	Ceramic Wall Tile Backing, Beige		
	53	1st floor Girls Bathroom			
23	54	Basement Girls Bathroom	Ceramic floor Tile Mortar, Dark Gray		
	55	1st floor Girls Bathroom			
24	56		Fixture Caulking, White		
	57	2nd floor			

 ENVIRONMENTAL LAB
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 2021 FEB 19 AM 8:52

CHAIN OF CUSTODY

Relinquished by: (Int) S. Garcia	(Sign)	2/19/21	AM/PM	Relinquished by: (print) K. Gibson	(Sign)	2/23/21	AM/PM
Received by: (Int) David H.	(Sign)	2/19/21	852A	Received by: (print) K. Gibson	(Sign)	02/22/2021	AM/PM

NOTE: USE STOP AT FIRST POSITIVE METHODOLOGY FOR EVERY HOMOGENEOUS MATERIAL

Order ID: 032102503

032102503

ASBESTOS SURVEY DATA SHEET/ CHAIN OF CUSTODYPAGE 6 OF 8**PROJECT NO.:** 31407882.011**CLIENT:** Irvington UFSD**PROJECT SITE:** Main Street School**Project Manager:** A Smolyar**LOCATION(S) SURVEYED:** Interior & Exterior**PROPOSED PROJECT:** Renovations**DATE(S) OF INSPECTION:** 2/17/21**Inspector(s):** S. Garcia & SP Gruber

WSP

TELEPHONE NO.: (212) 612-7900 FAX NO.: (212) 363-4341

ADDRESS: 96 Morton Street, 8th Floor, New York, NY 10014**RESULTS TO:** Lb.Labresults@wsp.comTURNAROUND TIME: ☐ 12 HR. ☐ 24 HR.☐ 48 HR. ☒ 72 HR.

HA	SAMPLE NO.	SAMPLE LOCATION	MATERIAL DESCRIPTION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
25	58	Main Bldg. 2 nd Fl Girl's Bathroom	2'x4' (2x2 Design) Ceiling Tile, white		
	59	Computer Lab 303	↓		
26	60	Basement Girl's Bathroom	2'x4' Fissured Ceiling Tile, white		
	61	↓ ↓	↓		
27	62	3 rd Floor P.L.T.M. 406	Stone Lab Countertop, Black		
	63	↓ ↓	↓		
28	64	2 nd Floor Computer Lab 303	Acoustic Associated with 12"X12"		
	65	3 rd Floor P.L.T.M. 406	Brown & Base Floor Tile, Brown		
29	66	2 nd Floor Computer Lab 303	12"X12" Floor Tile, Brown		
	67	3 rd Floor P.L.T.M. 406	↓		
30	68	2 nd Floor Computer Lab 303	12"X12" Floor Tile, Base		
	69	3 rd Floor P.L.T.M. 406	↓		

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CHAIN OF CUSTODY

Relinquished by: (Int) S. Garcia	(Sign)	2/19/21	AM/PM	Relinquished by: (print) K Gibson	(Sign)	02/23/21	AM/PM
Received by: (Int) David H	(Sign)	2/11/21	AM/PM	Received by: (print) K Gibson	(Sign)	1/1	AM/PM

NOTE: USE STOP AT FIRST POSITIVE METHODOLOGY FOR EVERY HOMOGENEOUS MATERIAL

Order ID: 032102503

ASBESTOS SURVEY DATA SHEET/ CHAIN OF CUSTODY

PAGE 7 OF 8

PROJECT NO.: 31402880.01

CLIENT: Irvington UFSD

PROJECT SITE: Main Street School

Project Manager: A. Smolyar

LOCATION(S) SURVEYED: Interior & Exterior

PROPOSED PROJECT: Renovations

DATE(S) OF INSPECTION: 2/17/21

Inspector(s): J. Garcia & S. Gruber

WSP
 TELEPHONE NO.: (212) 612-7900 FAX NO.: (212) 363-4341
 ADDRESS: 96 Morton Street, 8th Floor, New York, NY 10014

RESULTS TO: Lb.Labresults@wsp.com

TURNAROUND TIME: ☐ 12 HR. ☐ 24 HR.☐ 48 HR. ☒ 72 HR.




HA	SAMPLE NO.	SAMPLE LOCATION	MATERIAL DESCRIPTION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
31	70	Main Bldg. 3rd Floor P.L.T.M. 406	Mastic Associated with 12"X12"		
	71		White Floor Tile, Brown/yellow		
32	72		12"X12" Floor Tile, White		
	73				
33	74	3rd Floor Bathroom	Felt Rope/Mastic Associated with 9"X9" Brown		
	75		Floor Tile, Black (under ceramic floor tile)		
34	76		9"X9" Floor Tile, Brown		
	77				
35	78	3rd Floor P.L.T.M. 406	Mastic Associated with 6" Beige		
	79		Core Base Molding, Beige		
36	80		6" Core Base Molding, Black Beige		
	81				

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2021 FEB 19 AM 8:52
 Page 7 of 9

CHAIN OF CUSTODY

derID:

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Received by: (Int) DAVID H	(Sign) 	2/14/21	853 AM/PM	Received by: (print)	(Sign)	1	1	AMP/PM	Received by: (print)	(Sign)	1	1	AMP/PM

NOTE: USE STOP AT FIRST POSITIVE METHODOLOGY FOR EVERY HOMOGENEOUS MATERIAL

Order ID: 032102503

032102503

ASBESTOS SURVEY DATA SHEET/ CHAIN OF CUSTODY

PAGE 8 OF 8

PROJECT NO.: 3140 2880-01
CLIENT: Irvington UFSD
PROJECT SITE: Main Street School
Project Manager: A. Smolyar

LOCATION(S) SURVEYED: Interior & Exterior
PROPOSED PROJECT: Renovations
DATE(S) OF INSPECTION: 2/17/21
Inspector(s): S. Gortie & S. Gruber

WSP
 TELEPHONE NO.: (212) 612-7900 FAX NO.: (212) 363-4341
 ADDRESS: 96 Morton Street, 8th Floor, New York, NY 10014

RESULTS TO: Lb.Labresults@wsp.com

TURNAROUND TIME: ☐ 12 HR. ☐ 24 HR.
☐ 48 HR. ☒ 72 HR.

HA	SAMPLE NO.	SAMPLE LOCATION	MATERIAL DESCRIPTION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
37	82	Main Bldg. ↓	Mastic Associated with 4" Black		
	83		Over Base Moldings, Boise		
38	84		4" Over Base Moldings, Black		
	85		↓		

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Order ID: 032102503

CHAIN OF CUSTODY

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Received by: (print) David H.	(Sign)	2/19/21	(AM/PM)	Received by: (print) David H.	(Sign)	2/19/21	(AM/PM)	Received by: (print) David H.	(Sign)	2/19/21	(AM/PM)

NOTE: USE STOP AT FIRST POSITIVE METHODOLOGY FOR EVERY HOMOGENEOUS MATERIAL



EMSL Analytical, Inc.

307 West 38th Street New York, NY 10018

Tel/Fax: (212) 290-0051 / (212) 290-0058

<http://www.EMSL.com / manhattanlab@emsl.com>

EMSL Order: 032103350

Customer ID: LBAP78

Customer PO: 31401880.011

Project ID:

Attention: Alex Smolyar

WSP USA Solutions Inc

96 Morton Street

8th floor

New York, NY 10014

Phone: (212) 612-7900

Fax:

Received Date: 03/03/2021 11:05 AM

Analysis Date: 03/06/2021

Collected Date: 03/03/2021

Project: 31401880.011/ IRVINGTON UFSD/ MAIN STREET SCHOOL/ EXTERIOR

Test Report:Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 86 032103350-0001		Description Homogeneity	GYM ROOF CENTER - SCREED (GRAY) Homogeneous		
PLM NYS 198.1 Friable	03/06/2021	Gray		25.00% Ca Carbonate 10.00% Non-fibrous (other) 10.00% Perlite 55.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 87 032103350-0002		Description Homogeneity	GYM ROOF N - SCREED (GRAY) Homogeneous		
PLM NYS 198.1 Friable	03/06/2021	Gray		30.00% Ca Carbonate 4.00% Mica 16.00% Non-fibrous (other) 50.00% Quartz	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 88 032103350-0003		Description Homogeneity	GYM ROOF CENTER - FELT PAPER (BLACK) Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	03/06/2021	Black	<1.00% Min. Wool	100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	03/06/2021	Black		100.00% Other	None Detected
Sample ID 89 032103350-0004		Description Homogeneity	GYM ROOF N - FELT PAPER (BLACK) Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	03/06/2021	Black	<1.00% Min. Wool	100.00% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	03/06/2021	Black		100.00% Other	None Detected
Sample ID 90 032103350-0005		Description Homogeneity	GYM ROOF CENTER - BOTTOM LAYER (BLACK) Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	03/06/2021	Black	2.50% Glass	97.50% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	03/06/2021	Black	<1.00% Fibrous (other)	100.00% Other	None Detected

Initial report from: 03/06/2021 15:31:04



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307 West 38th Street New York, NY 10018

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EMSL Order: 032103350

Customer ID: LBAP78

Customer PO: 31401880.011

Project ID:

Test Report:Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID 91 032103350-0006		Description GYM ROOF N - BOTTOM LAYER (BLACK)	Homogeneity Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	03/06/2021	Black	2.90% Glass	97.10% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	03/06/2021	Black		100.00% Other	None Detected
Sample ID 92 032103350-0007		Description GYM ROOF CENTER - PERLITE INSULATION (BROWN)	Homogeneity Homogeneous		
PLM NYS 198.1 Friable	03/06/2021	Brown	85.00% Cellulose	15.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 93 032103350-0008		Description GYM ROOF N - PERLITE INSULATION (BROWN)	Homogeneity Homogeneous		
PLM NYS 198.1 Friable	03/06/2021	Brown	90.00% Cellulose	10.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 94 032103350-0009		Description GYM ROOF CENTER - TOP MEMBRANE (BLACK)	Homogeneity Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	03/06/2021	Black	3.50% Glass	96.50% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	03/06/2021	Black		100.00% Other	None Detected
Sample ID 95 032103350-0010		Description GYM ROOF N - TOP MEMBRANE (BLACK)	Homogeneity Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	03/06/2021	Black	1.70% Glass	98.30% Other	Inconclusive: None Detected
TEM NYS 198.4 NOB	03/06/2021	Black		100.00% Other	None Detected
Sample ID 96 032103350-0011		Description BELL TOWER @ - TAR (BLACK)	Homogeneity Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	03/06/2021	Black	None	89.00% Other	11.00% Chrysotile
TEM NYS 198.4 NOB	03/06/2021				Positive Stop (Not Analyzed)

Initial report from: 03/06/2021 15:31:04



EMSL Analytical, Inc.

307 West 38th Street New York, NY 10018

Tel/Fax: (212) 290-0051 / (212) 290-0058

<http://www.EMSL.com> / manhattanlab@emsl.com

EMSL Order: 032103350

Customer ID: LBAP78

Customer PO: 31401880.011

Project ID:

Test Report:Asbestos Analysis of Bulk Material

Test	Analyzed Date	Color	Non-Asbestos		Asbestos
			Fibrous	Non-Fibrous	
Sample ID	97	Description	BELL TOWER @ - TAR (BLACK)		
	032103350-0012	Homogeneity			
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	03/06/2021				Positive Stop (Not Analyzed)
TEM NYS 198.4 NOB	03/06/2021				Positive Stop (Not Analyzed)

Initial report from: 03/06/2021 15:31:04



EMSL Analytical, Inc.

307 West 38th Street New York, NY 10018

Tel/Fax: (212) 290-0051 / (212) 290-0058

<http://www.EMSL.com> / manhattanlab@emsl.com

EMSL Order: 032103350

Customer ID: LBAP78

Customer PO: 31401880.011

Project ID:

Test Report: Asbestos Analysis of Bulk Material

The samples in this report were submitted to EMSL for analysis by Asbestos Analysis of Bulk Materials via NYS ELAP Approved Methods. The reference number for these samples is the EMSL Order ID above. Please use this reference number when calling about these samples.

Report Comments:

Sample Receipt Date: 3/3/2021

Sample Receipt Time: 11:05 AM

Analysis Completed Date: 3/6/2021

Analysis Completed Time: 5:42 PM

Analyst(s):

Angelica Serrano PLM NYS 198.1 Friable (2)

Angelica Serrano PLM NYS 198.6 NOB (7)

Johannes Breckheimer PLM NYS 198.1 Friable (2)

Steven Dutter TEM NYS 198.4 NOB (6)

Samples reviewed and approved by:

James Hall, Laboratory Manager
or Other Approved Signatory

NOB = Non Friable Organically Bound N/A = Not Applicable VCM = Vermiculite Containing Material

-In New York State, TEM is currently the only method that can be used to determine if NOB materials can be considered or treated as non-asbestos containing.

All samples examined for the presence of vermiculite when analyzed via NYS 198.1.

-NYS Guidelines for Vermiculite containing samples are available at http://www.wadsworth.org/labcert/elapcert/forms/VermiculiteInterimGuidance_Rev070913.pdf EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples were received in good condition unless otherwise noted.

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. This report may contain data that is not covered by the NVLAP accreditation.

Samples analyzed by EMSL Analytical, Inc. New York, NY NYS ELAP 11506, NVLAP Lab Code 101048-9

Initial report from: 03/06/2021 15:31:04



ASBESTOS SURVEY DATA SHEET/ CHAIN OF CUSTODY

PAGE 1 OF 1

PROJECT NO.: 31401880.011

CLIENT: Irvington UFSD

PROJECT SITE: Main Street School

Project Manager: A. Smolyar

LOUIS BERGER

TELEPHONE NO.: (212) 612-7900 FAX NO.: (212) 363-4341

ADDRESS: 96 Morton Street, 8th Floor, New York, NY 10014

LOCATION(S) SURVEYED: Exterior

PROPOSED PROJECT: Renovation

DATE(S) OF INSPECTION: 3/13/21

Inspector(s): A. Smolyar, J. Wong

RESULTS TO: Lb.Labresults@wsp.com

TURNAROUND TIME: ☐ 12 HR. ☐ 24 HR.☐ 48 HR. ☒ 72 HR.

032103350

HA	SAMPLE NO.	SAMPLE LOCATION	MATERIAL DESCRIPTION	APPROX. QUANTITY (LF/SF)	FIELD NOTES
39	86	Gym Roof Center	Screed (gray)		
↓	87	N	↓		
40	88	Center	Felt paper (black)		
↓	89	N	↓		
41	90	Center	Bottom Layer (black)		
↓	91	N	↓		
42	92	Center	Perlite Insulation (brown)		
↓	93	N	↓		
43	94	Center	Top Membrane (black)		
↓	95	N	↓		
44	96	Bell Tower @ Windows	Tar (black)		
↓	97	↓	↓		

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CHAIN OF CUSTODY

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Received by: (print) J. Wong	(Sign)	3/13/21 10:50 AM/PM	Received by: (print)	(Sign)	1/1 AM/PM	Received by: (print)	(Sign)	1/1 AM/PM

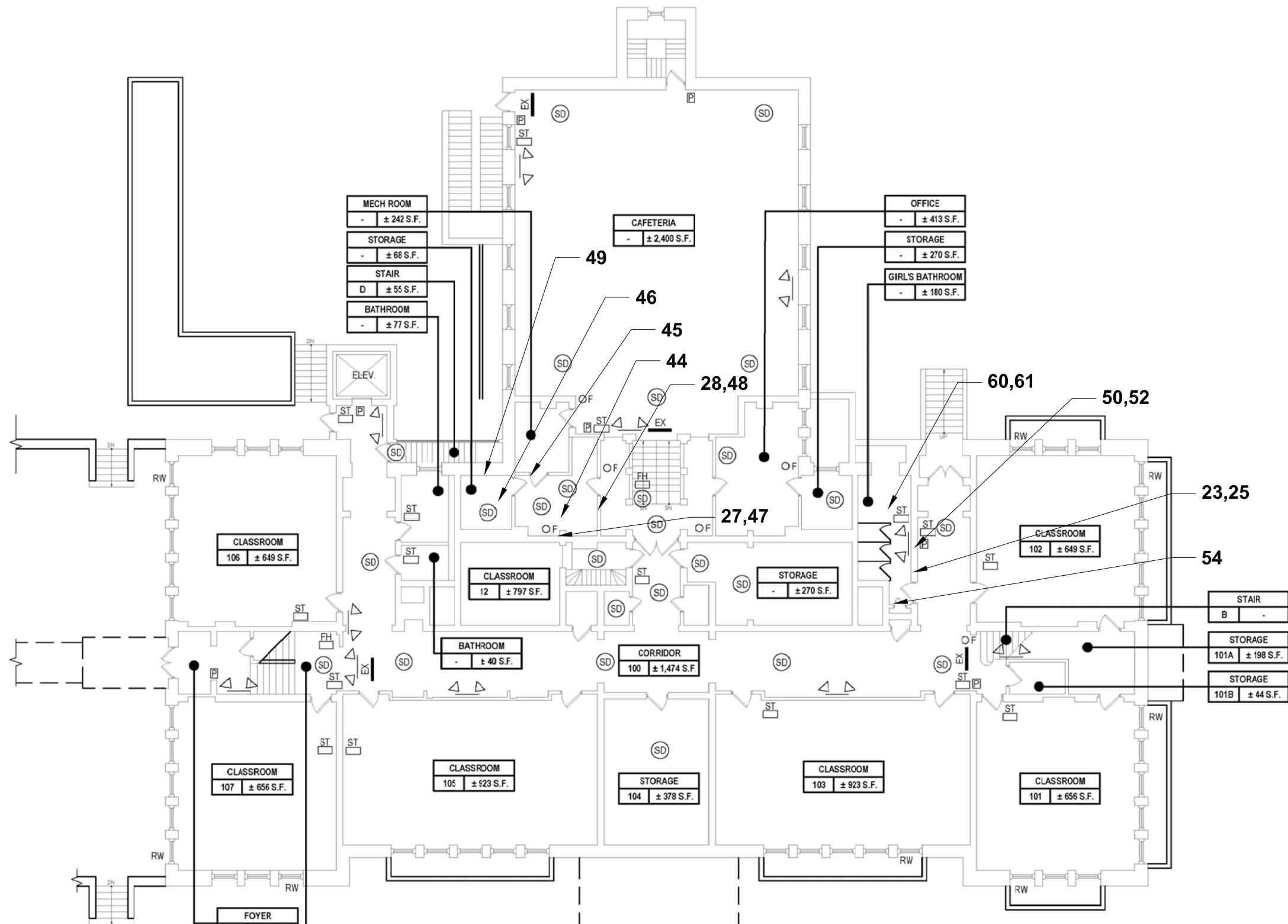
A. Smolyar 3/16/21

J. Wong 3/16/21

NOTE: USE STOP AT FIRST POSITIVE METHODOLOGY FOR EVERY HOMOGENEOUS MATERIAL



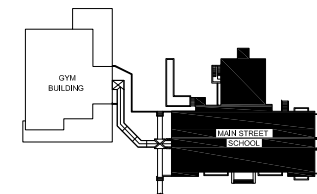
**APPENDIX C:
ASBESTOS BULK SAMPLE LOCATION DRAWINGS**



1
BSL001

MAIN BUILDING - BASEMENT PLAN

SCALE: 1/8" = 1'-0"



KEY PLAN
SCALE: NOT TO SCALE

CONSULTANTS: ENVIRONMENTAL CONSULTANT



WSP USA SOLUTIONS
500 SUMMIT ROAD, SUITE 450
VALHALLA, NY 10595
TELEPHONE: 914.762.1120

MARK	DATE	DESCRIPTION

DESIGNED BY:	DRAWN BY:	CHECKED BY:	REVIEWED BY:
SE	JG	AS	AS
PROJECT NO:	DATE:	SCALE:	
31402880.011	MARCH 2021	AS SHOWN	

CLIENT

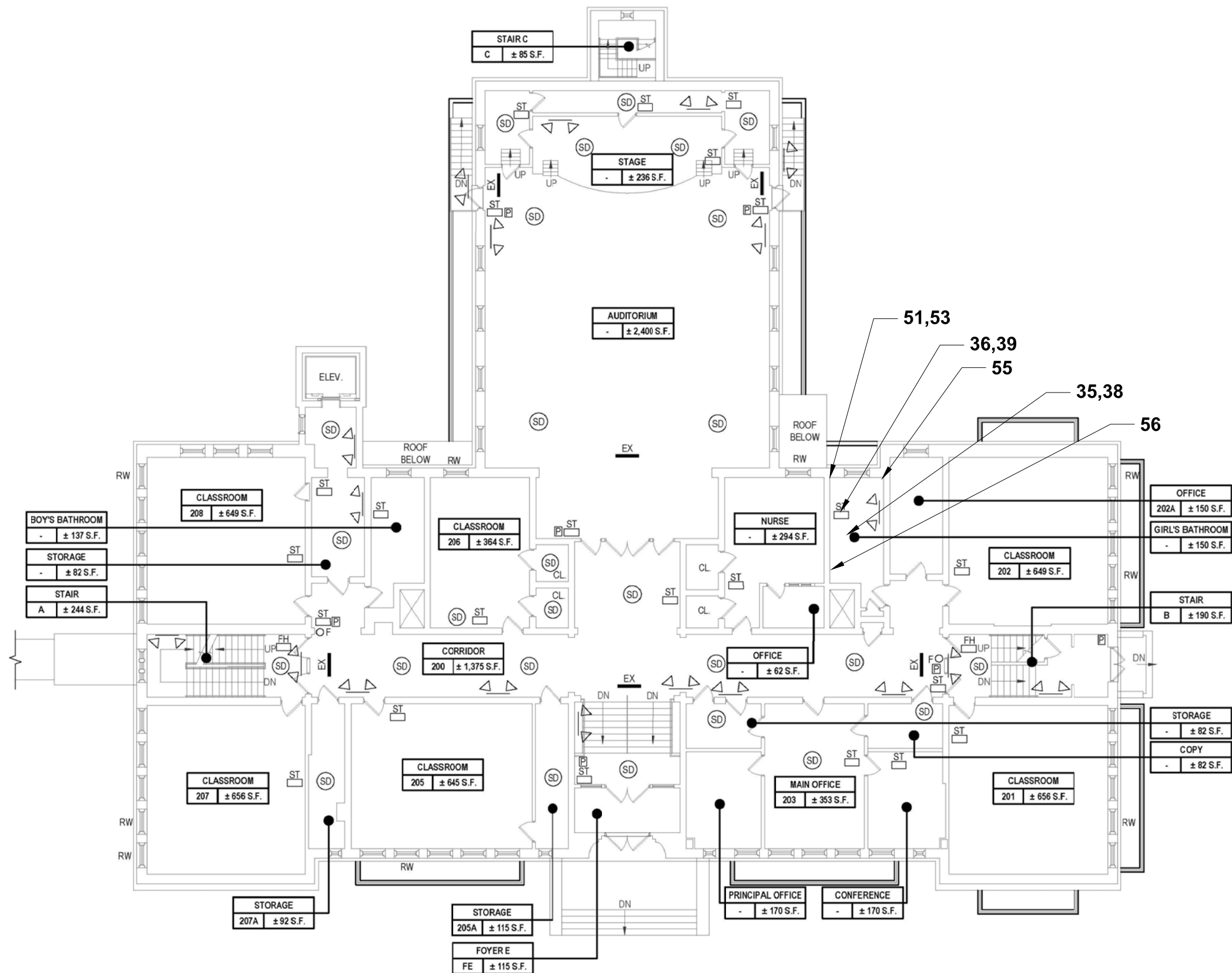
**Irvington
Union Free School
District**

**Main Street School
Renovations**

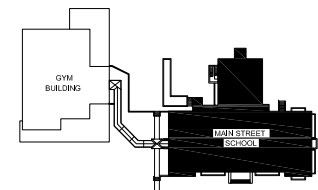


**101 Main Street
Irvington, NY 10533**

CONTRACT
STATUS
SHEET TITLE
BULK SAMPLE LOCATIONS MAIN BUILDING BASEMENT PLAN
DRAWING NO.
BSL001



1 MAIN BUILDING - FIRST FLOOR PLAN
BSL002 SCALE: 1/8" = 1'-0"



KEY PLAN
SCALE: NOT TO SCALE

CONSULTANTS: ENVIRONMENTAL CONSULTANT



MARK	DATE	DESCRIPTION

DESIGNED BY: SE	DRAWN BY: JG	CHECKED BY: AS	REVIEWED BY: AS
PROJECT NO: 31402880.011	DATE: MARCH 2021	SCALE: AS SHOWN	

CLIENT

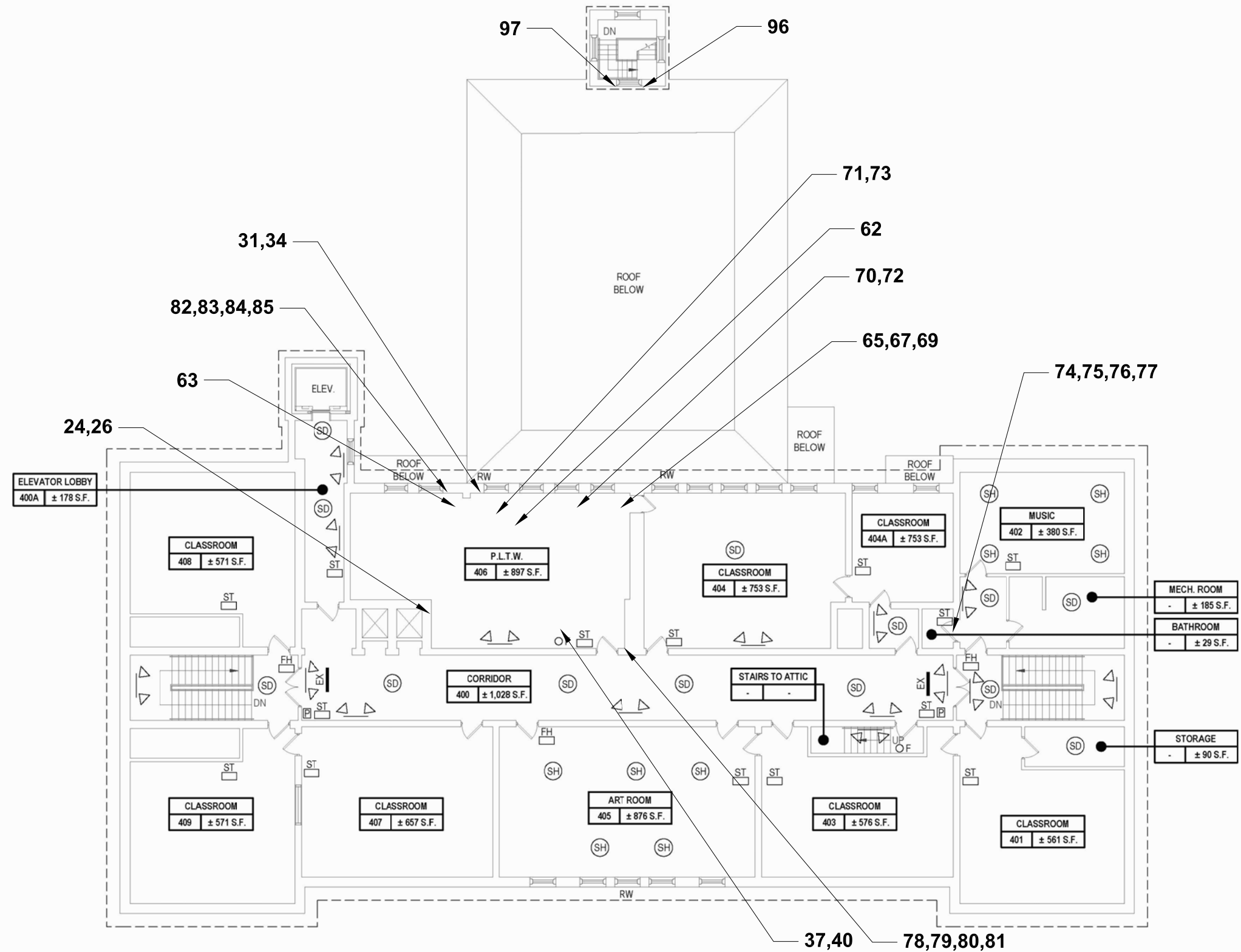
**Irvington
Union Free School
District**

**Main Street School
Renovations**



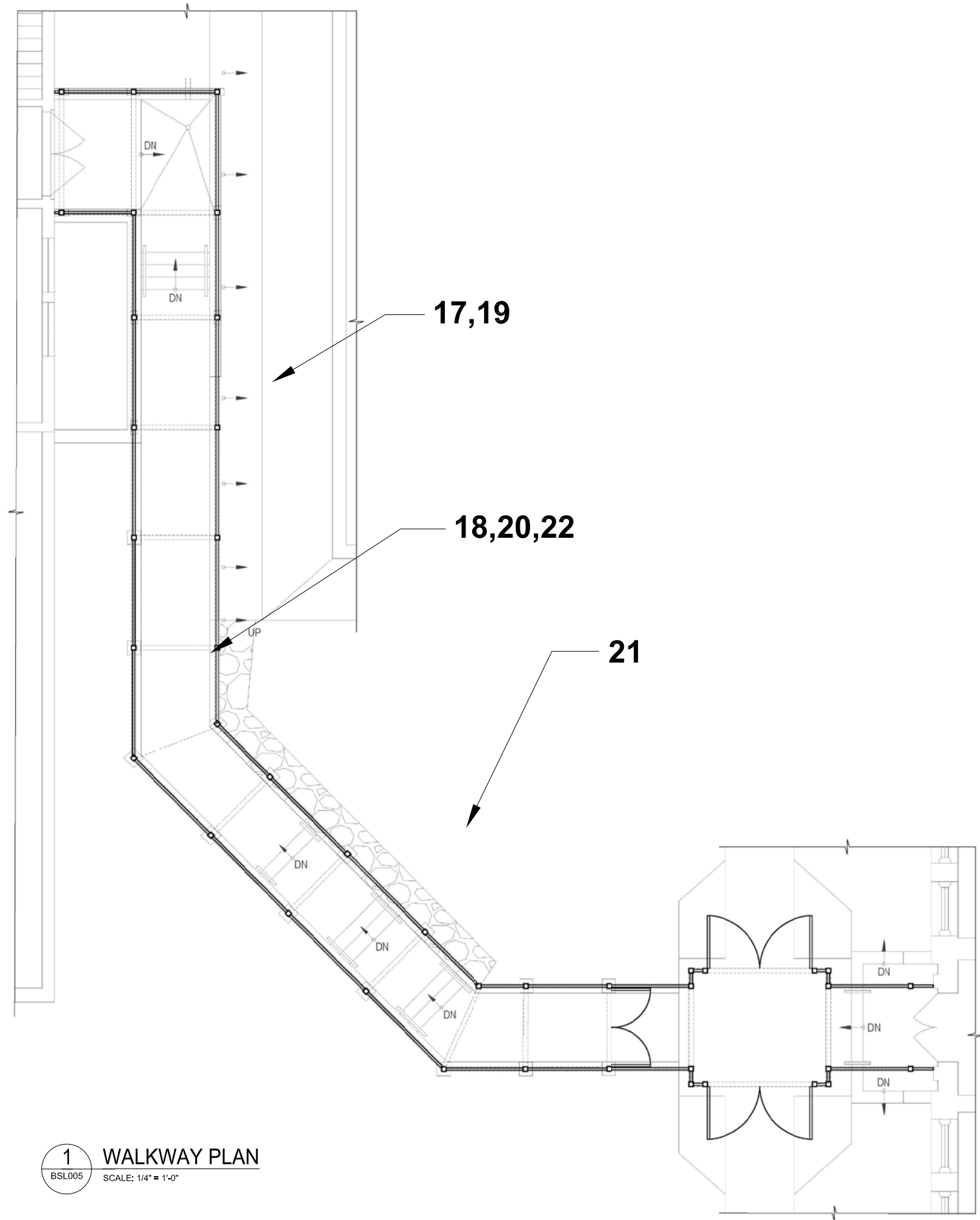
**101 Main Street
Irvington, NY 10533**

CONTRACT
STATUS
SHEET TITLE
BULK SAMPLE LOCATIONS MAIN BUILDING FIRST FLOOR PLAN
DRAWING NO.
BSL002

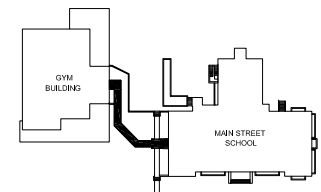


The diagram shows a schematic of the Main Street School and Gym Building. The Gym Building is on the left, and the Main Street School is on the right. The air conditioning units are located on the roof of the Main Street School, indicated by a label 'A/C' and arrows pointing to the units. The diagram also shows the layout of the buildings and the location of the air conditioning units.

DRAWING No. **BSL004**



1 WALKWAY PLAN
BSL005 SCALE: 1/4" = 1'-0"



KEY PLAN
SCALE: NOT TO SCALE

CONSULTANTS: ENVIRONMENTAL CONSULTANT



WSP USA SOLUTIONS
500 SUMMIT ROAD, SUITE 450
VALHALLA, NY 10595
TELEPHONE: 914.762.1120

MARK	DATE	DESCRIPTION

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DESIGNED BY: SE	DRAWN BY: JG	CHECKED BY: AS	REVIEWED BY: AS
PROJECT NO: 31402880.011	DATE: MARCH 2021	SCALE: AS SHOWN	

CLIENT

**Irvington
Union Free School
District**

**Main Street School
Renovations**



**101 Main Street
Irvington, NY 10533**

CONTRACT

STATUS

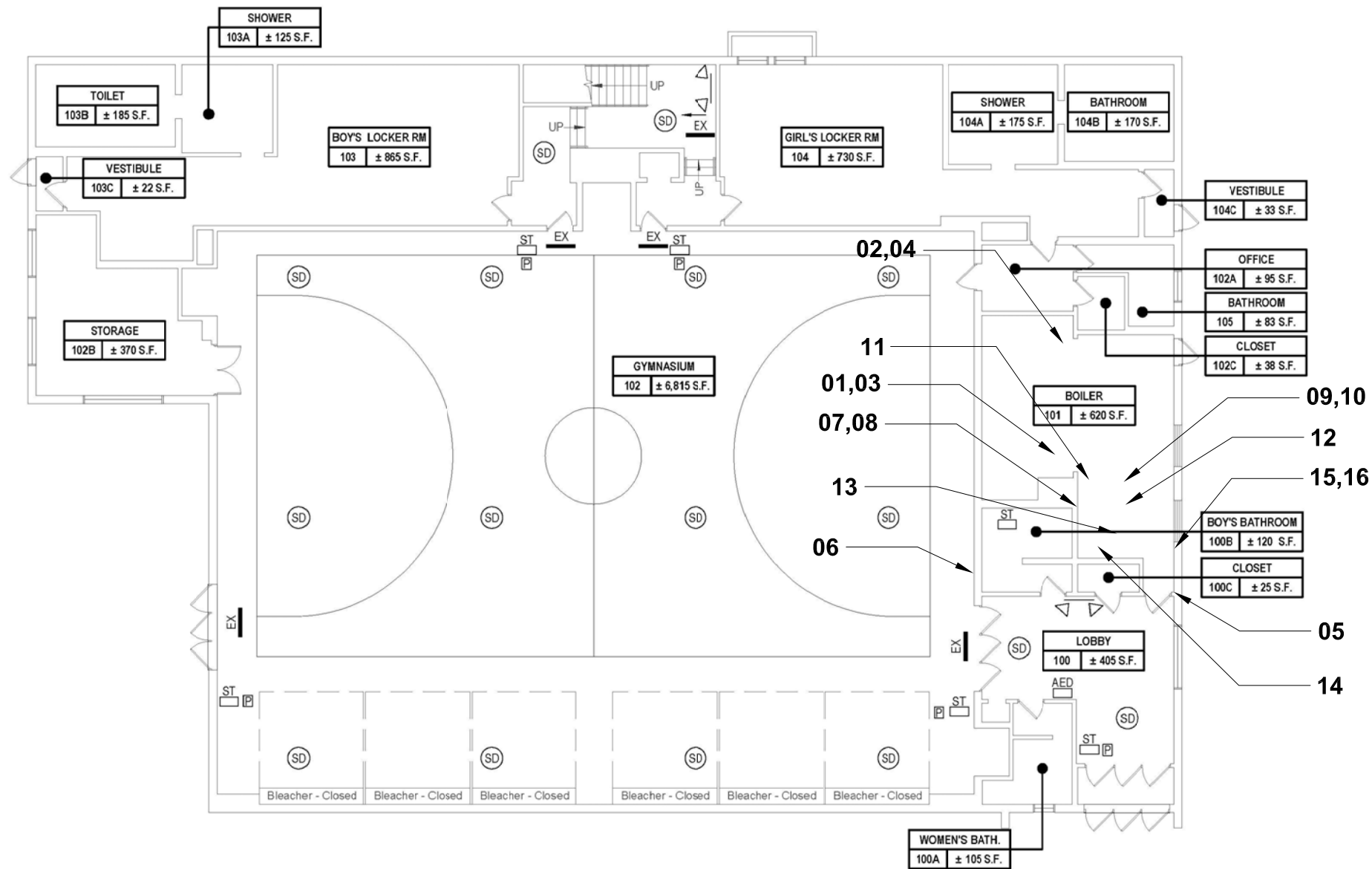
SHEET TITLE

**BULK SAMPLE LOCATIONS
WALKWAY PLAN**

DRAWING NO.

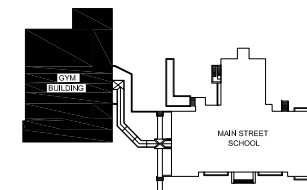
BSL005

\\spc-srv1\pub\proj\101 Main Street School\BSL005.dwg last modified: Mar 08, 2021 - 3:04pm By JLS062792



BSL006

SCALE: 1/8" = 1'-0"



KEY PLAN
SCALE: NOT TO SCALE

[illegible]

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DESIGNED BY: SE	DRAWN BY: JG	CHECKED BY: AS	REVIEWED BY: AS
PROJECT NO: 31402880.011	DATE: MARCH 2021		SCALE: AS SHOWN

**Irvington
Union Free School
District**

Main Street School Renovations



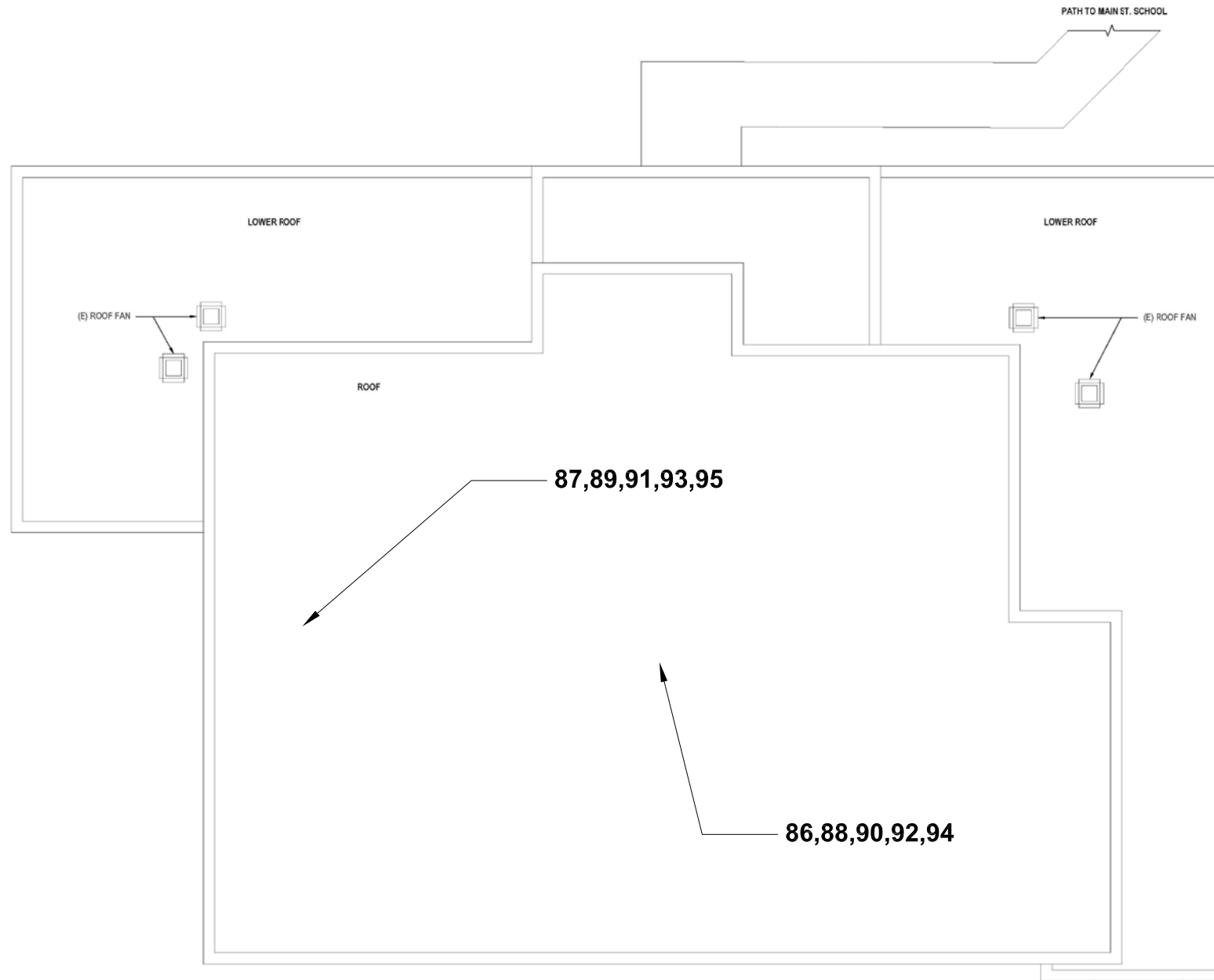
**101 Main Street
Irvington, NY 10533**

STATUS

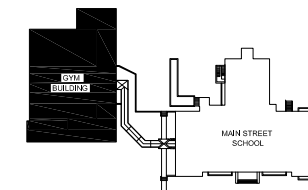
**BULK SAMPLE LOCATIONS
GYM BUILDING
FIRST FLOOR PLAN**

BSL006

nyse-aapl-us:ibgcorp.com?id=1jwYCCAGCAGDTEMP-2021SCHOL DISTRICT37402680.011--MAIN STREET SCHOOLSUS001-ESL007.dwg Last Modified: Mar 08, 2021 - 3:03pm Printed on: Mar 08, 2021 - 3:03pm Picked up: Mar 08, 2021 - 3:03pm By USJ5862792



SCALE: 1/8" = 1'-0"

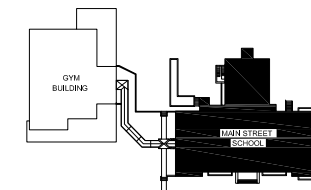
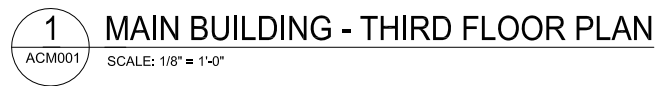
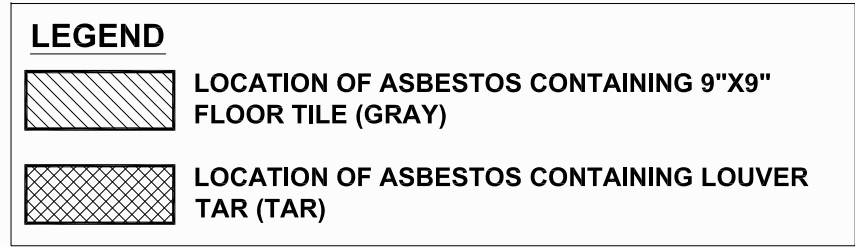


KEY PLAN
SCALE: NOT TO SCALE

DRAWING No. **BSL007**



**APPENDIX D:
ASBESTOS CONTAINING MATERIALS LOCATION
DRAWINGS**



KEY PLAN
SCALE: NOT TO SCALE

CONSULTANTS: ENVIRONMENTAL CONSULTANT

wsp

WSP USA SOLUTIONS
500 SUMMIT ROAD, SUITE 450
VALHALLA, NY 10595
TELEPHONE: 914.742.1120

[illegible]

"ALTERATION OF THIS DOCUMENT EXCEPT BY A LICENSED PROFESSIONAL IS ILLEGAL"			
DESIGNED BY: SE	DRAWN BY: JG	CHECKED BY: AS	REVIEWED BY: AS
PROJECT NO: 31402880.011	DATE: MARCH 2021		SCALE: AS SHOWN

CLIENT

**Irvington
Union Free School
District**

**Main Street School
Renovations**



The seal is circular with a green border. Inside the border, the text "IRVINGTON" is at the top and "UNION FREE SCHOOL DISTRICT" is at the bottom, both in green capital letters. In the center of the seal is a large, stylized green letter "I". To the left of the "I" is the text "NEW YORK" and to the right is "1836", both in green capital letters. Below the "I" is the text "FOR ADMISSION SEE STATE" in green capital letters.

**101 Main Street
Irvington, NY 10533**

CONTRACT
STATUS
SHEET TITLE
ASBESTOS CONTAINING MATERIALS MAIN BUILDING THIRD FLOOR PLAN
DRAWING No.
ACM001



**APPENDIX E:
LEAD XRF SHOT RESULTS**

XRF Testing Data Report

Project Number	31402880.011
Testing Location	Main Street School
Inspector	D.Kirnossenko, J. Garcia
Date	February 17, 2021
XRF Model	RMD LPA1
XRF Serial Number	

Test Number	Room	Component Name	Color	Condition	Substrate	Location (Wall/Side)	[Pb] (mg/cm ²)	Result
1	Irvington Main Street Elementary School	Calibrate @ 1.0	2/17/2021 11:10	---	---	---	1.2	POS
2		Calibrate @ 1.0		---	---	---	1.2	POS
3		Calibrate @ 1.0		---	---	---	1.2	POS
4		Calibrate @ 0.0		---	---	---	0.1	NEG
5		Calibrate @ 0.0		---	---	---	0.1	NEG
6		Calibrate @ 0.0		---	---	---	0.1	NEG
7	GYM Boiler Room	Panel Board	Black	Good	Wood	Wall B	0.1	NEG
8	GYM Boiler Room	Soffit	White	Good	Gypsum	Wall B	-0.1	NEG
9	GYM Boiler Room	Heat Unit	Blue	Good	Metal	Room Center	0.3	NEG
10	GYM Boiler Room	Door	Gray	Good	Metal	Wall A	0.3	NEG
11	GYM Boiler Room	Door frame	Gray	Good	Metal	Wall A	0.6	NEG
12	GYM	Door	Green	Good	Metal	Wall A	-0.3	NEG
13	GYM	Door frame	Green	Good	Metal	Wall A	-0.1	NEG
14	GYM	Wall	White	Good	Cinder Block	Wall A	0.1	NEG
15	GYM	Column	White	Good	Metal	Wall A	2.3	POS
16	GYM	Plank	Green	Good	Wood	Wall A	0.1	NEG
17	GYM	Wall	White	Good	Cinder Block	Wall B	0	NEG
18	GYM	Wall	White	Good	Cinder Block	Wall C	-0.2	NEG
19	GYM	Plank	Green	Good	Wood	Wall C	0.1	NEG
20	GYM	Column	White	Good	Metal	Wall C	3.2	POS
21	GYM	Door	Green	Good	Metal	Wall C	0	NEG
22	GYM	Door frame	White	Good	Metal	Wall C	-0.1	NEG

Test Number	Room	Component Name	Color	Condition	Substrate	Location (Wall/Side)	[Pb] (mg/cm ²)	Result
23	GYM	Wall	Gray	Good	Wood	Wall C	-0.2	NEG
24	GYM	Soffit	White	Good	Plaster	Wall C	-0.3	NEG
25	GYM	Wall	White	Good	Cinder Block	Wall D	-0.2	NEG
26	GYM	Drain Pipe	White	Good	Metal	Wall D	0	NEG
27	Exterior Walkway	Support Column	Green	Good	Metal	Exterior	0.2	NEG
28	Exterior Walkway	Retaining wall	Gray	Good	Concrete	Exterior	-0.2	NEG
29	Exterior Walkway	Hand rail	Green	Good	Metal	Exterior	-0.2	NEG
30	Mechanical Room by Cafeteria	Door	Gray	Good	Wood	Wall A	0.1	NEG
31	Mechanical Room by Cafeteria	Door frame	Gray	Good	Wood	Wall A	0.4	NEG
32	Mechanical Room by Cafeteria	Wall	White	Poor	Brick	Wall A	0	NEG
33	Mechanical Room by Cafeteria	Wall	Gray	Poor	Brick	Wall A	0.3	NEG
34	Mechanical Room by Cafeteria	Floor	Gray	Poor	Concrete	Room Center	0.1	NEG
35	Mechanical Room by Cafeteria	Soffit	Gray	Poor	Plaster	Ceiling	0.2	NEG
36	Mechanical Room by Cafeteria	Ceiling	Gray	Poor	Concrete	Ceiling	-0.3	NEG
37	Mechanical Room by Cafeteria	Wall	White	Poor	Brick	Wall B	-0.4	NEG
38	Mechanical Room by Cafeteria	Wall	Gray	Poor	Brick	Wall B	0	NEG
39	Mechanical Room by Cafeteria	Wall	White	Poor	Brick	Wall C	0	NEG
40	Mechanical Room by Cafeteria	Wall	Gray	Poor	Brick	Wall C	-0.2	NEG
41	Mechanical Room by Cafeteria	Door frame	Gray	Poor	Wood	Wall C	0.2	NEG
42	Mechanical Room by Cafeteria	Column	Gray	Poor	Brick	Room Center	0.2	NEG
43	Mechanical Room by Cafeteria	Wall	White	Poor	Brick	Wall D	-0.3	NEG
44	Mechanical Room by Cafeteria	Wall	Gray	Poor	Brick	Wall D	0	NEG
45	Mechanical Room by Cafeteria	Wall	L.Gray	Poor	Plaster	Wall D	-0.1	NEG
46	Mechanical Room by Cafeteria	Wall	Gray	Poor	Plaster	Wall D	0.1	NEG
47	Mechanical Room by Cafeteria	Window frame	Gray	Poor	Wood	Wall D	0.3	NEG
48	Mechanical Room by Cafeteria	Window sash	Gray	Poor	Wood	Wall D	5	POS
49	Mechanical Room by Cafeteria	Window frame	Gray	Poor	Wood	Wall D	5.4	POS

Test Number	Room	Component Name	Color	Condition	Substrate	Location (Wall/Side)	[Pb] (mg/cm ²)	Result
50	Mechanical Room by Cafeteria	Ceiling	L.Gray	Poor	Plaster	Ceiling	-0.2	NEG
51	Basement Bathroom	Door	Tan	Good	Wood	Wall A	-0.1	NEG
52	Basement Bathroom	Door frame	Tan	Good	Wood	Wall A	0	NEG
53	Basement Bathroom	Wall	Pink	Good	Gypsum	Wall A	0	NEG
54	Basement Bathroom	Wall	Pink	Good	Gypsum	Wall B	-0.3	NEG
55	Basement Bathroom	Wall	Pink	Good	Gypsum	Wall C	-0.1	NEG
56	Basement Bathroom	Wall	Pink	Good	Plaster	Wall D	0	NEG
57	Basement Bathroom	Window frame	Tan	Good	Wood	Wall D	-0.2	NEG
58	Basement Bathroom	Window sill	Tan	Good	Wood	Wall D	-0.2	NEG
59	Basement Bathroom	Window frame	White	Good	Metal	Wall D	-0.7	NEG
60	Basement Bathroom	Radiator cover	Tan	Good	Metal	Wall D	0	NEG
61	Basement Bathroom	Ceiling	White	Good	Wood	Ceiling	-0.3	NEG
62	Basement Bathroom	Wall	Tan	Poor	Plaster	Wall C	0.2	NEG
63	Basement Bathroom	Drain Pipe	White	Good	Metal	Ceiling	1	POS
64	Basement Bathroom	Ceiling	Tan	Poor	Plaster	Ceiling	0.1	NEG
65	1st Floor Bathroom	Door	Beige	Good	Wood	Wall A	-0.1	NEG
66	1st Floor Bathroom	Door frame	Beige	Good	Wood	Wall A	0.3	NEG
67	1st Floor Bathroom	Wall	White	Good	Plaster	Wall A	>9.9	POS
68	1st Floor Bathroom	Radiator	Beige	Good	Metal	Wall A	0	NEG
69	1st Floor Bathroom	Radiator Pipe	Beige	Good	Metal	Wall A	0	NEG
70	1st Floor Bathroom	Wall	Pink	Good	Plaster	Wall B	>9.9	POS
71	1st Floor Bathroom	Partition-wall	Beige	Good	Wood	Wall B	0.1	NEG
72	1st Floor Bathroom	Chair rail	Beige	Good	Wood	Wall C	0	NEG
73	1st Floor Bathroom	Ceiling	Beige	Good	Plaster	Ceiling	>9.9	POS
74	1st Floor Bathroom	Duct	Beige	Good	Metal	Ceiling	0	NEG
75	1st Floor Bathroom	Drain Pipe	Beige	Good	Metal	Ceiling	0.4	NEG
76	1st Floor Bathroom	Window frame	Beige	Good	Wood	Wall D	0.1	NEG

Test Number	Room	Component Name	Color	Condition	Substrate	Location (Wall/Side)	[Pb] (mg/cm ²)	Result
77	1st Floor Bathroom	Window sill	Beige	Good	Wood	Wall D	-0.2	NEG
78	1st Floor Bathroom	Window frame	White	Good	Metal	Wall D	-0.3	NEG
79	1st Floor Bathroom	Vent grille	White	Good	Metal	Wall D	-0.1	NEG
80	2nd Floor Bathroom	Door	Beige	Good	Wood	Wall A	0.3	NEG
81	2nd Floor Bathroom	Door frame	Beige	Good	Wood	Wall A	-0.1	NEG
82	2nd Floor Bathroom	Wall	White	Good	Plaster	Wall A	>9.9	POS
83	2nd Floor Bathroom	Radiator	Beige	Good	Metal	Wall A	0.3	NEG
84	2nd Floor Bathroom	Radiator Pipe	White	Good	Metal	Wall A	0.3	NEG
85	2nd Floor Bathroom	Wall	Yellow	Good	Plaster	Wall B	>9.9	POS
86	2nd Floor Bathroom	Access panel	Yellow	Good	Metal	Wall C	0.1	NEG
87	2nd Floor Bathroom	Window frame	Beige	Good	Wood	Wall D	0	NEG
88	2nd Floor Bathroom	Window sill	Beige	Good	Wood	Wall D	0	NEG
89	2nd Floor Bathroom	Window frame	White	Good	Metal	Wall D	-0.4	NEG
90	2nd Floor Bathroom	Ceiling	Beige	Poor	Plaster	Ceiling	>9.9	POS
91	Room 303	Door	Beige	Good	Wood	Wall A	0.1	NEG
92	Room 303	Door frame	Beige	Good	Wood	Wall A	-0.3	NEG
93	Room 303	Wall	Beige	Good	Gypsum	Wall A	-0.2	NEG
94	Room 303	Electrical conduit	Beige	Good	Metal	Wall A	0.4	NEG
95	Room 303	Vent grille	Beige	Good	Wood	Wall A	0	NEG
96	Room 303	Baseboard	Beige	Good	Wood	Wall A	-0.2	NEG
97	Room 303	Wall	Beige	Good	Gypsum	Wall B	-0.3	NEG
98	Room 303	Board frame	Beige	Good	Wood	Wall B	-0.2	NEG
99	Room 303	Wall	Beige	Good	Gypsum	Wall C	-0.1	NEG
100	Room 303	Radiator cover	Beige	Good	Wood	Wall C	-0.2	NEG
101	Room 303	Window frame	Beige	Good	Wood	Wall C	-0.1	NEG
102	Room 303	Window sill	Beige	Good	Wood	Wall C	-0.1	NEG
103	Room 303	Window frame	White	Good	Metal	Wall C	-0.5	NEG

Test Number	Room	Component Name	Color	Condition	Substrate	Location (Wall/Side)	[Pb] (mg/cm ²)	Result
104	Room 303	Wall	Beige	Good	Gypsum	Wall D	-0.1	NEG
105	Room 303	Beam	White	Good	Concrete	Ceiling	0.3	NEG
106	Room 303	Window frame	Beige	Good	Wood	Wall D	-0.2	NEG
107	Room 406	Door	Beige	Good	Wood	Wall A	0	NEG
108	Room 406	Door frame	Beige	Good	Wood	Wall A	0	NEG
109	Room 406	Wall	White	Good	Gypsum	Wall A	-0.3	NEG
110	Room 406	Wall	White	Good	Gypsum	Wall B	-0.2	NEG
111	Room 406	Wall	White	Good	Plaster	Wall C	9.6	POS
112	Room 406	Beam	White	Good	Gypsum	Wall C	-0.2	NEG
113	Room 406	Radiator	White	Good	Metal	Wall C	0	NEG
114	Room 406	Baseboard	Beige	Good	Wood	Wall C	-0.1	NEG
115	Room 406	Window frame	Beige	Good	Wood	Wall C	-0.1	NEG
116	Room 406	Window frame	White	Good	Metal	Wall C	-0.4	NEG
117	Room 406	Electrical conduit	White	Good	Metal	Wall C	0.2	NEG
118	Room 406	Wall	White	Good	Gypsum	Wall D	0.2	NEG
119	Room 406	Board frame	Beige	Good	Wood	Wall D	-0.1	NEG
120	Room 406	Ceiling	Beige	Good	Plaster	Ceiling	0.1	NEG
121	Bathroom in Room 402	Door	Beige	Good	Wood	Wall A	0	NEG
122	Bathroom in Room 402	Door frame	Beige	Good	Wood	Wall A	-0.2	NEG
123	Bathroom in Room 402	Wall	Yellow	Good	Gypsum	Wall A	-0.3	NEG
124	Bathroom in Room 402	Wall	Yellow	Good	Gypsum	Wall B	0.1	NEG
125	Bathroom in Room 402	Wall	Yellow	Good	Gypsum	Wall C	0	NEG
126	Bathroom in Room 402	Wall	Yellow	Good	Gypsum	Wall D	0	NEG
127	Bathroom in Room 402	Ceiling	White	Good	Gypsum	Ceiling	-0.6	NEG
128	Bathroom in Room 402	Vent grille	White	Good	Metal	Ceiling	0.1	NEG
129	Irvington Main Street Elementary School	Calibrate @ 1.0	2/17/2021 13:55	---	---	---		NEG
130		Calibrate @ 1.0		---	---	---		NEG

Test Number	Room	Component Name	Color	Condition	Substrate	Location (Wall/Side)	[Pb] (mg/cm ²)	Result
131		Calibrate @ 1.0		---	---	---		NEG



Louis Berger

XRF CALIBRATION CHECK FORMPAGE 1 OF 1

PROJ. NO.:	31402880.008/31402880.011		DATE:		2/17/21	
PROJECT NAME:	DOWS LN Main St.		INSPECTOR NAME:		DK, JG	
CLIENT:	Irvington School District		INSPECTOR SIGNATURE:			
SITE:	DOWS LN & Main St Elementary		PROJ. MANAGER:			
LOUIS BERGER TELEPHONE #: (212) 612-7900 FAX #: (212) 425-1618 ADDRESS: 96 Morton Street 8th Floor New York, NY 10014		XRF MAKE/MODEL: RMD LPA-1; PB200i-#2150		XRF JOB #		
NOTES:						

CALIBRATION CHECK – FIELD-END/2-HR/4-HR (circle one)					
1.0 mg/cm ² Calibration Block	FIRST READING	SECOND READING	THIRD READING	AVERAGE	
CALIBRATION TIME: 908	TEST # 1	2	3		
XRF READING	1.3	1.2	1.1		

CALIBRATION CHECK – FIELD-END/2-HR/4-HR (circle one)					
0.0 mg/cm ² Calibration Block	FIRST READING	SECOND READING	THIRD READING	AVERAGE	
CALIBRATION TIME:	TEST # 4	5	6		
XRF READING	0.2	0.2	0.2		

CALIBRATION CHECK – FIELD-END/2-HR/4-HR (circle one)					
1.0 mg/cm ² Calibration Block	FIRST READING	SECOND READING	THIRD READING	AVERAGE	
CALIBRATION TIME: 1035	TEST # 100	101	102		
XRF READING	1.2	1.3	1.3		

CALIBRATION CHECK – FIELD-END/2-HR/4-HR (circle one)					
1.0 mg/cm ² Calibration Block	FIRST READING	SECOND READING	THIRD READING	AVERAGE	
CALIBRATION TIME: 1110	TEST # 1	2	3		
XRF READING	1.2	1.2	1.2		

CALIBRATION CHECK – FIELD-END/2-HR/4-HR (circle one)					
mg/cm ² Calibration Block	FIRST READING	SECOND READING	THIRD READING	AVERAGE	
CALIBRATION TIME:	TEST # 4	5	6		
XRF READING	0.1	0.1	0.1		

CALIBRATION CHECK – FIELD-END/2-HR/4-HR (circle one)					
1.0 mg/cm ² Calibration Block	FIRST READING	SECOND READING	THIRD READING	AVERAGE	
CALIBRATION TIME: 1355	TEST # 129	130	131		
XRF READING	1.3	1.2	1.2		

CALIBRATION CHECK – FIELD-END/2-HR/4-HR (circle one)					
mg/cm ² Calibration Block	FIRST READING	SECOND READING	THIRD READING	AVERAGE	
CALIBRATION TIME:	TEST #				
XRF READING					

CALIBRATION CHECK – FIELD-END/2-HR/4-HR (circle one)					
mg/cm ² Calibration Block	FIRST READING	SECOND READING	THIRD READING	AVERAGE	
CALIBRATION TIME:	TEST #				
XRF READING					

CALIBRATION CHECK – FIELD-END/2-HR/4-HR (circle one)					
mg/cm ² Calibration Block	FIRST READING	SECOND READING	THIRD READING	AVERAGE	
CALIBRATION TIME:	TEST #				
XRF READING					

CALIBRATION CHECK – FIELD-END/2-HR/4-HR (circle one)					
mg/cm ² Calibration Block	FIRST READING	SECOND READING	THIRD READING	AVERAGE	
CALIBRATION TIME:	TEST #				
XRF READING					

DOWS LN Elementary
Main St Elementary



Louis Berger

XRF LEAD-BASED PAINT TESTING DATA SHEET/CHAIN OF CUSTODY

PAGE 1 OFPROJECT NO.: 3140280.011

PROJECT NAME:

XRF SERIAL

CLIENT: Irvington School DistrictPROJECT LOCATION: Main St ElementaryINSPECTOR(S): DK, JG

PROJ. MANAGER:

INSPECTION DATE: 02/17/21

SPACE CHARACTERISTICS:

NOTES:

FLOOR #: _____ ROOM #: _____ ROOM NAME: _____

SAMPLE #	SUBSTRATE	COMPONENT DESCRIPTION										RE. [m]
		COLOR	CONDITION [I/F/P]	COMPONENT	WALL/SIDE DESIGN.	SIDE [L/C/R]	HEIGHT [L/M/U]	COMPONENT REPLICANT	QUANTITY (IF POSITIVE) [SF]	PHOTO	NOTES (DETERIORATION TO FRICTION/IMPACT AND/OR MOISTURE?)	
7	M PL S C CB PG CR B W V CT G FG OTHER:	Black		Panel Board	A B C D RM CTR FL CL				GYM Boiler Room			0.1
8	M PL S C CB PG CR B W V CT G FG OTHER:	White		SF	A B C D RM CTR FL CL							-0.1
9	M PL S C CB PG CR B W V CT G FG OTHER:	Blue		Heater Unit	A B C D RM CTR FL CL							0.3
10	M PL S C CB PG CR B W V CT G FG OTHER:	Gray		DR	A B C D RM CTR FL CL							0.3
11	M PL S C CB PG CR B W V CT G FG OTHER:	Gray		DF	A B C D RM CTR FL CL							0.6
12	M PL S C CB PG CR B W V CT G FG OTHER:	Green		DR	A B C D RM CTR FL CL				GYM			-0.3
13	M PL S C CB PG CR B W V CT G FG OTHER:	Green		DF	A B C D RM CTR FL CL							-0.1
14	M PL S C CB PG CR B W V CT G FG OTHER:	White		W	A B C D RM CTR FL CL							0.1
15	M PL S C CB PG CR B W V CT G FG OTHER:	White		CLM	A B C D RM CTR FL CL				Vertical Structural Steel			2.3
16	M PL S C CB PG CR B W V CT G FG OTHER:	Green		Plank Molding	A B C D RM CTR FL CL							0.1
17	M PL S C CB PG CR B W V CT G FG OTHER:	White		W	A B C D RM CTR FL CL							0.0
18	M PL S C CB PG CR B W V CT G FG OTHER:	White		W	A B C D RM CTR FL CL							0.2
19	M PL S C CB PG CR B W V CT G FG OTHER:	Green		Plank Molding	A B C D RM CTR FL CL							0.1
20	M PL S C CB PG CR B W V CT G FG OTHER:	White		CLM	A B C D RM CTR FL CL				Vertical Structural Steel			3.2
21	M PL S C CB PG CR B W V CT G FG OTHER:	Green		DR	A B C D RM CTR FL CL							0.0
22	M PL S C CB PG CR B W V CT G FG OTHER:	White		DF	A B C D RM CTR FL CL							-0.1
23	M PL S C CB PG CR B W V CT G FG OTHER:	Gray		W	A B C D RM CTR FL CL							-0.2
24	M PL S C CB PG CR B W V CT G FG OTHER:	White		SF	A B C D RM CTR FL CL							-0.3
25	M PL S C CB PG CR B W V CT G FG OTHER:	White		W	A B C D RM CTR FL CL							-0.2
26	M PL S C CB PG CR B W V CT G FG OTHER:	White		Drain Pipe	A B C D RM CTR FL CL							0.0

Side: Left/Center/Right; Height: Lower/Middle/Upper; Substrate: M: Metal; PL: Plaster; S: Sheetrock; C: Concrete; CB: Cinder Block; CR: Sinks, Water Closets, etc.; CT: Ceramic Tile; PG: Porcelain-glazed Block; B: Brick; W: Wood; V: Vinyl; FG: Fiberglass; G: Glass; Condition: I = Intact; F = Fair; P = Poor; Initial Result: P = Positive; N = Negative;



XRF LEAD-BASED PAINT TESTING DATA SHEET/CHAIN OF CUSTODY

PAGE 2 OF

PROJECT NO.:

CLIENT: Irvington School DistrictINSPECTOR(S): DL, JB

PROJ. MANAGER:

PROJECT NAME:

PROJECT LOCATION: Main St ElementaryINSPECTION DATE: 02/17/21

XRF SERIAL

SPACE CHARACTERISTICS:

FLOOR #: _____ ROOM #: _____ ROOM NAME: _____

NOTES:

SAMPLE #	SUBSTRATE	COMPONENT DESCRIPTION										RE: (m)
		COLOR	CONDITION (I/F/P)	COMPONENT	WALL/SIDE DESIGN.	SIDE IL/CL/RT	HEIGHT (L/M/U)	COMPONENT REPLACANT	QUANTITY (IF POSITIVE) [SF]	PHOTO	NOTES (DETERIORATION TO FRICTION/IMPACT AND/OR MOISTURE?)	
27	M PL S C CB PG CR B W V CT G FG OTHER:	Green		PASADENA/Support beam	A B C D RM CTR FL CL	EXT.		PASADENA/Support beam			0.2	
28	M PL S C CB PG CR B W V CT G FG OTHER:	Gray		RET WALL	A B C D RM CTR FL CL	EXT.		PASADENA			-0.2	
29	M PL S C CB PG CR B W V CT G FG OTHER:	Green		HR	A B C D RM CTR FL CL	EXT.		PASADENA			-0.2	
30	M PL S C CB PG CR B W V CT G FG OTHER:	Gray		DR	A B C D RM CTR FL CL			Mech Run by Cape			0.1	
31	M PL S C CB PG CR B W V CT G FG OTHER:	Gray		DF	A B C D RM CTR FL CL						0.4	
32	M PL S C CB PG CR B W V CT G FG OTHER:	White		W	A B C D RM CTR FL CL						0.0	
33	M PL S C CB PG CR B W V CT G FG OTHER:	Gray		W	A B C D RM CTR FL CL						0.3	
34	M PL S C CB PG CR B W V CT G FG OTHER:	Gray		FI	A B C D RM CTR FL CL						0.1	
35	M PL S C CB PG CR B W V CT G FG OTHER:	Gray		SE	A B C D RM CTR FL CL						0.2	
36	M PL S C CB PG CR B W V CT G FG OTHER:	Gray		CL	A B C D RM CTR FL CL						-0.3	
37	M PL S C CB PG CR B W V CT G FG OTHER:	White		W	A B C D RM CTR FL CL						-0.4	
38	M PL S C CB PG CR B W V CT G FG OTHER:	Gray		W	A B C D RM CTR FL CL						0.0	
39	M PL S C CB PG CR B W V CT G FG OTHER:	White		W	A B C D RM CTR FL CL						0.0	
40	M PL S C CB PG CR B W V CT G FG OTHER:	Gray		W	A B C D RM CTR FL CL						-0.2	
41	M PL S C CB PG CR B W V CT G FG OTHER:	Gray		DF	A B C D RM CTR FL CL						0.2	
42	M PL S C CB PG CR B W V CT G FG OTHER:	Gray		CLM	A B C D RM CTR FL CL						0.2	
43	M PL S C CB PG CR B W V CT G FG OTHER:	White		W	A B C D RM CTR FL CL						-0.3	
44	M PL S C CB PG CR B W V CT G FG OTHER:	Gray		W	A B C D RM CTR FL CL						0.0	
45	M PL S C CB PG CR B W V CT G FG OTHER:	L-Gray		W	A B C D RM CTR FL CL						-0.1	
46	M PL S C CB PG CR B W V CT G FG OTHER:	Gray		W	A B C D RM CTR FL CL						0.1	

Side: Left/Center/Right; Height: Lower/Middle/Upper; Substrate: M: Metal; PL: Plaster; S: Sheetrock; C: Concrete; CB: Cinder Block; CR: Sinks, Water Closets, etc.; CT: Ceramic Tile; PG: Porcelain-glazed Block; B: Brick; W: Wood; V: Vinyl; FG: Fiberglass; G: Glass; Condition: I = Intact; F = Fair; P = Poor; Initial Result: P = Positive; N = Negative;



XRF LEAD-BASED PAINT TESTING DATA SHEET/CHAIN OF CUSTODY

PAGE 3 OF

PROJECT NO.:

CLIENT: Irvington School DistrictINSPECTOR(S): OK; JG

PROJ. MANAGER:

PROJECT NAME:

PROJECT LOCATION: Main St ElementaryINSPECTION DATE: 02/17/21

XRF SERIAL

SPACE CHARACTERISTICS:

FLOOR #: _____ ROOM #: _____ ROOM NAME: _____

NOTES:

SAMPLE #	SUBSTRATE	COMPONENT DESCRIPTION										RE. [m]
		COLOR	CONDITION [I/F/P]	COMPONENT	WALL/SIDE DESIGN.	SIDE IL/CL/RT	HEIGHT [L/M/U]	COMPONENT REPLACANT	QUANTITY (IF POSITIVE) [SF]	PHOTO	NOTES (DETERIORATION TO FRICTION/IMPACT AND/OR MOISTURE?)	
47	M PL S C CB PG CR B W V CT G FG OTHER:	GRAY		WF	A B C D RM CTR FL CL						Mech Loc by APE	0.3
48	M PL S C CB PG CR B W V CT G FG OTHER:	Gray		W. SASH	A B C D RM CTR FL CL							5.0
49	M PL S C CB PG CR B W V CT G FG OTHER:	Gray		WF	A B C D RM CTR FL CL							5.4
50	M PL S C CB PG CR B W V CT G FG OTHER:	Light Gray		CL	A B C D RM CTR FL CL							-0.2
51	M PL S C CB PG CR B W V CT G FG OTHER:	TAN		DR	A B C D RM CTR FL CL						BSMT Girls Bathrm	-0.1
52	M PL S C CB PG CR B W V CT G FG OTHER:	TAN		DF	A B C D RM CTR FL CL							0.0
53	M PL S C CB PG CR B W V CT G FG OTHER:	Pink		W	A B C D RM CTR FL CL							0.0
54	M PL S C CB PG CR B W V CT G FG OTHER:	Pink		W	A B C D RM CTR FL CL							-0.3
55	M PL S C CB PG CR B W V CT G FG OTHER:	Pink		W	A B C D RM CTR FL CL							-0.1
56	M PL S C CB PG CR B W V CT G FG OTHER:	Pink		W	A B C D RM CTR FL CL							0.0
57	M PL S C CB PG CR B W V CT G FG OTHER:	TAN		WF	A B C D RM CTR FL CL							-0.2
58	M PL S C CB PG CR B W V CT G FG OTHER:	TAN		W Sill	A B C D RM CTR FL CL							-0.2
59	M PL S C CB PG CR B W V CT G FG OTHER:	White		WF	A B C D RM CTR FL CL							-0.7
60	M PL S C CB PG CR B W V CT G FG OTHER:	TAN		RC	A B C D RM CTR FL CL							0.0
61	M PL S C CB PG CR B W V CT G FG OTHER:	White		CL	A B C D RM CTR FL CL							-0.3
62	M PL S C CB PG CR B W V CT G FG OTHER:	TAN		W	A B C D RM CTR FL CL						Above ceiling tile	0.2
63	M PL S C CB PG CR B W V CT G FG OTHER:	White		Skirt P	A B C D RM CTR FL CL							1.0
64	M PL S C CB PG CR B W V CT G FG OTHER:	TAN		CL	A B C D RM CTR FL CL						Above ceiling tile	0.1
65	M PL S C CB PG CR B W V CT G FG OTHER:	Beige		DR	A B C D RM CTR FL CL						1st Fl Ladies Bathrm	-0.1
66	M PL S C CB PG CR B W V CT G FG OTHER:	Beige		DF	A B C D RM CTR FL CL							0.3

Side: Left/Center/Right; Height: Lower/Middle/Upper; Substrate: M: Metal; PL: Plaster; S: Sheetrock; C: Concrete; CB: Cinder Block; CR: Sinks, Water Closets, etc.; CT: Ceramic Tile; PG: Porcelain-glazed Block; B: Brick; W: Wood; V: Vinyl; FG: Fiberglass; G: Glass; Condition: I = Intact; F = Fair; P = Poor; Initial Result: P = Positive; N = Negative;



Louis Berger

XRF LEAD-BASED PAINT TESTING DATA SHEET/CHAIN OF CUSTODY

PAGE 4 OF 4

XRF SERIAL

PROJECT NO.:

CLIENT: Irvington School District

INSPECTOR(S): DK, JG

PROJ. MANAGER:

PROJECT NAME:

PROJECT LOCATION: Main St Elementary

INSPECTION DATE: 02/17/21

SPACE CHARACTERISTICS:

FLOOR #: ROOM #: ROOM NAME:

NOTES:

SAMPLE #	SUBSTRATE	COMPONENT DISCRIPTION										RE. [m]
		COLOR	CONDITION [I/F/P]	COMPONENT	WALL/SIDE DESIGN.	SIDE [L/C/R]	HEIGHT [L/M/U]	COMPONENT REPLICANT	QUANTITY (IF POSITIVE) [SF]	PHOTO	NOTES (DETERIORATION TO FRICTION/IMPACT AND/OR MOISTURE?)	
67	M PL S C CB PG CR B W V CT G FG OTHER:	white		W	A B C D RM CTR FL CL		1st Fl Ladies Bath Rm				> 9.9	
68	M PL S C CB PG CR B W V CT G FG OTHER:	beige		RAD	A B C D RM CTR FL CL						0.0	
69	M PL S C CB PG CR B W V CT G FG OTHER:	beige		RAD P	A B C D RM CTR FL CL						0.0	
70	M PL S C CB PG CR B W V CT G FG OTHER:	pink		W	A B C D RM CTR FL CL						> 9.9	
71	M PL S C CB PG CR B W V CT G FG OTHER:	beige		PW	A B C D RM CTR FL CL						0.1	
72	M PL S C CB PG CR B W V CT G FG OTHER:	beige		Ch R	A B C D RM CTR FL CL						0.0	
73	M PL S C CB PG CR B W V CT G FG OTHER:			CL	A B C D RM CTR FL CL						> 9.9	
74	M PL S C CB PG CR B W V CT G FG OTHER:			duct	A B C D RM CTR FL CL						0.0	
75	M PL S C CB PG CR B W V CT G FG OTHER:			pipe	A B C D RM CTR FL CL						0.4	
76	M PL S C CB PG CR B W V CT G FG OTHER:	beige		WF	A B C D RM CTR FL CL						0.1	
77	M PL S C CB PG CR B W V CT G FG OTHER:	beige		W sill	A B C D RM CTR FL CL						0.2	
78	M PL S C CB PG CR B W V CT G FG OTHER:	white		WF	A B C D RM CTR FL CL						0.3	
79	M PL S C CB PG CR B W V CT G FG OTHER:	white		VG	A B C D RM CTR FL CL						0.1	
80	M PL S C CB PG CR B W V CT G FG OTHER:	beige		DR	A B C D RM CTR FL CL		2nd Fl Bath Rm				0.3	
81	M PL S C CB PG CR B W V CT G FG OTHER:	beige		DF	A B C D RM CTR FL CL						0.1	
82	M PL S C CB PG CR B W V CT G FG OTHER:	white		W	A B C D RM CTR FL CL						> 9.9	
83	M PL S C CB PG CR B W V CT G FG OTHER:	beige		RAD	A B C D RM CTR FL CL						0.3	
84	M PL S C CB PG CR B W V CT G FG OTHER:	white		RAD P	A B C D RM CTR FL CL						0.3	
85	M PL S C CB PG CR B W V CT G FG OTHER:	yellow		W	A B C D RM CTR FL CL						> 9.9	
86	M PL S C CB PG CR B W V CT G FG OTHER:	yellow		Access panel	A B C D RM CTR FL CL						0.1	

Side: Left/Center/Right; Height: Lower/Middle/Upper; Substrate: M: Metal; PL: Plaster; S: Sheetrock; C: Concrete; CB: Cinder Block; CR: Sinks, Water Closets, etc.; CT: Ceramic Tile; PG: Porcelain-glazed Block; B: Brick; W: Wood; V: Vinyl; FG: Fiberglass; G: Glass; Condition: I = Intact; F = Fair; P = Poor; Initial Result: P = Positive; N = Negative;



Louis Berger

XRF LEAD-BASED PAINT TESTING DATA SHEET/CHAIN OF CUSTODY

PAGE 5 OF

XRF SERIAL

PROJECT NO.:

CLIENT: Irvington School District

INSPECTOR(S): DK, JG

PROJ. MANAGER:

PROJECT NAME:

PROJECT LOCATION: Main St Elementary

INSPECTION DATE: 02/17/21

SPACE CHARACTERISTICS:

NOTES:

FLOOR #: ROOM #: ROOM NAME:

SAMPLE #	SUBSTRATE	COMPONENT DISCRIPTION										RE. [m]
		COLOR	CONDITION [I/F/P]	COMPONENT	WALL/SIDE DESIGN.	SIDE [L/C/R]	HEIGHT [L/M/U]	COMPONENT REPLICANT	QUANTITY (IF POSITIVE) [SF]	PHOTO	NOTES (DETERIORATION TO FRICTION/IMPACT AND/OR MOISTURE?)	
87	M PL S C CB PG CR B W V CT G FG OTHER:	beige		WF	A B C D RM CTR FL CL		2nd Fl Bath Rm				0.0	
88	M PL S C CB PG CR B W V CT G FG OTHER:	beige		W Sill	A B C D RM CTR FL CL						0.0	
89	M PL S C CB PG CR B W V CT G FG OTHER:	white		WF	A B C D RM CTR FL CL						-0.4	
90	M PL S C CB PG CR B W V CT G FG OTHER:	beige		CL	A B C D RM CTR FL CL						>9.9	
91	M PL S C CB PG CR B W V CT G FG OTHER:	beige		DR	A B C D RM CTR FL CL		Rm 303				0.1	
92	M PL S C CB PG CR B W V CT G FG OTHER:	beige		DR	A B C D RM CTR FL CL						-0.3	
93	M PL S C CB PG CR B W V CT G FG OTHER:			W	A B C D RM CTR FL CL						-0.2	
94	M PL S C CB PG CR B W V CT G FG OTHER:			EC	A B C D RM CTR FL CL						0.4	
95	M PL S C CB PG CR B W V CT G FG OTHER:			VG	A B C D RM CTR FL CL						0.0	
96	M PL S C CB PG CR B W V CT G FG OTHER:			BB	A B C D RM CTR FL CL						-0.2	
97	M PL S C CB PG CR B W V CT G FG OTHER:			W	A B C D RM CTR FL CL						-0.3	
98	M PL S C CB PG CR B W V CT G FG OTHER:			BRD FR	A B C D RM CTR FL CL						-0.2	
99	M PL S C CB PG CR B W V CT G FG OTHER:			W	A B C D RM CTR FL CL						-0.1	
100	M PL S C CB PG CR B W V CT G FG OTHER:			PC	A B C D RM CTR FL CL						-0.2	
101	M PL S C CB PG CR B W V CT G FG OTHER:			WF	A B C D RM CTR FL CL						-0.1	
102	M PL S C CB PG CR B W V CT G FG OTHER:			W. Sill	A B C D RM CTR FL CL						-0.1	
103	M PL S C CB PG CR B W V CT G FG OTHER:	white		WF	A B C D RM CTR FL CL						-0.5	
104	M PL S C CB PG CR B W V CT G FG OTHER:	beige		W	A B C D RM CTR FL CL						-0.1	
105	M PL S C CB PG CR B W V CT G FG OTHER:	white		Beam	A B C D RM CTR FL CL						0.3	
106	M PL S C CB PG CR B W V CT G FG OTHER:	beige		WF	A B C D RM CTR FL CL						-0.2	

Side: Left/Center/Right; Height: Lower/Middle/Upper; Substrate: M: Metal; PL: Plaster; S: Sheetrock; C: Concrete; CB: Cinder Block; CR: Sinks, Water Closets, etc.; CT: Ceramic Tile; PG: Porcelain-glazed Block; B: Brick; W: Wood; V: Vinyl; FG: Fiberglass; G: Glass; Condition: I = Intact; F = Fair; P = Poor; Initial Result: P = Positive; N = Negative;



XRF LEAD-BASED PAINT TESTING DATA SHEET/CHAIN OF CUSTODY

PAGE 6 OF XRF SERIAL #: PROJECT NO.: PROJECT NAME: CLIENT: Irvington School DistrictPROJECT LOCATION: Main St ElementaryINSPECTOR(S): DK, JBPROJ. MANAGER: INSPECTION DATE: 02/17/21

SPACE CHARACTERISTICS:

FLOOR #: ROOM #: ROOM NAME:

NOTES:

SAMPLE #	SUBSTRATE	COMPONENT DESCRIPTION										XRF READING [mg/cm]
		COLOR	CONDITION [I/F/P]	COMPONENT	WALL/SIDE DESIGN.	SIDE IL/CR	HEIGHT [L/M/U]	COMPONENT REPLICANT	QUANTITY (IF POSITIVE) [SF]	PHOTO	NOTES (DETERIORATION TO FRICTION/IMPAC T AND/OR MOISTURE?)	
107	M PL S C CB PG CR B W V CT G FG OTHER: <u> </u>	Beige		DR	A B C D RM CTR FL CL				406			0.0
108	M PL S C CB PG CR B W V CT G FG OTHER: <u> </u>	Beige		DR	A B C D RM CTR FL CL							0.0
109	M PL S C CB PG CR B W V CT G FG OTHER: <u> </u>	white		W	A B C D RM CTR FL CL							-0.3
110	M PL S C CB PG CR B W V CT G FG OTHER: <u> </u>	white		W	A B C D RM CTR FL CL							-0.2
111	M PL S C CB PG CR B W V CT G FG OTHER: <u> </u>	white		W	A B C D RM CTR FL CL							9.6
112	M PL S C CB PG CR B W V CT G FG OTHER: <u> </u>	white		W	A B C D RM CTR FL CL							-0.2
113	M PL S C CB PG CR B W V CT G FG OTHER: <u> </u>	white		RAD	A B C D RM CTR FL CL							0.0
114	M PL S C CB PG CR B W V CT G FG OTHER: <u> </u>	Beige		BB	A B C D RM CTR FL CL							-0.1
115	M PL S C CB PG CR B W V CT G FG OTHER: <u> </u>	Beige		WF	A B C D RM CTR FL CL							-0.1
116	M PL S C CB PG CR B W V CT G FG OTHER: <u> </u>	white		WF	A B C D RM CTR FL CL							-0.4
117	M PL S C CB PG CR B W V CT G FG OTHER: <u> </u>	white		EC	A B C D RM CTR FL CL							0.2
118	M PL S C CB PG CR B W V CT G FG OTHER: <u> </u>	white		W	A B C D RM CTR FL CL							0.2
119	M PL S C CB PG CR B W V CT G FG OTHER: <u> </u>	Beige		Brd FR	A B C D RM CTR FL CL							-0.1
120	M PL S C CB PG CR B W V CT G FG OTHER: <u> </u>	Beige		CL	A B C D RM CTR FL CL							0.1
121	M PL S C CB PG CR B W V CT G FG OTHER: <u> </u>	Beige		DR	A B C D RM CTR FL CL							0.0
122	M PL S C CB PG CR B W V CT G FG OTHER: <u> </u>	Beige		DF	A B C D RM CTR FL CL							-0.2
123	M PL S C CB PG CR B W V CT G FG OTHER: <u> </u>	Yellow		W	A B C D RM CTR FL CL							-0.3
124	M PL S C CB PG CR B W V CT G FG OTHER: <u> </u>			W	A B C D RM CTR FL CL							0.1
125	M PL S C CB PG CR B W V CT G FG OTHER: <u> </u>			W	A B C D RM CTR FL CL							0.0
126	M PL S C CB PG CR B W V CT G FG OTHER: <u> </u>			W	A B C D RM CTR FL CL							0.0

Side: Left/Center/Right; Height: Lower/Middle/Upper; Substrate: M: Metal; PL: Plaster; S: Sheetrock; C: Concrete; CB: Cinder Block; CR: Sinks, Water Closets, etc.; CT: Ceramic Tile; PG: Porcelain-glazed Block; B: Brick; W: Wood; V: Vinyl; FG: Fiberglass; G: Glass; Condition: I = Intact; F = Fair; P = Poor; Initial Result: P = Positive; N = Negative;

XRF LEAD-BASED PAINT TESTING DATA SHEET/CHAIN OF CUSTODY

PROJECT NO.: _____
CLIENT: Irvington School District
INSPECTOR(S): *DA, JB*
PROJ. MANAGER: _____

PROJECT NAME:

XRF SERIAL #:

PROJECT LOCATION: Main St Elementary

INSPECTION DATE: 02/17/21

SPACE CHARACTERISTICS:

FLOOR #: _____ ROOM #: _____ ROOM NAME: _____

NOTES:

[illegible]

Side: Left/Center/Right; Height: Lower/Middle/Upper; Substrate: M: Metal; PL: Plaster; S: Sheetrock; C: Concrete; CB: Cinder Block; CR: Sinks, Water Closets, etc.; CT: Ceramic Tile; PG: Porcelain-glazed Block; B: Brick; W: Wood; V: Vinyl; FG: Fiberglass; G: Glass ; Condition: I = Intact; F = Fair; P = Poor; Initial Result: P = Positive; N = Negative;

XRF Testing Data Report

Project Number	31402880.011
Testing Location	Main Street School
Inspector	A. Smolyar
Date	March 1, 2021
XRF Model	Heuresis
XRF Serial Number	Pb200i

Test Number	Room	Component Name	Color	Condition	Substrate	Location (Wall/Side)	[Pb] (mg/cm ²)	Result
1	Irvington Main Street Elementary School	Calibrate @ 1.0	3/1/2021 6:32	---	---	---	1.1	POS
2		Calibrate @ 1.0		---	---	---	0.8	NEG
3		Calibrate @ 1.0		---	---	---	1.0	POS
4		Calibrate @ 0.0	3/1/2021 6:48	---	---	---	-0.1	NEG
5		Calibrate @ 0.0		---	---	---	-0.1	NEG
6		Calibrate @ 0.0		---	---	---	-0.1	NEG
7		Calibrate @ 1.0	3/1/2021 9:14	---	---	---	1.0	POS
8		Calibrate @ 1.0		---	---	---	0.9	NEG
9		Calibrate @ 1.0		---	---	---	0.9	NEG
10	Bell Tower	Louver Frame	White	Poor	Wood	---	0.7	NEG
11	Bell Tower	Louver Frame	White	Poor	Wood	---	1.0	POS
12	Irvington Main Street Elementary School	Calibrate @ 1.0	3/1/2021 9:20	---	---	---	1.0	POS
13		Calibrate @ 1.0		---	---	---	1.0	POS
14		Calibrate @ 1.0		---	---	---	1.0	POS
15		Calibrate @ 0.0	3/1/2021 9:22	---	---	---	0.1	NEG
16		Calibrate @ 0.0		---	---	---	0.1	NEG
17		Calibrate @ 0.0		---	---	---	0.1	NEG

WSP		XRF CALIBRATION CHECK FORM			PAGE <u>1</u> OF <u>1</u>	
PROJ. NO.: <u>31402880.011</u>		DATE: <u>3/3/21</u>				
PROJECT NAME: <u>Main Street School Renov.</u>		INSPECTOR NAME: <u>J. Wray</u>		INSPECTOR SIGNATURE: <u>[Signature]</u>		
CLIENT: <u>Irvington SD</u>		INSPECTOR SIGNATURE: <u>[Signature]</u>		PROJ. MANAGER: <u>A. Smolyar</u>		
SITE: <u>Main Street School</u>		PROJ. MANAGER: <u>A. Smolyar</u>				
WSP USA Solutions Inc. TELEPHONE #: (212) 612-7900 FAX #: (212) 425-1618 ADDRESS: 96 Morton Street, 8th Floor, New York, NY 10014		XRF MAKE/MODEL: <u>RMD LPA-1 (Serial#3675)</u> <u>Heuresis Pb200i (Serial#2150)</u>		LLW#:		JOB#:
NOTES:						
CALIBRATION CHECK – PRIOR TO LEAVING OFFICE						
<u>1.0</u> mg/cm ² Calibration Block		FIRST READING	SECOND READING	THIRD READING	AVERAGE	
CALIBRATION TIME: <u>0632</u>	TEST #	<u>1</u>	<u>2</u>	<u>3</u>		
	XRF READING	<u>1.0</u>	<u>0.8</u>	<u>1.0</u>		
CALIBRATION CHECK – PRIOR TO LEAVING OFFICE						
<u> </u> mg/cm ² Calibration Block		FIRST READING	SECOND READING	THIRD READING	AVERAGE	
CALIBRATION TIME: <u>0648</u>	TEST #	<u>4</u>	<u>5</u>	<u>6</u>		
	XRF READING	<u>-0.1</u>	<u>-0.1</u>	<u>-0.1</u>		
CALIBRATION CHECK – FIELD-START						
<u>1.0</u> mg/cm ² Calibration Block		FIRST READING	SECOND READING	THIRD READING	AVERAGE	
CALIBRATION TIME: <u>0914</u>	TEST #	<u>7</u>	<u>8</u>	<u>9</u>		
	XRF READING	<u>1.0</u>	<u>0.9</u>	<u>0.9</u>		
CALIBRATION CHECK – FIELD-END/2-HR (circle one)						
<u>1.0</u> mg/cm ² Calibration Block		FIRST READING	SECOND READING	THIRD READING	AVERAGE	
CALIBRATION TIME: <u>0920</u>	TEST #	<u>12</u>	<u>13</u>	<u>14</u>		
	XRF READING	<u>1.0</u>	<u>1.0</u>	<u>1.0</u>		
CALIBRATION CHECK – FIELD-END/2-HR (circle one)						
<u>0.0</u> mg/cm ² Calibration Block		FIRST READING	SECOND READING	THIRD READING	AVERAGE	
CALIBRATION TIME: <u>9:22</u>	TEST #	<u>15</u>	<u>16</u>	<u>17</u>		
	XRF READING	<u>0.1</u>	<u>0.1</u>	<u>0.1</u>		
CALIBRATION CHECK – FIELD-END/2-HR (circle one)						
<u> </u> mg/cm ² Calibration Block		FIRST READING	SECOND READING	THIRD READING	AVERAGE	
CALIBRATION TIME: <u> </u>	TEST #					
	XRF READING					
CALIBRATION CHECK – FIELD-END/2-HR (circle one)						
<u> </u> mg/cm ² Calibration Block		FIRST READING	SECOND READING	THIRD READING	AVERAGE	
CALIBRATION TIME: <u> </u>	TEST #					
	XRF READING					

XRF LEAD-BASED PAINT TESTING DATA SHEET/CHAIN OF CUSTODY

PAGE 1 OF 1

PROJECT NO.: 31402880.011
CLIENT: Irvingto S.P.
INSPECTOR(S): J. Wong, A. Smolyar
PROJ. MANAGER: A. Smolyar

PROJECT NAME: Main Street School
PROJECT LOCATION: _____
INSPECTION DATE: 5/3/21

SPACE CHARACTERISTICS:

NOTES:

FLOOR #: _____ ROOM #: _____ ROOM NAME: _____

[illegible]

Side: Left/Center/Right; **Height:** Lower/Middle/Upper; **Substrate:** M: Metal; PL: Plaster; S: Sheetrock; C: Concrete; CB: Cinder Block; CR: Sinks, Water Closets, etc.; CT: Ceramic Tile; PG: Porcelain-glazed Block; B: Brick; W: Wood; V: Vinyl; FG: Fiberglass; G: Glass; **Condition:** I = Intact; F = Fair; P = Poor; Initial Result: P = Positive; N = Negative



**APPENDIX F:
PCB BULK SAMPLE FIELD DATA SHEETS WITH CHAIN OF
CUSTODY & LABORATORY RESULTS**



EMSL Analytical, Inc.

200 Route 130 North, Cinnaminson, NJ 08077

Phone: (856) 303-2500 Fax: (856) 858-4571 Email: EnvChemistry2@emsl.com

Attn:

**Alex Smolyar
WSP USA Solutions Inc
96 Morton Street
8th floor
New York, NY 10014**

Phone: (212) 612-7900

Fax:

3/1/2021

The following analytical report covers the analysis performed on samples submitted to EMSL Analytical, Inc. on 2/22/2021. The results are tabulated on the attached data pages for the following client designated project:

31402880.011 Main Street School

The reference number for these samples is EMSL Order #012101555. Please use this reference when calling about these samples. If you have any questions, please do not hesitate to contact me at (856) 303-2500.

Approved By:

Phillip Worby, Environmental Chemistry
Laboratory Director



The test results contained within this report meet the requirements of NELAP and/or the specific certification program that is applicable, unless otherwise noted.

NELAP Certifications: NJ 03036, NY 10872, PA 68-00367, CA ELAP 1877

The samples associated with this report were received in good condition unless otherwise noted. This report relates only to those items tested as received by the laboratory. The QC data associated with the sample results meet the recovery and precision requirements established by the NELAP, unless specifically indicated. All results for soil samples are reported on a dry weight basis, unless otherwise noted. This report may not be reproduced except in full and without written approval by EMSL Analytical, Inc.

**EMSL Analytical, Inc.**

200 Route 130 North, Cinnaminson, NJ 08077

Phone/Fax: (856) 303-2500 / (856) 858-4571

<http://www.EMSL.com>EnvChemistry2@emsl.com

EMSL Order: 012101555

CustomerID: LBAP78

CustomerPO:

ProjectID:

Attn: **Alex Smolyar**
WSP USA Solutions Inc
96 Morton Street
8th floor
New York, NY 10014

Phone: (212) 612-7900

Fax:

Received: 02/22/21 9:00 AM

Project: 31402880.011 Main Street School

Analytical Results

Client Sample Description 01,02,03 **Collected:** 2/17/2021 **Lab ID:** 012101555-0001
 Gym Bldg 1st floor Boiler Room

Method	Parameter	Result	RL Units	Prep Date & Analyst	Analysis Date & Analyst
GC-SVOA					
3540C/8082A	Aroclor-1016	ND D	0.95 mg/Kg	2/22/2021 AC	02/23/21 0:00 EH
3540C/8082A	Aroclor-1221	ND D	0.95 mg/Kg	2/22/2021 AC	02/23/21 0:00 EH
3540C/8082A	Aroclor-1232	ND D	0.95 mg/Kg	2/22/2021 AC	02/23/21 0:00 EH
3540C/8082A	Aroclor-1242	ND D	0.95 mg/Kg	2/22/2021 AC	02/23/21 0:00 EH
3540C/8082A	Aroclor-1248	ND D	0.95 mg/Kg	2/22/2021 AC	02/23/21 0:00 EH
3540C/8082A	Aroclor-1254	ND D	0.95 mg/Kg	2/22/2021 AC	02/23/21 0:00 EH
3540C/8082A	Aroclor-1260	ND D	0.95 mg/Kg	2/22/2021 AC	02/23/21 0:00 EH
3540C/8082A	Aroclor-1262	ND D	0.95 mg/Kg	2/22/2021 AC	02/23/21 0:00 EH
3540C/8082A	Aroclor-1268	ND D	0.95 mg/Kg	2/22/2021 AC	02/23/21 0:00 EH

Client Sample Description 04,05,06 **Collected:** 2/17/2021 **Lab ID:** 012101555-0002
 Main Building 1st & 2nd floor Girl's
 Bathroom

Method	Parameter	Result	RL Units	Prep Date & Analyst	Analysis Date & Analyst
GC-SVOA					
3540C/8082A	Aroclor-1016	ND D	0.91 mg/Kg	2/22/2021 AC	02/23/21 0:00 EH
3540C/8082A	Aroclor-1221	ND D	0.91 mg/Kg	2/22/2021 AC	02/23/21 0:00 EH
3540C/8082A	Aroclor-1232	ND D	0.91 mg/Kg	2/22/2021 AC	02/23/21 0:00 EH
3540C/8082A	Aroclor-1242	ND D	0.91 mg/Kg	2/22/2021 AC	02/23/21 0:00 EH
3540C/8082A	Aroclor-1248	ND D	0.91 mg/Kg	2/22/2021 AC	02/23/21 0:00 EH
3540C/8082A	Aroclor-1254	ND D	0.91 mg/Kg	2/22/2021 AC	02/23/21 0:00 EH
3540C/8082A	Aroclor-1260	ND D	0.91 mg/Kg	2/22/2021 AC	02/23/21 0:00 EH
3540C/8082A	Aroclor-1262	ND D	0.91 mg/Kg	2/22/2021 AC	02/23/21 0:00 EH
3540C/8082A	Aroclor-1268	ND D	0.91 mg/Kg	2/22/2021 AC	02/23/21 0:00 EH

Definitions:

MDL - method detection limit

J - Result was below the reporting limit, but at or above the MDL

ND - indicates that the analyte was not detected at the reporting limit

RL - Reporting Limit (Analytical)

D - Dilution Sample required a dilution which was used to calculate final results

012101555

WSP

PCB SURVEY DATA SHEET/ CHAIN OF CUSTODY

PAGE 1 OF 1

LB PROJ #: 31402880.011 **Service ID #:**

CLIENT: Irvington UFSD **LLW#:**

Project Site: Main Street School

Project Manager: P. Smolyar

LOCATION(S) SURVEYED: Interior & Exterior

PROPOSED PROJECT: Renovations

DATE(S) OF INSPECTION: 2/17/21

Inspector(s): S. Garcia & S. Gruba

WSP
TELEPHONE NO.: (212) 612-7900 **FAX NO.:** (212) 363-4341
ADDRESS: 96 Morton Street, 8 Floor, New York, NY 10014

RESULTS TO: lb.labresults@wsp.com

TURNAROUND TIME:

☐ 48 HR ☐ 72 HR ☐ 96 HR ☒ 120 HR

LAB SAMPLE NO.	HA	SAMPLE NO.	MATERIAL DESCRIPTION <i>Location</i>	SAMPLE LOCATION <i>Material</i>	APPROX. QUANTITY (LF/SF)	FIELD NOTES
①	01	01	Gym Bldg. 1st Floor Boiler Room	Wall Penetration Sealant, Red		
		02	↓	↓		
		03	↓	↓		
②	02	04	Main Bldg. 1st Floor Girl's Bathroom	Fixture Caulking, white		
		05	2nd Floor	↓		
		06	↓	↓		

2021 FEB 19 AM 8:51
EMSL MANHATTAN LAB
RECEIVED

CHAIN OF CUSTODY

Relinquished by: (Sign) S. Garcia	(Sign)	2/19/21	AM/PM	Relinquished by: (print)	(Sign)	/ /	AM/PM	Relinquished by: (print)	(Sign)	/ /	AM/PM
Received by: (Sign) David H. H. H.	(Sign)	2/19/21	AM/PM	Received by: (print)	(Sign)	/ /	AM/PM	Received by: (print) Lgm	(Sign)	2/19/21	AM/PM

LAB INSTRUCTIONS: create one (1) composite sample of each homogeneous material from equal mass portions ($\pm 5\%$) of the three (3) sub-samples for extraction and analysis via EPA Method 8082 and report the Aroclors listed (Arochlor 1016, Arochlor 1221, Arochlor 1232, Arochlor 1242, Arochlor 1248, Arochlor 1254, Arochlor 1260). The laboratory shall target a PCB detection limit of 1 ppm

COPIER 8:25 pm
Colleen P. H. H. 2/22/21
ice packs 2.7°C

OrderID: 012101555

Page 1 Of 1



**APPENDIX G:
COMPANY LICENSE, PERSONAL CERTIFICATIONS AND
LABORATORY ACCREDITATIONS**

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER



Expires 12:01 AM April 01, 2021
Issued April 01, 2020

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

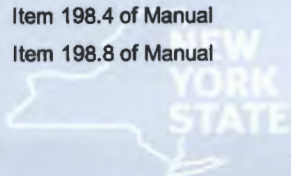
MR. JAMES HALL
EMSL ANALYTICAL, INC
307 WEST 38TH STREET
NEW YORK, NY 10018

NY Lab Id No: 11506

*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



Department
of Health

Serial No.: 61413

Property of the New York State Department of Health. Certificates are valid only at the address shown, must be conspicuously posted, and are printed on secure paper. Continued accreditation depends on successful ongoing participation in the Program. Consumers are urged to call (518) 485-5570 to verify the laboratory's accreditation status.

United States Department of Commerce
National Institute of Standards and Technology



Certificate of Accreditation to ISO/IEC 17025:2017

NVLAP LAB CODE: 101048-9

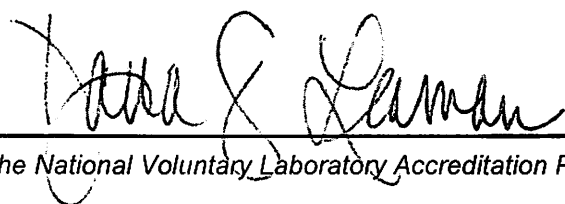
EMSL Analytical, Inc.
New York, NY

*is accredited by the National Voluntary Laboratory Accreditation Program for specific services,
listed on the Scope of Accreditation, for:*

Asbestos Fiber Analysis

*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017.
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality
management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).*

2020-07-01 through 2021-06-30
Effective Dates



For the National Voluntary Laboratory Accreditation Program

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

EMSL Analytical, Inc.

307 W. 38th Street

New York, NY 10018

Mr. Jim Hall

Phone: 212-290-0051 Fax: 212-290-0058

Email: jhall@emsl.com

<http://www.emsl.com>

ASBESTOS FIBER ANALYSIS

NVLAP LAB CODE 101048-9

Bulk Asbestos Analysis

Code

Description

18/A01

EPA -- 40 CFR Appendix E to Subpart E of Part 763, Interim Method of the Determination of Asbestos in Bulk Insulation Samples

18/A03

EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials

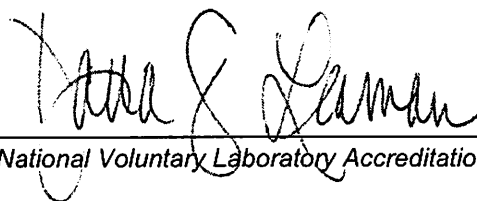
Airborne Asbestos Analysis

Code

Description

18/A02

U.S. EPA's "Interim Transmission Electron Microscopy Analytical Methods-Mandatory and Nonmandatory-and Mandatory Section to Determine Completion of Response Actions" as found in 40 CFR, Part 763, Subpart E, Appendix A.



For the National Voluntary Laboratory Accreditation Program



01213 005579771 60



**Department
of Labor**

JOSUE GARCIA

C/O LOUIS BERGER 96 MORTON ST 8TH FL
NEW YORK NY 10014

Enclosed is your new card.

NYS Department of Labor

The Department of Labor is happy to provide this improved card. We welcome your comments:

nysdol@labor.ny.gov or call (518) 457-2735

YOUR NEW CARD



STATE OF NEW YORK - DEPARTMENT OF LABOR
ASBESTOS CERTIFICATE



STEPHEN C GRUBER

CLASS(EXPIRES)

C ATEC(06/21) D INSP(06/21)

H PM (06/21)

CERT# 17-42557

DMV# [REDACTED]

MUST BE CARRIED ON ASBESTOS PROJECTS



NYC DEP ASBESTOS CONTROL PROGRAM
ASBESTOS CERTIFICATE

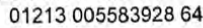


WONG,
JORDAN
INVESTIGATOR
151162

EXPIRES: 2/22/2021
DOB: 2/22/1965 M 5' 09"

MUST BE CARRIED ON ALL ASBESTOS PROJECTS





C/O LOUIS BERGER 96 MORTON ST, 8TH FL
NEW YORK NY 10014

Enclosed is your new card.

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The Department of Labor is happy to provide this improved card. We welcome your comments:
nysdol@labor.ny.gov or call (518) 457-2735

YOUR NEW CARD



United States Environmental Protection Agency

This is to certify that



Dmitri Kirnossenko

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 January 11, 2022

LBP-R-16279-1

Certification #

December 28, 2018

Issued On



John Gorman, Chief

Pesticides & Toxic Substances Branch

United States Environmental Protection Agency

This is to certify that



Alexander Smolyar

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 March 13, 2022

LBP-R-129050-1

Certification #

February 27, 2019

Issued On



John Gorman, Chief

Pesticides & Toxic Substances Branch



**APPENDIX H:
SCOPE OF WORK DRAWINGS**

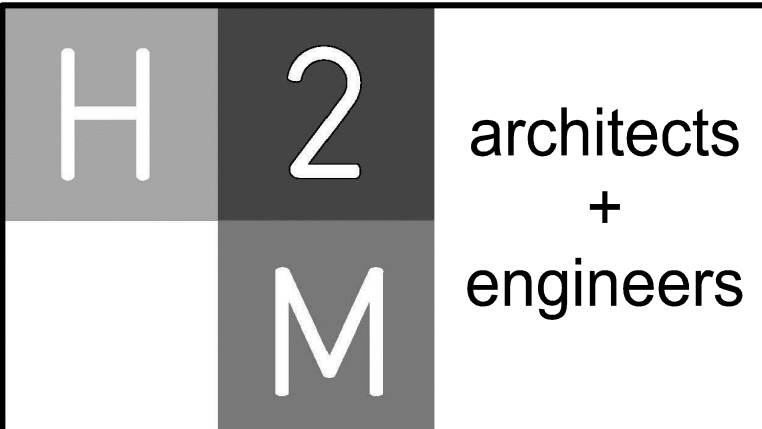
IRVINGTON UNION FREE SCHOOL DISTRICT

MAIN STREET SCHOOL RENOVATIONS

101 MAIN STREET, IRVINGTON, NEW YORK 10533

SED PROJECT CONTROL NUMBER 66-04-02-02-0-001-016

CONTRACT G - GENERAL CONSTRUCTION WORK



2700 Westchester Avenue, Suite 415
Purchase, NY 10577
914.358.5623 • www.h2m.com

CONSULTANTS:

MARK	DATE	DESCRIPTION

"ALTERATION OF THIS DOCUMENT EXCEPT BY A LICENSED PROFESSIONAL IS ILLEGAL."			
DESIGNED BY: BSP	DRAWN BY: BEK	CHECKED BY: BSP	REVIEWED BY: VEB
PROJECT NO: IRSD 1910	DATE: JULY 2020	SCALE: AS SHOWN	

CLIENT
Irvington Union Free School District

Main Street School Renovations



101 Main Street
Irvington, NY 10533

SED Number:66-04-02-02-0-001-016

CONTRACT

ALL CONTRACTS

STATUS

NOT FOR CONSTRUCTION

SHEET TITLE

**GENERAL NOTES, ABBREVIATIONS,
DRAWING LIST, STAGING PLAN,
LOCATION MAP AND LEGEND**

DRAWING No.

G0.0

ABBREVIATIONS

AB	Anchor Bolt	FIN	Finish
A/C	Air Conditioning	FR	Fire Retardant
ACI	American Concrete Institute	FTG	Footing
ACST	Acoustic	GA	Gauge
ACT	Acoustical Ceiling Tile	GWB	Gypsum Wall Board
ACU	Air Conditioning Unit	GYP	Gypsum
AD	Access Door	GYP. BD.	Gypsum Board
ADJ	Adjustable	HC	Handicapped
A/E	Architect/Engineer	HM	Hollow Metal
AFF	Above Finish Floor	HOR	Horizontal
ALUM	Aluminum	HW	Hot Water
ANCH	Anchor	INSUL	Insulation/Insulating
ANSI	American National Standards Institute	INT	Interior
APA	Access Panel	LAV	Lavatory
APPROX	Approximately	LDR	Leader
ASPH	Asphalt	LT	Light
ASTM	American Society for Testing & Materials	MAX	Maximum
	American Welding Society	MECH	Mechanical
AWS		MISC	Miscellaneous
B	Fire Blanket	MO	Moisture Resistant
BAL	Balance	MR	Moisture Resistant
BB	Bulletin Board	NTS	Not in Contract
BD	Board	OC	Not to Scale
BLDG	Building	OD	Outside Diameter
BLK	Block	PLYWD	Plywood
BLKG	Blocking	PSF	Pounds per Square Foot
BM	Beam	PSI	Pounds per Square Inch
B.O.	Bottom Of	PTD	Painted
BOL	Bottom Of Lintel	PVC	Polyvinyl Chloride
BOT	Bottom	R	Radius or Riser
CEIL	Ceiling	RCP	Reflected Ceiling Plan
CEM	Cement	RD	Roof Drain
CER	Ceramic	REINF	Reinforced
CLO	Closet	RM	Room
CMU	Concrete Masonry Unit	RO	Rough Opening
COL	Column	SIM	Similar
CONC	Concrete	SPEC	Specifications
CONST	Construction	SQ	Square
CONT	Continuous	SS	Stainless Steel
CORR	Corridor	STL	Steel
CPT	Carpet	TEMP	Temperature
DS	Downspout	TER	Terrazzo
DW	Dishwasher	THK	Thick
DWG	Drawing	TYP	Typical
EA	Each	UTIL	Utility
EL	Elevation	VB	Vapor Barrier
ELEC	Electric/Electrical	VCT	Vinyl Composition Tile
ELEV	Elevator	VERT	Vertical
EP	Electrical Panel	VTR	Vent Thru Roof
EPY	Epoxy Coating	WC	Water Closet
EQ	Equal	WH	Water Heater
EQUIP	Equipment	WWF	Welded Wire Fabric
EXIST	Existing		
EXST	Exhaust		
FAI	Fresh Air Intake		
F.C.	Fire Code		
FD	Floor Drain		

GENERAL NOTES

ALL WORK SHALL COMPLY WITH THE NEW YORK STATE FIRE PREVENTION AND BUILDING CODE AS WELL AS THE NEW YORK STATE EDUCATION DEPARTMENT MANUAL OF PLANNING STANDARDS.

ALL NOTES APPEARING HEREIN, WITH THOSE ON VARIOUS DRAWINGS SHALL APPLY TO ALL DRAWINGS AND FORM PART OF THE CONTRACT DOCUMENTS.

IT IS THE CONTRACTORS RESPONSIBILITY TO FIELD VERIFY ALL DIMENSIONS, SQUARE FOOTAGES, LOCATIONS AND QUANTITIES OF ALL ITEMS AND/OR SPACES WHETHER INDICATED IN THE DRAWINGS OR NOT.

DO NOT SCALE MEASURE ANY DRAWING. VERIFY THE FIGURES, DIMENSIONS AND DESIGN INTENTION SHOWN ON THE DRAWINGS BEFORE BEGINNING LAYOUT OF THE WORK AND REPORT ANY ERRORS, INACCURACIES, OR CONFLICTS TO THE ARCHITECT/ENGINEER IN WRITING BEFORE BEGINNING ANY WORK.

ALL WORK SHALL COMPLY WITH ALL APPLICABLE CODES, LAWS AND STATUTES AS REQUIRED. STRICTLY ADHERE TO MANUFACTURER'S PRINTED INSTRUCTIONS.

VERIFY EXACT LAYOUT COMPATIBILITY WITH ALL EXISTING CONDITIONS BEFORE BEGINNING WORK.

DISTURB ONLY THOSE AREAS OF THE SITE AFFECTED BY RENOVATION, UNLESS NOTED OTHERWISE. PROTECT ALL OTHER AREAS. CONTRACTORS SHALL BE RESPONSIBLE FOR ALL PATCH AND REPAIR OF EXISTING FINISHES WHICH ARE DAMAGED DURING CONSTRUCTION.

EACH CONTRACTOR SHALL COMPLY WITH THE REQUIREMENTS OF ANSI AND PROVIDE WHERE APPLICABLE ADA COMPLIANT BUILDING COMPONENTS.

THE OWNER RESERVES THE RIGHT AT ALL TIMES TO DELIVER, PLACE AND INSTALL EQUIPMENT AND FURNISHINGS AS THE WORK PROGRESSES SO LONG AS THERE IS NOT A CONFLICT WITH THE CONTRACTORS.

THE CONTRACTOR SHALL MAINTAIN AT THE SITE ONE RECORD COPY OF ALL DRAWINGS, SPECIFICATIONS AND APPROVED SHOP DRAWINGS AND APPROVED SAMPLES MARKED CURRENTLY TO RECORD ALL CHANGES DURING CONSTRUCTION.

ANY CHANGES TO THE SCOPE OF WORK OR IN THE CONSTRUCTION DETAILS, WHETHER DUE TO FIELD CONDITIONS OR OMISSION SHALL BE DOCUMENTED BY THE ARCHITECT PRIOR TO EXECUTION. ANY INCREASE OR DECREASE IN THE CONTRACT PRICE MUST BE APPROVED IN WRITING PRIOR TO EXECUTION.

DRAWING LIST

INFORMATIONAL DRAWINGS
G.0.0 GENERAL NOTES, ABBREVIATIONS, DRAWING LIST, STAGING PLAN, LOCATION MAP & LEGEND
G1.0 EXISTING BASEMENT LIFE SAFETY PLAN
G1.1 EXISTING FIRST FLOOR LIFE SAFETY PLAN
G1.2 EXISTING SECOND FLOOR LIFE SAFETY PLAN
G1.3 EXISTING THIRD FLOOR LIFE SAFETY PLAN
G1.4 LIFE SAFETY PLAN
G1.5 EXISTING MAIN STREET SCHOOL GYM SECOND FLOOR LIFE SAFETY PLAN

CIVIL DRAWINGS
C1.0 EXISTING SITE CONDITIONS & SITE REMOVALS PLAN
C2.0 SITE IMPROVEMENTS PLAN
C3.0 SITE DETAILS

STRUCTURAL DRAWINGS
S1.0 _____

DEMOLITION DRAWINGS
D1.0 SECOND FLOOR COMPUTER LAB DEMOLITION FLOOR PLAN, NOTES
D1.1 THIRD FLOOR PLTW CLASSROOM DEMOLITION FLOOR PLAN, NOTES

ARCHITECTURAL DRAWINGS
A1.0 SECOND FLOOR COMPUTER LAB FLOOR PLAN, INTERIOR ELEVATIONS, NOTES
A1.1 THIRD FLOOR PLTW CLASSROOM FLOOR PLAN, NOTES
A1.2 WALKWAY PLAN, FENCE ELEVATION & SECTION OPTIONS, NOTES
A2.0 ELEVATIONS
A2.1 ELEVATIONS
A7.0 PLTW CLASSROOM & COMPUTER LAB FINISH SCHEDULE, DOOR SCHEDULE AND DETAILS

HVAC DRAWINGS
H0.0 HVAC LEGENDS, SYMBOLS, ABBREVIATIONS AND GENERAL NOTES
H1.0 HVAC COMPUTER ROOM CONSTRUCTION PLAN
H1.1 HVAC UPPER GYMNASIUM CONSTRUCTION PLAN
H1.2 HVAC GYMNASIUM ROOF CONSTRUCTION PLAN
H2.0 HVAC SCHEDULES AND DETAILS

STAGING PLAN NOTES

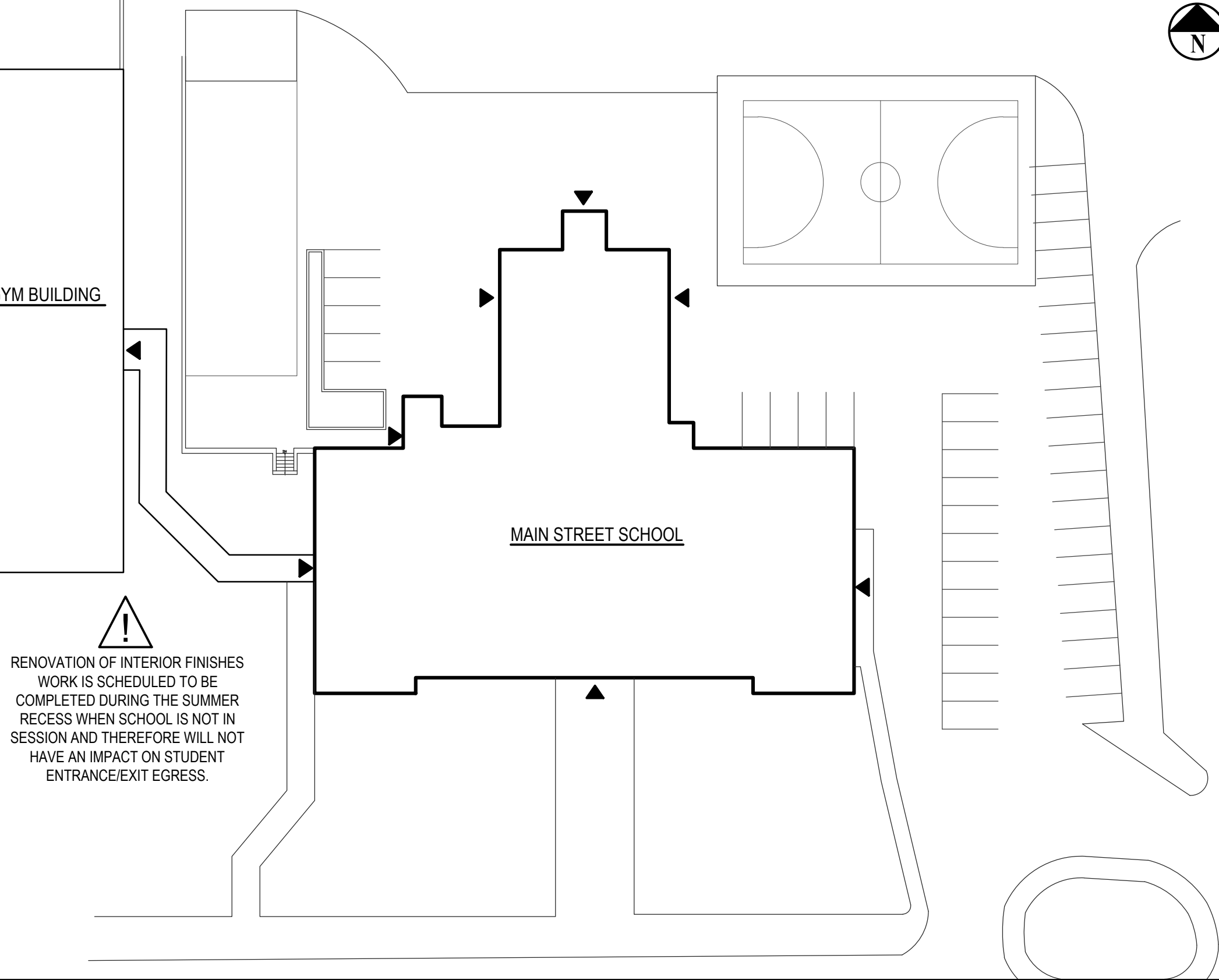
1. POST SIGNS INDICATING CONSTRUCTION AREA AND CONSTRUCTION EMPLOYEE ENTRANCE.

2. CONSTRUCTION FENCE TO BE 8'-0" HIGH CHAIN LINK FENCE LOCATED A MINIMUM OF 15'-0" FROM ALL WINDOW OPENINGS. ALL GATES ARE TO BE LOCKED AT ALL TIMES, EXCEPT FOR WHEN A WORKER IS IN ATTENDANCE TO PREVENT UNAUTHORIZED ENTRY.

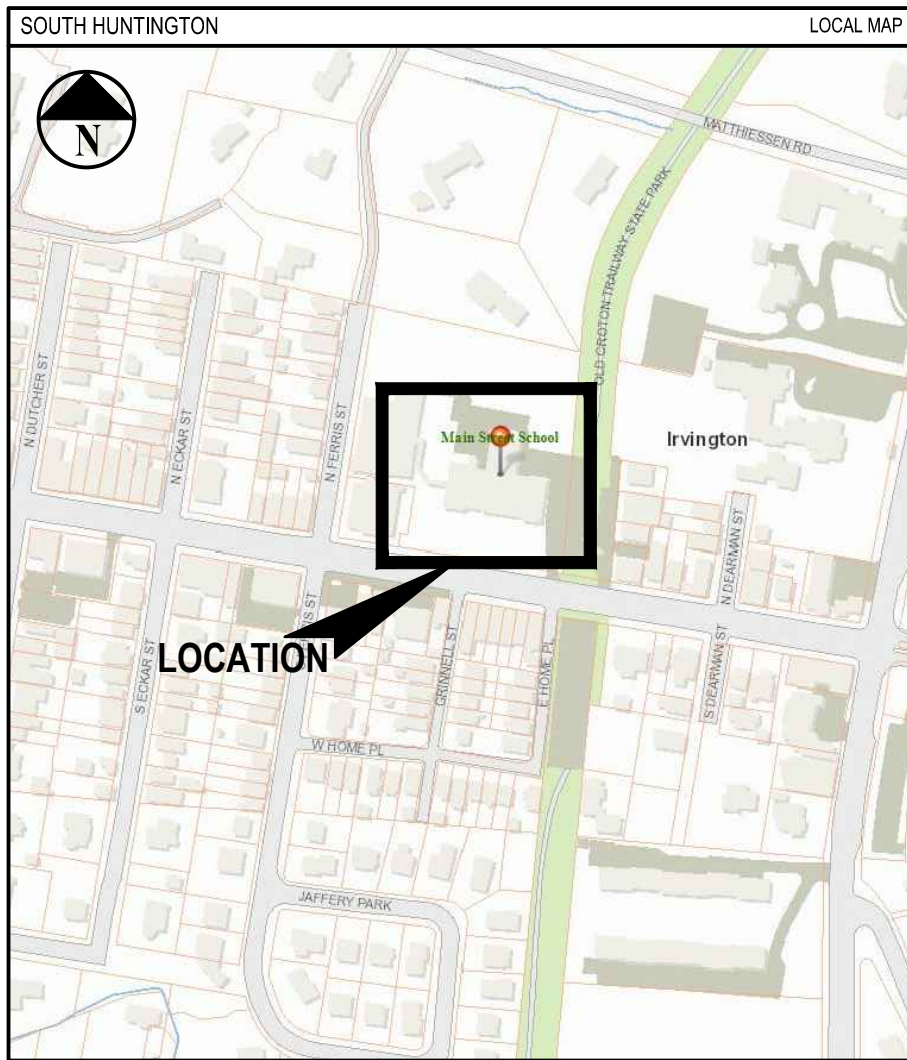
3. CONTRACTOR IS TO STAGE ON THE SITE IN SUCH A MANNER AS TO NOT BLOCK OR ENCRoACH UPON EXISTING EXITS/ENTRANCES TO BUILDING, AND VEHICLE ACCESS.

SYMBOLS
▲ STAFF ENTRANCE / EGRESS

STAGING PLAN



LOCATION MAPS



SYMBOLS LEGEND

NAME	ROOM DESIGNATION		
NO.	S.F.		
3	A4.2	SECTION MARK	GYPSUM
1	A2.0	DETAIL SYMBOL	CONCRETE
3	A4.2	ELEVATION KEY	AGGREGATE SUB-BASE
3	A4.2	INTERIOR ELEVATION REFERENCE	EARTH
5	A1.1	ELEVATION LINE	BATT INSULATION
5	A1.1	REVISION	PLYWOOD
2	A1.1	PARTITION TYPE	RIGID INSULATION
2	A1.1	DOOR TAG	STEEL
2	A1.1	WINDOW TAG	WOOD
2	A1.1		WOOD BLOCKING

UNIFORM SAFETY STANDARDS - FOR SCHOOL CONSTRUCTION AND MAINTENANCE PROJECTS

- "THE OCCUPIED PORTION OF ANY SCHOOL BUILDING SHALL ALWAYS COMPLY WITH THE MINIMUM REQUIREMENTS NECESSARY TO MAINTAIN A CERTIFICATE OF OCCUPANCY."
- ACCORDING TO THE DISTRICTS AHERA MANAGEMENT PLAN ALL AREAS OF _____ HAVE BEEN FOUND TO CONTAIN ASBESTOS. THESE AREAS WILL BE ABATED IN ACCORDANCE WITH SPECIFICATION SECTION 028200. A COPY OF THE REPORT CAN BE VIEWED AT THE DISTRICT OFFICE LOCATED _____
- "GENERAL SAFETY AND SECURITY STANDARDS FOR CONSTRUCTION PROJECTS:
(1) ALL CONSTRUCTION MATERIALS SHALL BE STORED IN A SAFE AND SECURE MANNER.
(2) FENCES AROUND CONSTRUCTION SUPPLIES OR DEBRIS SHALL BE MAINTAINED.
(3) GATES SHALL ALWAYS BE LOCKED UNLESS A WORKER IS IN ATTENDANCE TO PREVENT UNAUTHORIZED ENTRY.
(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.
(5) WORKERS SHALL BE REQUIRED TO WEAR PHOTO-IDENTIFICATION BADGES AT ALL TIMES FOR IDENTIFICATION AND SECURITY PURPOSES WHILE WORKING AT OCCUPIED SITES."
- "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.
(1) A SPECIFIC STAIRWELL AND/OR ELEVATOR SHALL BE ASSIGNED OR CONSTRUCTION WORKER USE DURING WORK HOURS. IN GENERAL, WORKERS MAY NOT USE CORRIDORS, STAIRS OR ELEVATORS DESIGNATED FOR STUDENTS OR SCHOOL STAFF, WHERE NO STAIRWELL AND OR ELEVATOR IS ASSIGNED, WORKERS MUST ENTER THE CONSTRUCTION SPACES DIRECTLY FROM THE BUILDING EXTERIOR.
(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.
(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."
- A PLAN DETAILING HOW EXITING REQUIRED BY THE APPLICABLE BUILDING CODE WILL BE MAINTAINED.
- WORK UNDER THIS CONTRACT WILL BE CONDUCTED DURING THE SUMMER RECESS WHEN THE BUILDING IS UNOCCUPIED. IF THE BUILDING BECOMES OCCUPIED THE CONTRACTOR SHALL BE RESPONSIBLE TO MAINTAIN ALL EXISTING MEANS OF EGRESS IN A CLEAR AND FREE MANNER, INCLUDING THE STORAGE OF MATERIALS AND STAGING OF EQUIPMENT ON THE SITE. IF ANY PORTION OF THE BUILDING DOES BECOME OCCUPIED THE ARCHITECT WILL PROVIDE A DETAILED PLAN FOR EXITING, OVERHEAD PROTECTION AND EGRESS IN ACCORDANCE WITH APPLICABLE BUILDING CODES.
- A PLAN DETAILING HOW ADEQUATE VENTILATION WILL BE MAINTAINED DURING CONSTRUCTION.
- WORK UNDER THIS PROJECT WILL BE COMPLETED DURING THE SUMMER RECESS WHEN THE BUILDING WILL NOT BE OCCUPIED BY FACILITY, STAFF OR STUDENTS. IF A PORTION OF THE BUILDING IS TO BECOME OCCUPIED DURING THE CONSTRUCTION PROCESS THE CONTRACTOR SHALL CLOSE OFF ALL INTAKES, OPENINGS, AND MECHANICAL VENTILATION SYSTEMS ADJACENT TO THE WORK AREA. THE ARCHITECT SHALL ASSIST THE CONTRACTOR IN DEVELOPING A PLAN TO PROVIDE ALTERNATE MEANS OF FRESH AIR TO ALL OCCUPIED SPACES.
"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."
"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." ALL VENTS SHALL BE SEALED TO PREVENT CONTAMINANTS FROM THE CONSTRUCTION AREA FROM ENTERING THE OCCUPIED AREAS OF THE BUILDING.
- "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."
- "LARGE AND SMALL ASBESTOS ABATEMENT PROJECTS AS DEFINED BY 12NYCRR56 SHALL NOT BE PERFORMED WHILE THE BUILDING IS OCCUPIED." 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.
- 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 INTERRUPTED BY NOISE OR VISUAL DISTRACTION.
MINOR ASBESTOS PROJECTS DEFINED BY 12NYCRR56 AS AN ASBESTOS PROJECT INVOLVING THE REMOVAL, DISTURBANCE, REPAIR, ENCAPSULATION, ENCLOSURE OR HANDLING OF 10 SQUARE FEET OF ASBESTOS OR ASBESTOS MATERIAL MAY BE PERFORMED IN UNOCCUPIED AREAS OF AN OCCUPIED BUILDING IN ACCORDANCE WITH 12NYCRR56.
NONE OF THE SURFACES AND/OR MATERIALS TO BE REMOVED OR DISTURBED BY THIS RENOVATION ARE SUSPECT OF CONTAINING LEAD.
- UNDER NEW YORK STATE LAW SMOKING IS PROHIBITED ON SCHOOL GROUNDS. EMPLOYEES FOUND TO BE SMOKING ON SCHOOL GROUNDS SHALL BE ORDERED OFF SITE AND A SECOND OFFENSE WILL BE GROUNDS FOR PERMANENT REMOVAL FROM PROJECT. LEGAL PENALTIES MAY ALSO BE APPLIED.
ALL CONTRACTORS SHALL TAKE EVERY PRECAUTION AND SHALL PROVIDE SUCH EQUIPMENT AND FACILITIES AS ARE NECESSARY OR REQUIRED FOR THE SAFETY OF ITS EMPLOYEES. IN CASE OF AN ACCIDENT, FIRST AID SHALL BE ADMINISTERED TO ANY WHO MAY BE INJURED IN THE PROGRESS OF THE WORK. IN ADDITION, THE CONTRACTOR SHALL BE PREPARED FOR THE REMOVAL TO THE HOSPITAL FOR TREATMENT OF ANY EMPLOYEE EITHER SERIOUSLY INJURED OR ILL.
THE CONTRACTOR FOR GENERAL CONSTRUCTION SHALL PROVIDE TEMPORARY WEATHER-TIGHT AND INSULATED ENCLOSURES AS MAY BE REQUIRED BY THE SCOPE OF WORK FOR ALL EXTERIOR OPENINGS SO AS TO PROTECT ALL WORK FROM THE WEATHER, AND TO PROVIDE SECURITY AGAINST UNAUTHORIZED ENTRY. ENCLOSURES SHALL NOT CREATE DEAD END CONDITIONS, REQUIRED EXITS SHALL BE MAINTAINED FREE AND CLEAR.

[illegible]

DESIGNED BY: BSP	DRAWN BY: BEK	CHECKED BY: BSP	REVIEWED BY: VEB
PROJECT No.: IRSD 1910	DATE: JULY 2020	SCALE: AS SHOWN	

**Irvington Union Free
School District**

The logo of the Irvington Union Free School District is a circular emblem. It features a large, stylized green letter 'I' in the center. To the left of the 'I' is the text 'NEW YORK' and to the right is '1856'. The outer ring of the circle contains the text 'IRVINGTON' at the top and 'UNION FREE SCHOOL DISTRICT' at the bottom. At the very bottom of the circle is the Latin motto 'PER ASPERA AD ASTRA'.

SED Number:66-04-02-02-0-001-016

ALL CONTRACTS

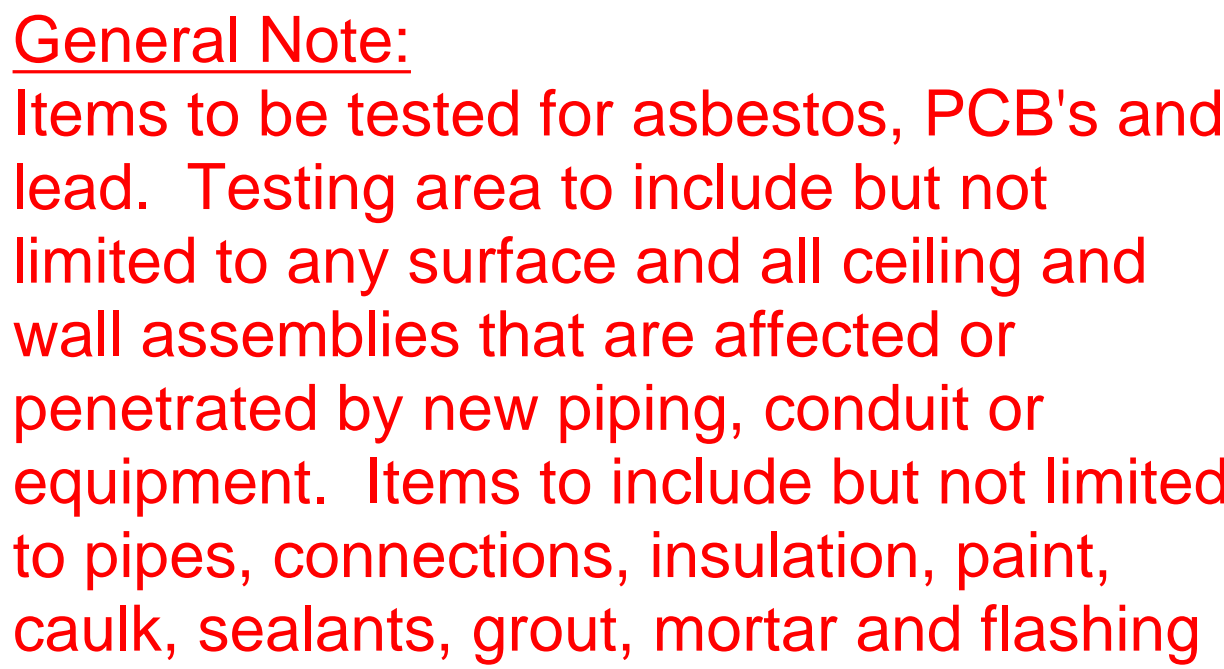
NOT FOR CONSTRUCTION

EXISTING BASEMENT LIFE SAFETY PLAN

G1.0

LEGEND

NOTE:
EXISTING SMOKE DETECTORS TO
REMAIN (TYP. FOR ALL).



Testing to include, but not limited to walls and electrical wiring at the panel

Testing to include, but not limited to walls, ceilings, floors & insulation (include basement below)

Existing Basement Life Safety Plan
SCALE: 3/32"=1'-0"

[illegible]

DESIGNED BY: BSP	DRAWN BY: BEK	CHECKED BY: BSP	REVIEWED BY: VEB
PROJECT No.: IRSD 1910		DATE: JULY 2020	SCALE: AS SHOWN

Main Street School Renovations



CONTRACT

ALL CONTRACTS

STATUS **NOT FOR CONSTRUCTION**

SHEET TITLE

**EXISTING FIRST FLOOR LIFE
SAFETY PLAN**

DRAWING No.

G1.1

ROOM		ROOM NUMBER DESIGNATION TAG		
000	± S.F.			
OF	EXISTING FIRE EXTINGUISHER		FA	EXISTING FIRE ALARM PANEL
EX	EXISTING EXIT SIGN		RW	EXISTING RESCUE WINDOW
P	EXISTING PULL STATION		AED	AUTOMATED EXTERNAL DEFIBRILLATOR (AED)
ST	EXISTING FIRE ALARM STROBE		IB	EXISTING ALARM BELL
SD	EXISTING SMOKE DETECTOR		CM	EXISTING CARBON MONOXIDE DETECTOR
SP	EXISTING SPEAKER		WS	EYE WASH STATION
			B	EMERGENCY FIRE BLANKET
			SH	EXISTING SPRINKLER HEAD
EL	EXISTING EMERGENCY LIGHTING		FI	EXISTING FIRE HOSE

Testing to include, but not limited to walls, ceilings, floors & insulation



CONSULTANTS:


MARK	DATE	DESCRIPTION

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PROJECT NO: IRSD 1910	DATE: JULY 2020	SCALE: AS SHOWN	

CLIENT

Irvington Union Free School District

Main Street School Renovations



101 Main Street
Irvington, NY 10533

SED Number:66-04-02-02-0-001-016

CONTRACT

ALL CONTRACTS

STATUS

NOT FOR CONSTRUCTION

SHEET TITLE

EXISTING SECOND FLOOR LIFE SAFETY PLAN

DRAWING No.

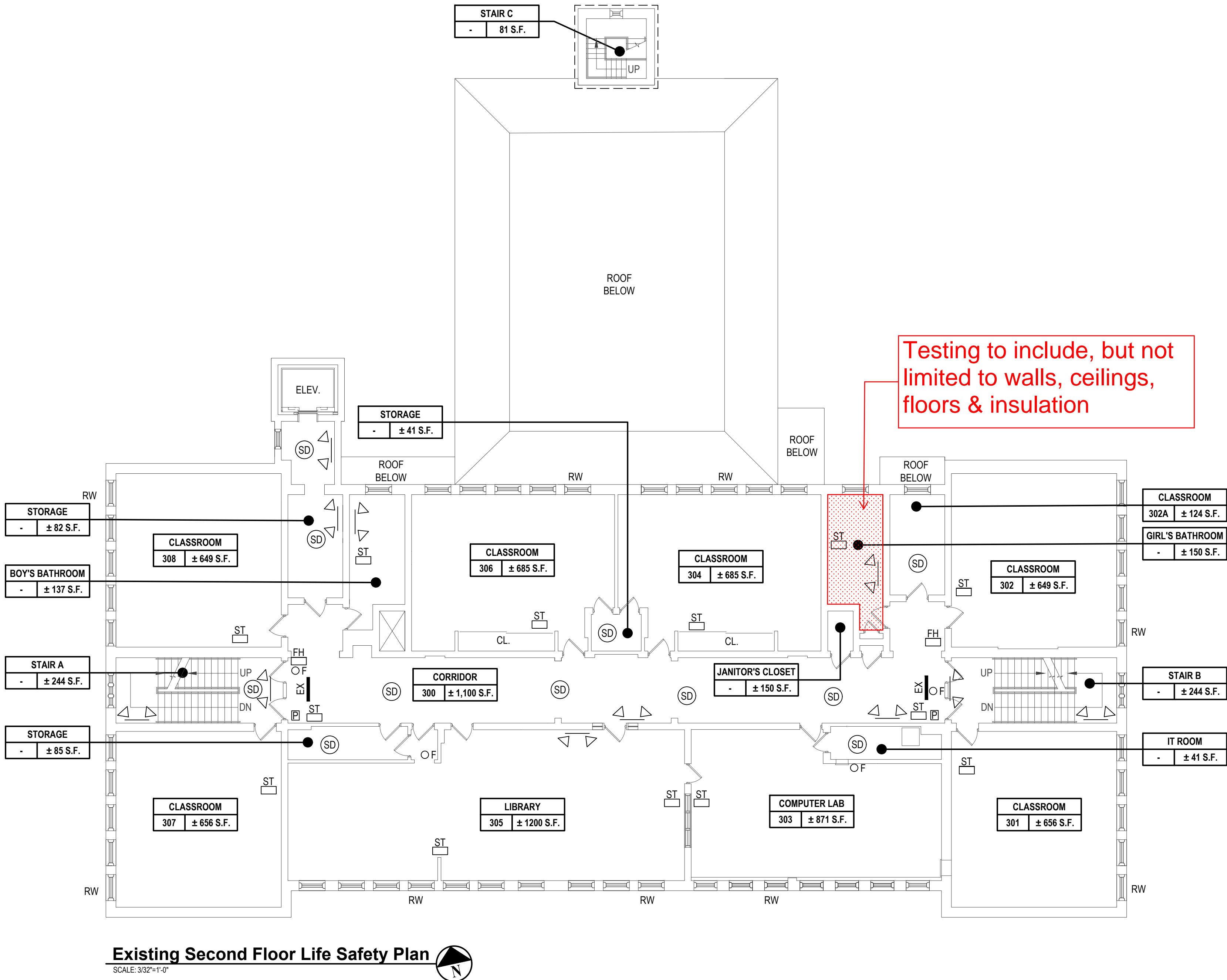
G1.2

2020 BUILDING CODE OF NEW YORK STATE (NYS CODE TABLE 504.3, 504.4)		
	ALLOWED	EXISTING
BUILDING OCCUPANCY	EDUCATIONAL (GROUP E)	EDUCATIONAL (GROUP E)
CONSTRUCTION CLASSIFICATION	IIIB	IIIB
HEIGHT (STORIES)	2 STORIES	--
HEIGHT (FEET)	55 FEET	N/A (NO CHANGE)
NOTES: 1. EDUCATIONAL GROUP "E" OCCUPANCY INCLUDES, AMONG OTHERS, THE USE OF A BUILDING OR STRUCTURE, OR A PORTION THEREOF, BY SIX OR MORE PERSONS AT ANY ONE TIME FOR EDUCATIONAL PURPOSES THROUGH THE 12TH GRADE.		

LEGEND

ROOM	ROOM NUMBER		
000	± S.F.	DESIGNATION TAG	
OF	EXISTING FIRE EXTINGUISHER	FA	EXISTING FIRE ALARM PANEL
ES	EXISTING EXIT SIGN	RW	EXISTING RESCUE WINDOW
PS	EXISTING PULL STATION	AED	AUTOMATED EXTERNAL DEFIBRILLATOR (AED)
FS	EXISTING FIRE ALARM STROBE	AB	EXISTING ALARM BELL
SD	EXISTING SMOKE DETECTOR	CD	EXISTING CARBON MONOXIDE DETECTOR
SP	EXISTING SPEAKER	EW	EYE WASH STATION
EL	EXISTING EMERGENCY LIGHTING	EFB	EMERGENCY FIRE BLANKET
		SH	EXISTING SPRINKLER HEAD
		FH	EXISTING FIRE HOSE

NOTE:
EXISTING SMOKE DETECTORS TO REMAIN (TYP. FOR ALL).

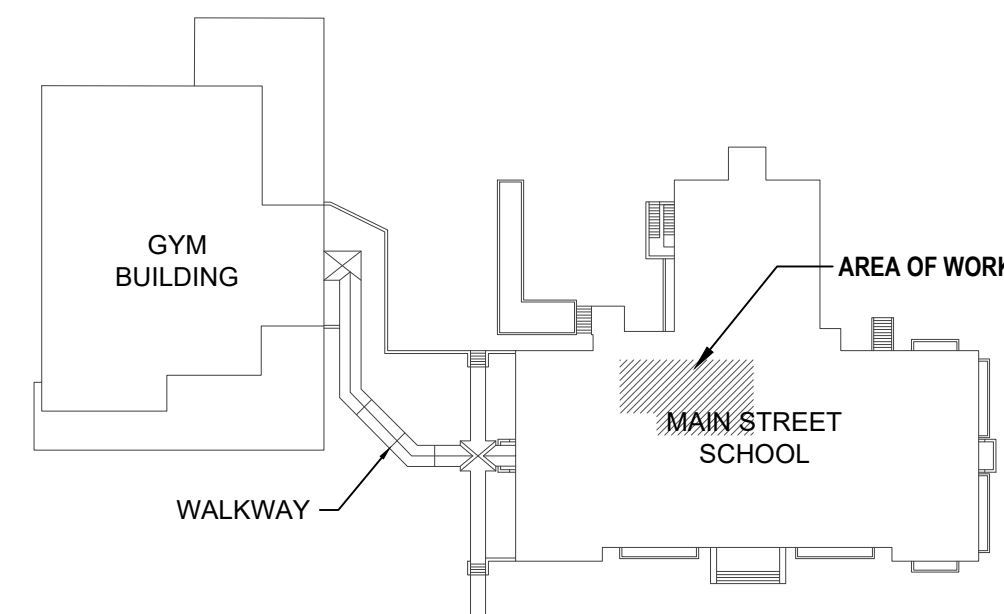


N:\SSD\Irvington\USD\IRSD 1910\Main St School Renovations\02-02-02-0-001-016\G1.2.dwg (Main St School Renovations) [02-02-02-0-001-016] 10/20/2020 10:02am By: jhassan

- Test Area Limits shown with a redline
- Assumptions are insufficient (core drill as required)

This architectural floor plan shows a building with a large room outlined in red. The room is filled with a diagonal hatching pattern. A red arrow points from the top center towards the room. The room contains several dashed-line rectangles, some of which are further divided into smaller rectangles. Numbered callouts (1-14) are placed throughout the plan, indicating specific features or measurements. The surrounding area includes walls, columns, and other architectural details.

A Third Floor PLTW Classroom Demolition Floor Plan, Room #406
SCALE: 1/4" = 1'-0"



Key Plan
SCALE: 1/64"=1'-0"

1. ALL DEMOLITION WORK SHALL BE IN COMPLIANCE WITH ALL FEDERAL AND NEW YORK STATE APPLICABLE BUILDING AND LIFE AND SAFETY CODES AND REGULATIONS.
2. COORDINATE THE WORK OF THE DEMOLITION DRAWINGS WITH ALL CONSTRUCTION DRAWINGS AND DOCUMENTS.
3. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND QUANTITIES OF ALL ITEMS TO BE REMOVED PRIOR TO START OF WORK.
4. THE GENERAL WORK CONTRACTOR SHALL PROTECT ALL PORTIONS OF THE EXISTING BUILDING WHERE NEW WORK IS TO BE DONE FROM DUST, WEATHER INCLEMENCY AND FREEZING. PROVIDE DUST FREE BARRIER PARTITIONS DURING DEMOLITION TO PREVENT DEBRIS FROM ENTERING STUDENT AND FACULTY OCCUPIED AREAS. THE GENERAL WORK CONTRACTOR WILL BE HELD RESPONSIBLE FOR ANY DAMAGE TO THE EXISTING STRUCTURE OR BUILDING CONTENTS.
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6. CONTRACTOR SHALL TAKE CARE NOT TO DAMAGE ADJOINING SURFACES AND FINISHES DURING DEMOLITION. ALL AFFECTED SURFACES SHALL BE PATCHED AND PAINTED TO MATCH EXISTING.
7. OVER-DEMOLITION SHALL BE ALLOWED PROVIDING THAT ALL SURFACES BE REBUILT TO MATCH MATERIALS, STRUCTURAL INTEGRITY AND APPEARANCE OF THOSE THAT WERE REMOVED AND IN CONFORMANCE WITH CONTRACT DOCUMENTS AND AT NO ADDITIONAL COST TO THE DISTRICT.
8. CONTRACTOR SHALL PROTECT AND MAKE WEATHER TIGHT ALL EXTERIOR OPENINGS EXPOSED AS A PART OF THE DEMOLITION.
9. CONTRACTOR SHALL PROTECT AND MAINTAIN EXISTING DOORS AND FRAMES TO REMAIN, AS REQUIRED THROUGHOUT COURSE OF WORK, INCLUDING ALL RELATED HARDWARE AND ACCESSORIES.
10. CONTRACTOR SHALL PROTECT AND MAINTAIN ALL EXISTING WALL-MOUNTED ITEMS INCLUDING BUT NOT LIMITED TO FIRE ALARM SYSTEM DEVICES, LIGHTING CONTROLS AND HVAC CONTROLS, UNLESS OTHERWISE NOTED.
11. CONTRACTOR SHALL BE RESPONSIBLE TO WIPE DOWN AND CLEAN ALL ROOMS WHERE WORK IS BEING DONE UPON COMPLETION OF THE PROJECT.
12. THE USE OF OPEN CHUTES SHALL NOT BE PERMITTED.
13. THE CONTRACTOR SHALL TAKE CARE NOT TO DAMAGE PARKING LOT PAVING, CONCRETE SIDEWALKS, LANDSCAPING, GRASS AREAS AND EXTERIOR FINISHES. ANY DAMAGED AREAS SHALL BE RESTORED TO EXISTING CONDITION BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE DISTRICT.
14. THE DRAWINGS ARE A GENERAL LIST OF DEMOLITION ITEMS AND DO NOT LIST EVERY ITEM REQUIRED FOR DEMOLITION. CONTRACTOR SHALL PROVIDE ALL DEMOLITION REQUIRED TO PERFORM THE WORK INDICATED WITHIN THE PROJECT DRAWINGS AND SPECIFICATIONS AND TO PREPARE ALL AREAS FOR THE CONSTRUCTION WORK.
15. THE CONTRACTOR SHALL PROVIDE WEATHER TIGHT PLYWOOD ENCLOSURES FOR ALL OPENINGS AS REQUIRED TO MAINTAIN WEATHER TIGHT BUILDING FOR ENTIRE DURATION OF PROJECT.
16. CONTRACTOR SHALL REPAIR ALL GLASS TO RECEIVE SECURITY FILM. SEE NEW WORK SHEETS FOR ADDITIONAL INFORMATION.

- 1 REMOVE EXISTING RADIATOR COVER.
- 2 REMOVE EXISTING WINDOWS.
- 3 REMOVE EXISTING CHILLER.
- 4 REMOVE EXISTING FLOOR MOUNTED ELECTRICAL OUTLET.
- 5 REMOVE EXISTING DOOR, WALL AND SHELVING AS INDICATED BY DASHED LINES.
- 6 REMOVE EXISTING SINK. REFER TO DEMOLITION PLUMBING NOTES FOR REMOVAL OF ALL ASSOCIATED PIPES AND FIXTURES.
- 7 REMOVE EXISTING CEILING MOUNTED PROJECTOR.
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- 15 EXISTING DROPPED SOFFIT TO REMAIN.
- 16 REMOVE EXISTING CEILING MOUNTED PROJECTOR CAREFULLY. RETURN TO DISTRICT.
- 17 REMOVE EXISTING WINDOW TREATMENT.
- 18 REMOVE EXISTING CLOCK.
- 19 REMOVE EXISTING P.A.
- 20 EXISTING ELECTRICAL PANEL TO REMAIN.
- 21 REMOVE EXISTING PHONE.
- 22 REMOVE EXISTING HORN STROBE.
- 23 EXISTING LIGHT SWITCH TO BE RELOCATED. REFER TO ELECTRICAL DRAWINGS.
- 24 EXISTING EXTERIOR LIGHTING TIMER.
- 25 REMOVE EXISTING FIRE EXTINGUISHER.
- 26 EXISTING CEILING GRID AND LIGHTING FIXTURES TO REMAIN.

ROOM NUMBER DESIGNATION TAG

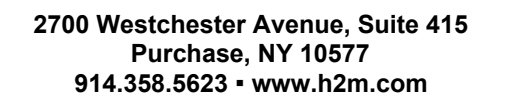
ROOM	
000	± S.F.

EXISTING VCT TILE REMOVAL

EXISTING DOOR TO REMAIN

EXISTING WALL

KEYED NOTE INDICATOR



CONSULTANTS:

[illegible]

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PROJECT No.: IRSD 1910		DATE: JULY 2020	SCALE: AS SHOWN

CLIENT

Main Street School Renovations



**101 Main Street
Irvington, NY 10533**

SED Number:66-04-02-02-0-001-016

CONTRACT

CONTRACT G
GENERAL CONSTRUCTION

STATUS

NOT FOR CONSTRUCTION

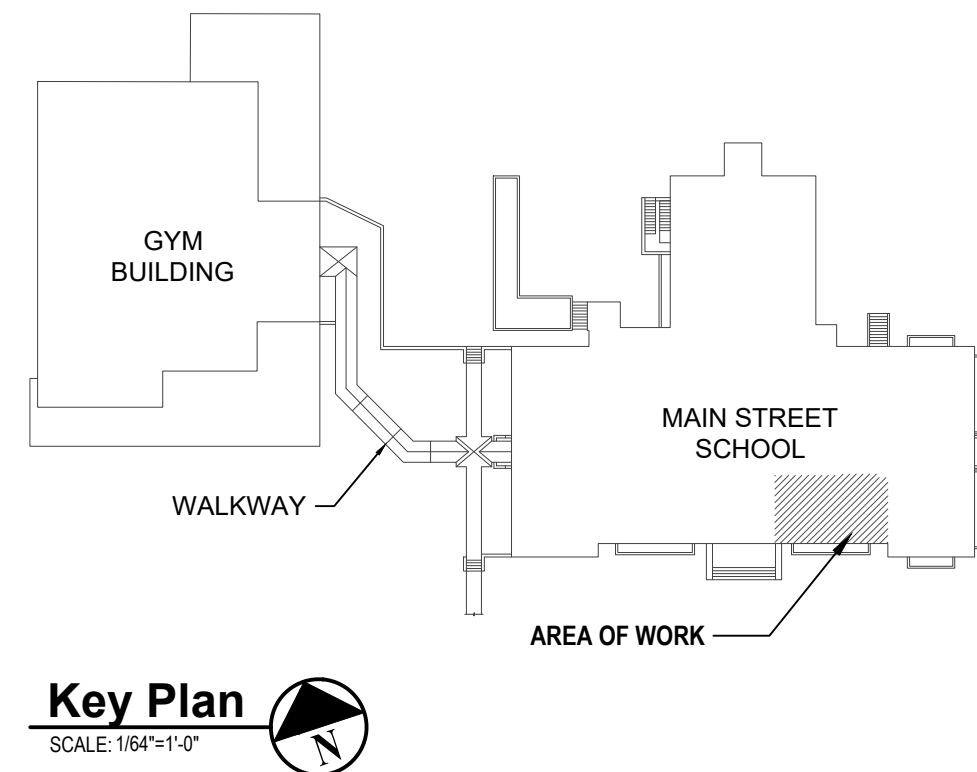
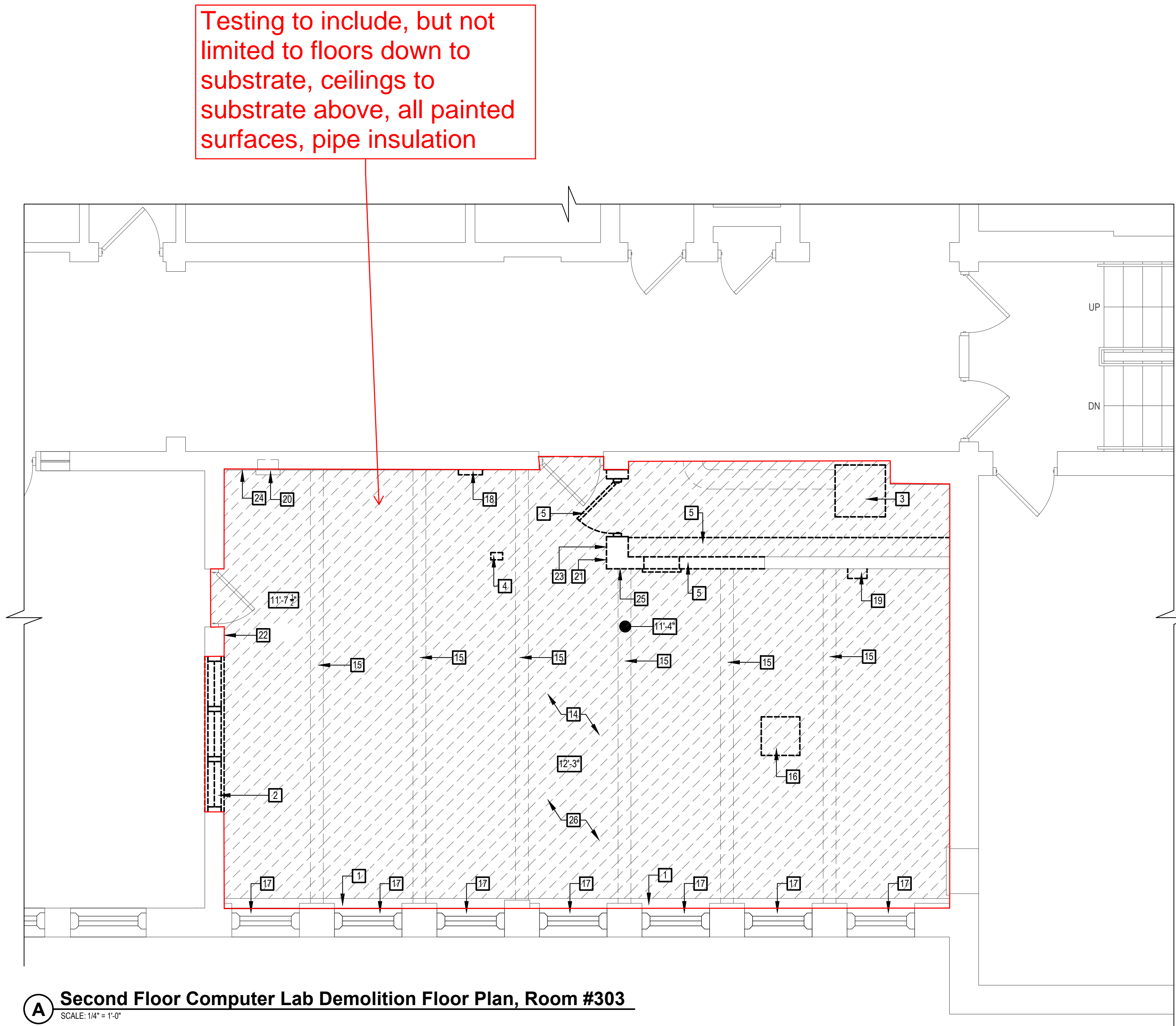
SHEET TITLE

THIRD FLOOR PLTW CLASSROOM DEMOLITION FLOOR PLAN, NOTES

DRAWING No. _____

D1.1

02-BIM-CADDiarchD1.1 Third Floor PLTW Classroom Demolition Floor Plan, Notes dwg Last Modified: Jul 29, 2020 - 2:33pm By bkhorrassani



GENERAL DEMOLITION WORK NOTES

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- REMOVE EXISTING CHILLER.
- REMOVE EXISTING FLOOR MOUNTED ELECTRICAL OUTLET.
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- REMOVE EXISTING FIRE EXTINGUISHER.
- EXISTING CEILING GRID AND LIGHTING FIXTURES TO REMAIN.

DEMOLITION LEGEND: (NOT ALL NOTES USED ON EACH SHEET)

ROOM 000 ± S.F.	ROOM NUMBER DESIGNATION TAG	EXISTING VCT TILE REMOVAL
	EXISTING DOOR TO REMAIN	
	KEYED NOTE INDICATOR	

H2architects
+
engineers

2700 Westchester Avenue, Suite 415
Purchase, NY 10577
914.358.5623 • www.h2m.com


CONSULTANTS:		

MARK	DATE	DESCRIPTION

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PROJECT NO: IRSD 1910	DATE: JULY 2020	SCALE: AS SHOWN	

CLIENT
Irvington Union Free School District

Main Street School Renovations



101 Main Street
Irvington, NY 10533

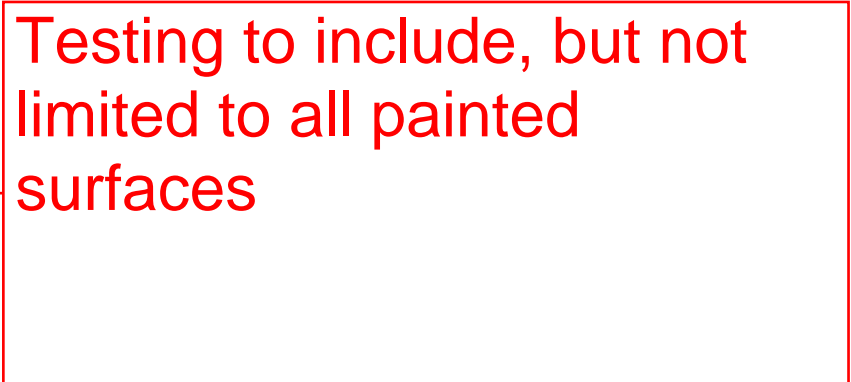
SED Number:66-04-02-02-0-001-016

CONTRACT
**CONTRACT G
GENERAL CONSTRUCTION**

STATUS
NOT FOR CONSTRUCTION

SHEET TITLE
**SECOND FLOOR COMPUTER LAB
DEMOLITION FLOOR PLAN,
NOTES**

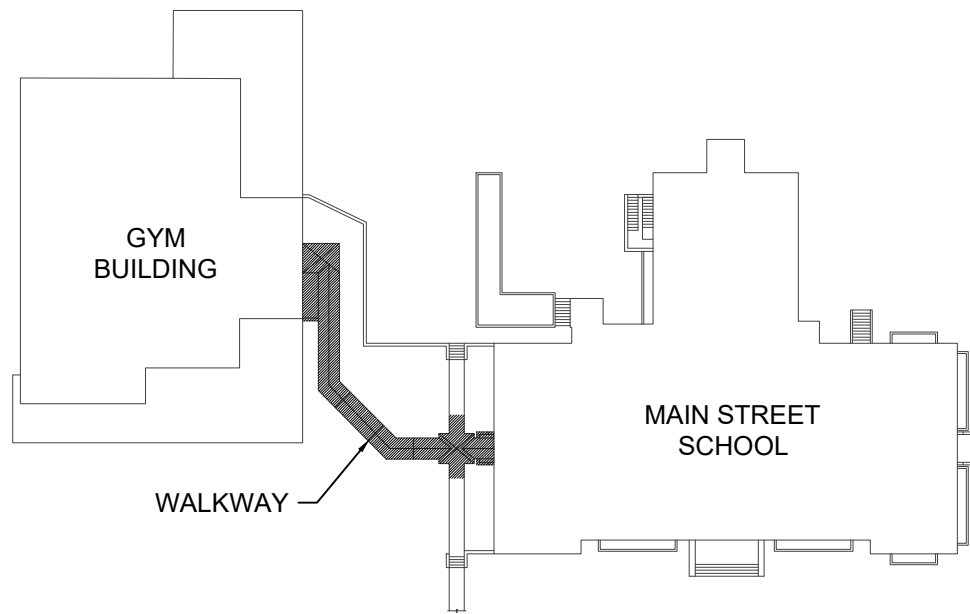
DRAWING No.
D1.0




1. EXISTING WALKWAY TO REMAIN, U.O.N.
2. EXISTING CANOPY STRUCTURE TO REMAIN, U.O.N.
3. EXISTING ASPHALT ROOFING AND SHEATHING TO BE REMOVED TO THE EXISTING METAL DECK.
4. INSTALL NEW ASPHALT SHINGLE ROOFING IN ACCORDANCE WITH THE REQUIREMENTS CONTAINED IN SECTION _____ OF THE SPECIFICATIONS.

- 1** EXISTING STEEL POST TO REMAIN, TYPICAL U.O.N.
- 2** EXISTING STEEL BEAM ABOVE TO REMAIN, TYPICAL U.O.N.
- 3** EXISTING RIP-RAP TO REMAIN.
- 4** EXISTING STORM DRAIN INLET TO REMAIN.
- 5** NEW CONCRETE WALKWAY SLOPE TO EXISTING FLOOR DRAIN TO REMAIN.
- 6** EXISTING DRAIN LINE TO REMAIN.
- 7** EXISTING CONCRETE RETAINING WALL TO REMAIN U.O.N.
- 8** EXISTING SLOPED RETAINING WALL TO REMAIN.
- 9** NEW ALUMINUM INFILL PANEL, TYPICAL.
- 10** NEW PIPE RAIL HAND RAIL. REFER TO DETAIL ____ ON SHEET A ____.
- 11** NEW STEEL POST TO MATCH EXISTING SET IN NEW CONCRETE PIER. REFER TO DETAIL ____ ON SHEET A ____.
- 12** EXISTING STEEL POST TO BE REPLACED TO MATCH EXISTING.
- 13** NEW GATE WITH CARD READER. CONTRACTOR SHALL COORDINATE WITH SECURITY VENDOR.
- 14** NEW ASPHALT ROOFING TO REPLACE EXISTING.
- 15** NEW CONCRETE WALKWAY. REFER TO DETAIL ____ ON SHEET A ____.

	ROOM NUMBER DESIGNATION TAG		INDICATES ENLARGED PLAN
	DOOR TAG (REFER TO A7.0 FOR SCHEDULE)		NEW CONCRETE WALKWAY
	NEW GATE		EXISTING WALL
	EXISTING DOOR TO REMAIN		SECTION MARKER
	KEYED NOTE INDICATOR		ELEVATION MARKER



Key Plan 
SCALE: 1/64"=1'-0"

CONSULTANTS:

[illegible]

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PROJECT No.: IRSD 1910	DATE: JULY 2020	SCALE: AS SHOWN	

CLIENT

**Irvington Union Free
School District**

Main Street School Renovations



**101 Main Street
Irvington, NY 10533**

SED Number:66-04-02-02-0-001-016

CONTRACT

CONTRACT G
GENERAL CONSTRUCTION

STATU

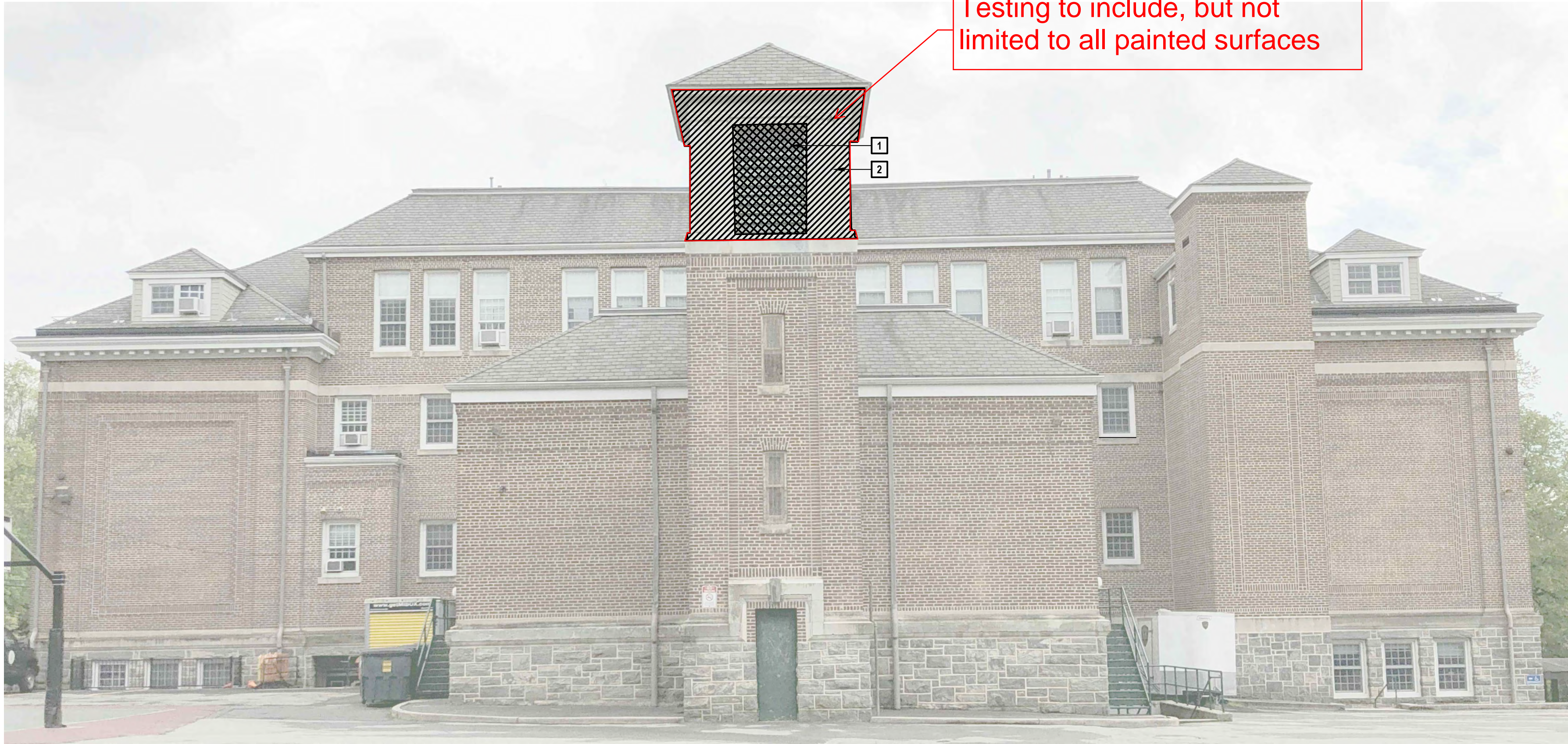
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SHEET TITLE

WALKWAY PLAN, FENCE ELEVATION & SECTION, NOTES

DRAWING No.

A1.2



1 Southwest Elevation
SCALE: 1/8"=1'-0"



2 East Elevation
SCALE: 1/8"=1'-0"

GENERAL NOTES

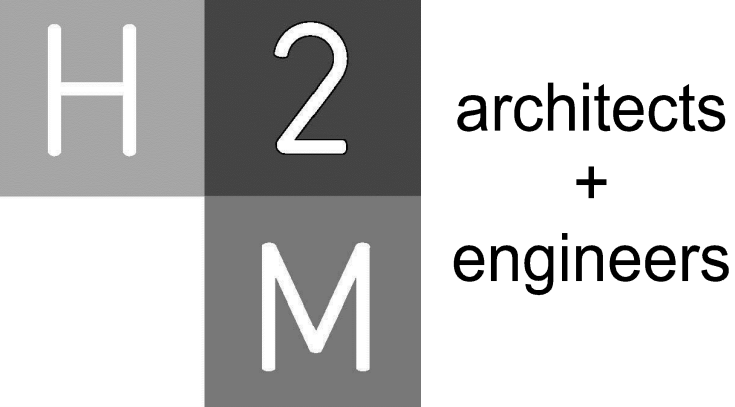
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5. ANY DETERIORATED STRUCTURE SHALL BE BROUGHT TO THE ARCHITECT'S ATTENTION IN WRITING IMMEDIATELY.

KEY NOTES

- 1 CONTRACTOR SHALL SCRAPE, PRIME AND PAINT EXISTING METAL LOUVER AS INDICATED BY HATCHED AREA. PAINTING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS CONTAINED IN SECTION 099000 OF THE SPECIFICATIONS.
- 2 CONTRACTOR SHALL SCRAPE, PRIME AND PAINT EXISTING BELL TOWER AS INDICATED BY HATCHED AREA. PAINTING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS CONTAINED IN SECTION 099000 OF THE SPECIFICATIONS.

SYMBOLS LEGEND

- | | | | |
|------|---|----------|-----------------------------|
| # | KEYED WORK NOTE DESIGNATION | X
XXX | SECTION/ELEVATION INDICATOR |
| /// | AREA OF WORK FOR NEW PAINT | | |
| XXXX | AREA OF WORK FOR NEW PAINT ON EXISTING LOUVER | | |



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Irvington Union Free School District

Main Street School Renovations



**101 Main Street
Irvington, NY 10533**

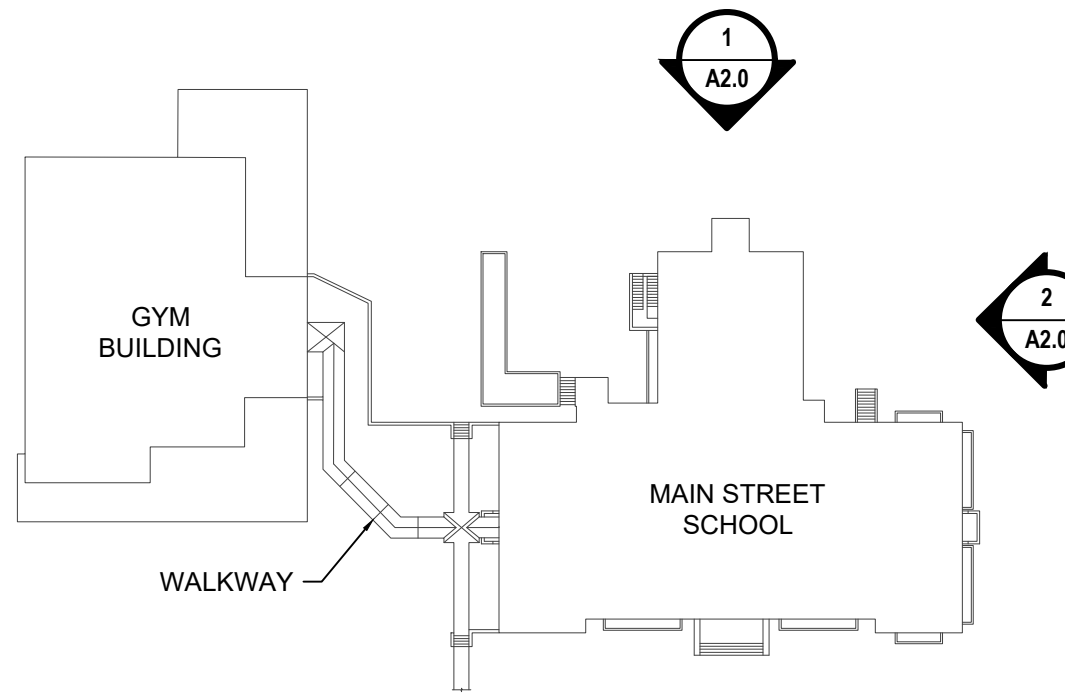
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CONTRACT
**CONTRACT G
GENERAL CONSTRUCTION**

STATUS
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SHEET TITLE
ELEVATIONS

DRAWING No.
A2.0

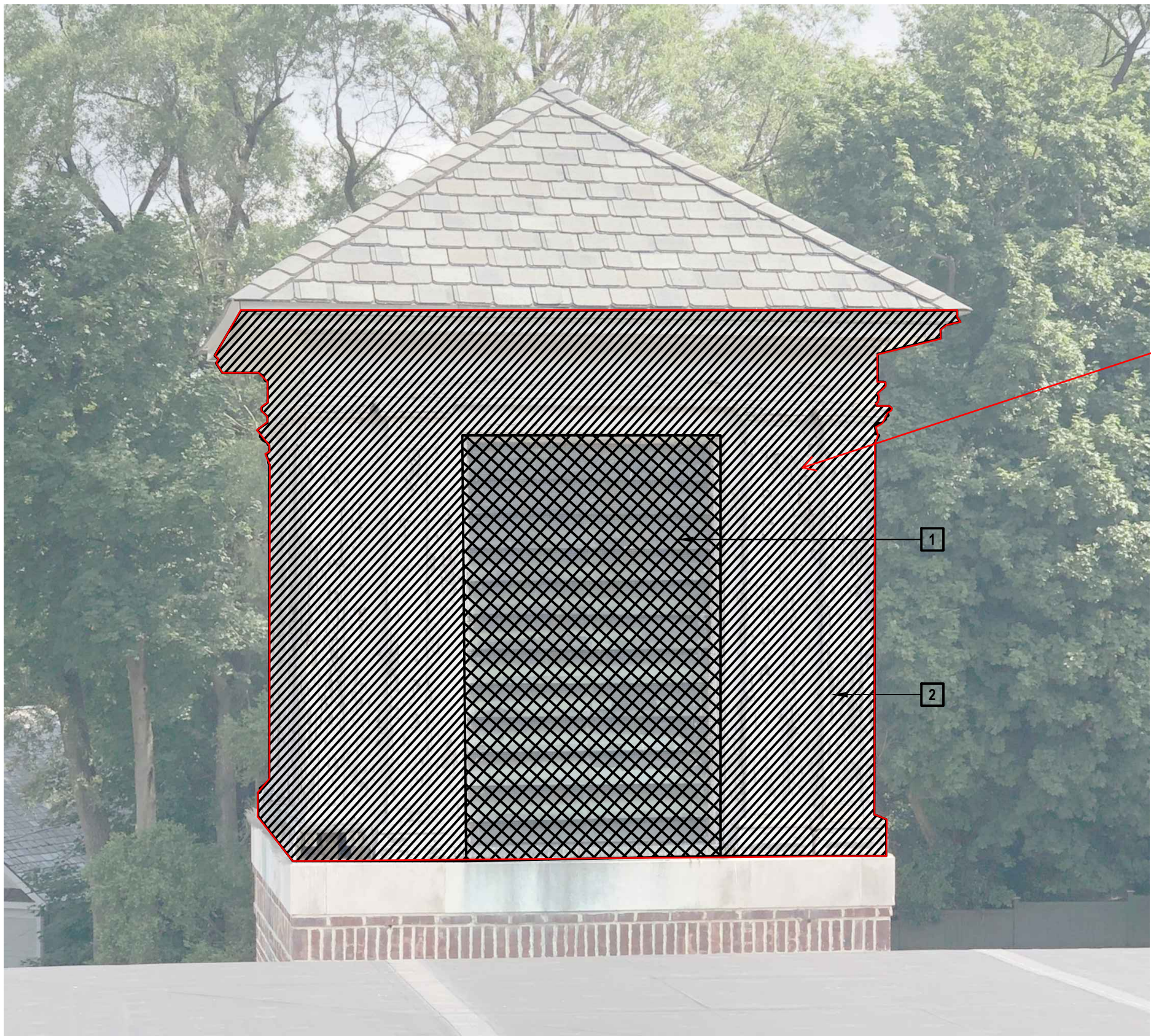


Key Plan
SCALE: 1/8"=1'-0"

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1 West Elevation
SCALE: N.T.S.



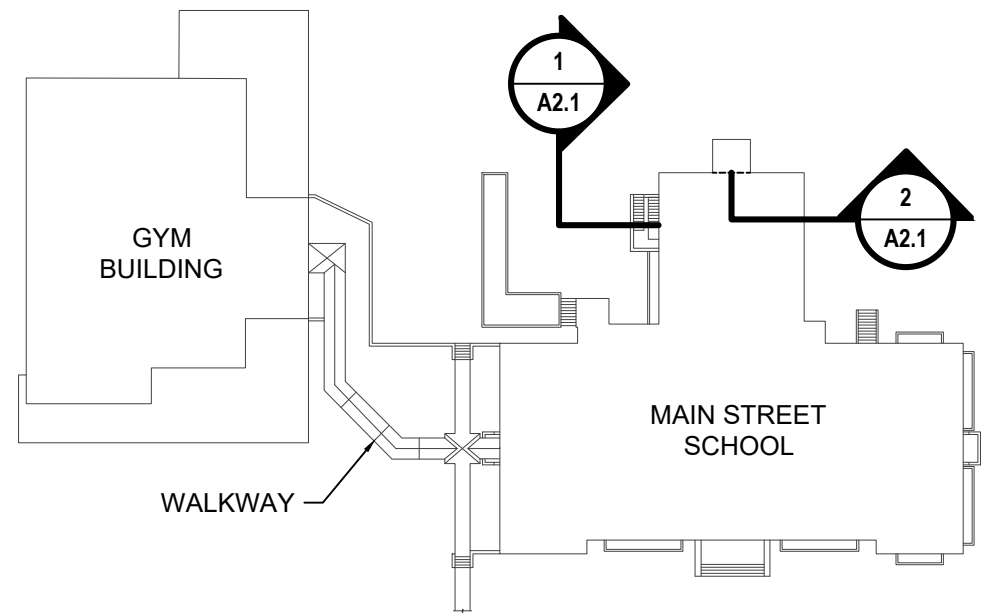
2 Northeast Elevation
SCALE: N.T.S.

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SYMBOLS LEGEND

1	KEYED WORK NOTE DESIGNATION	X XXX	SECTION/ELEVATION INDICATOR
	AREA OF WORK FOR NEW PAINT		
	AREA OF WORK FOR NEW PAINT ON EXISTING LOUVER		



Key Plan
SCALE: 1/8"=1'-0"

H 2 architects + engineers
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Irvington Union Free School District

Main Street School Renovations



**101 Main Street
Irvington, NY 10533**

SED Number:66-04-02-02-0-001-016

CONTRACT

**CONTRACT G
GENERAL CONSTRUCTION**

STATUS

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SHEET TITLE

ELEVATIONS

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**Irvington Union Free
School District**

Main Street School Renovations



**101 Main Street
Irvington, NY 10533**

SED Number:66-04-02-02-0-001-016

ALL CONTRACTS

NOT FOR CONSTRUCTION

**EXISTING
MAIN STREET SCHOOL GYM
FIRST FLOOR LIFE SAFETY PLAN**

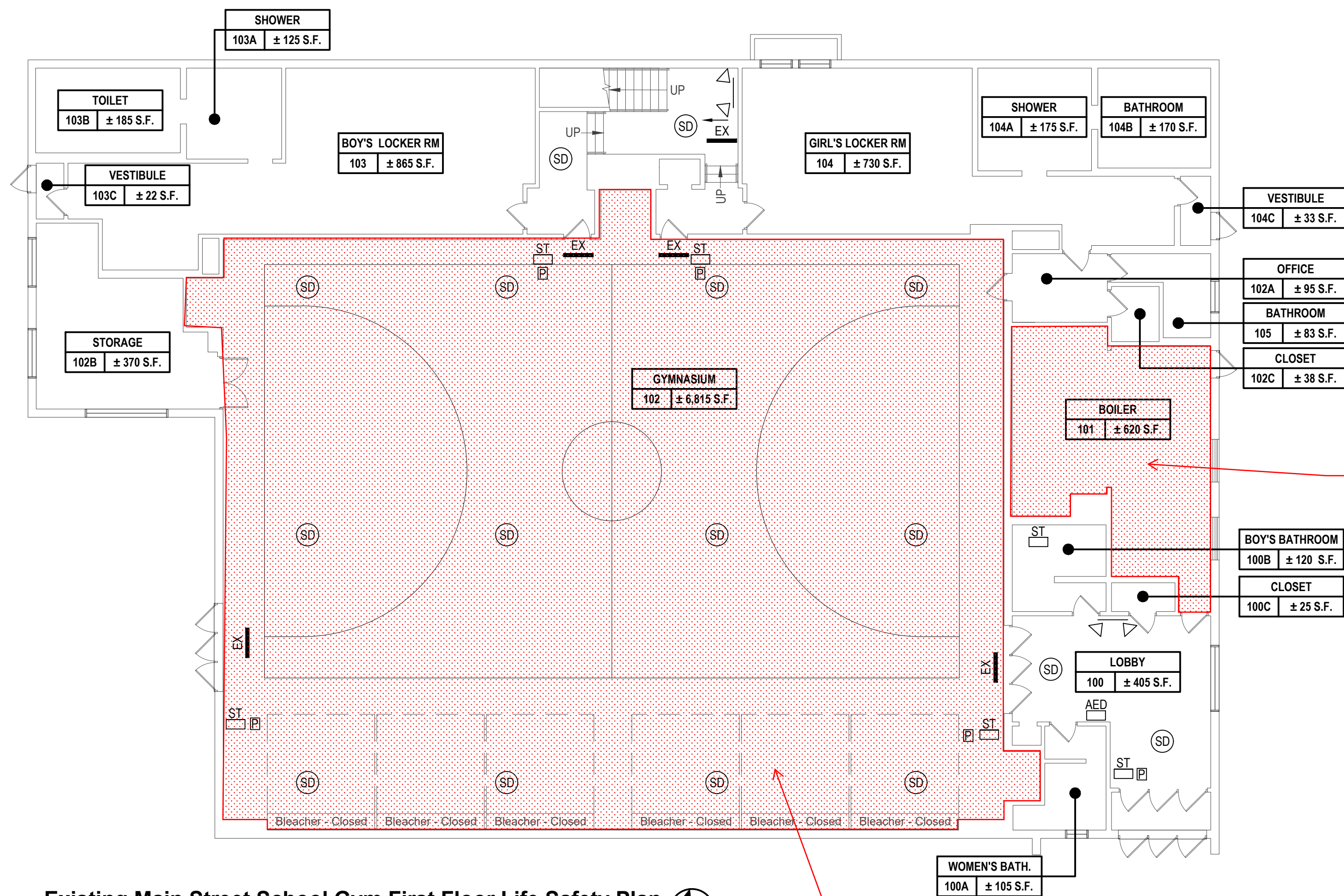
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NOTES:

1. EDUCATIONAL GROUP 'E' OCCUPANCY INCLUDES, AMONG OTHERS, THE USE OF A BUILDING OR STRUCTURE, OR A PORTION THEREOF, BY SIX OR MORE PERSONS AT ANY ONE TIME FOR EDUCATIONAL PURPOSES THROUGH THE 12TH GRADE

ROOM			
000	± S.F.	ROOM NUMBER DESIGNATION TAG	
OF		EXISTING FIRE EXTINGUISHER	
EX		EXISTING EXIT SIGN	
P		EXISTING PULL STATION	
FI		EXISTING FIRE ALARM STROBE	
SD		EXISTING SMOKE DETECTOR	
SP		EXISTING SPEAKER	
↓		EXISTING EMERGENCY LIGHTING	
			FA EXISTING FIRE ALARM PANEL
			RW EXISTING RESCUE WINDOW
			AED AUTOMATED EXTERNAL DEFIBRILLATOR (AED)
			TR EXISTING ALARM BELL
			CO EXISTING CARBON MONOXIDE DETECTOR
			WY EYE WASH STATION
			FB EMERGENCY FIRE BLANKET
			SP EXISTING SPRINKLER HEAD

EXISTING SMOKE DETECTORS TO
REMAIN (TYP. FOR ALL).



Testing to include, but not limited to all painted surfaces and insulation

Testing to include, but not limited to all walls, ceiling and roof structure

Existing Main Street School Gym First Floor Life Safety Plan
SCALE: 3/32"=1'-0"

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**Irvington Union Free
School District**

**Main Street School
Renovations**



**101 Main Street
Irvington, NY 10533**

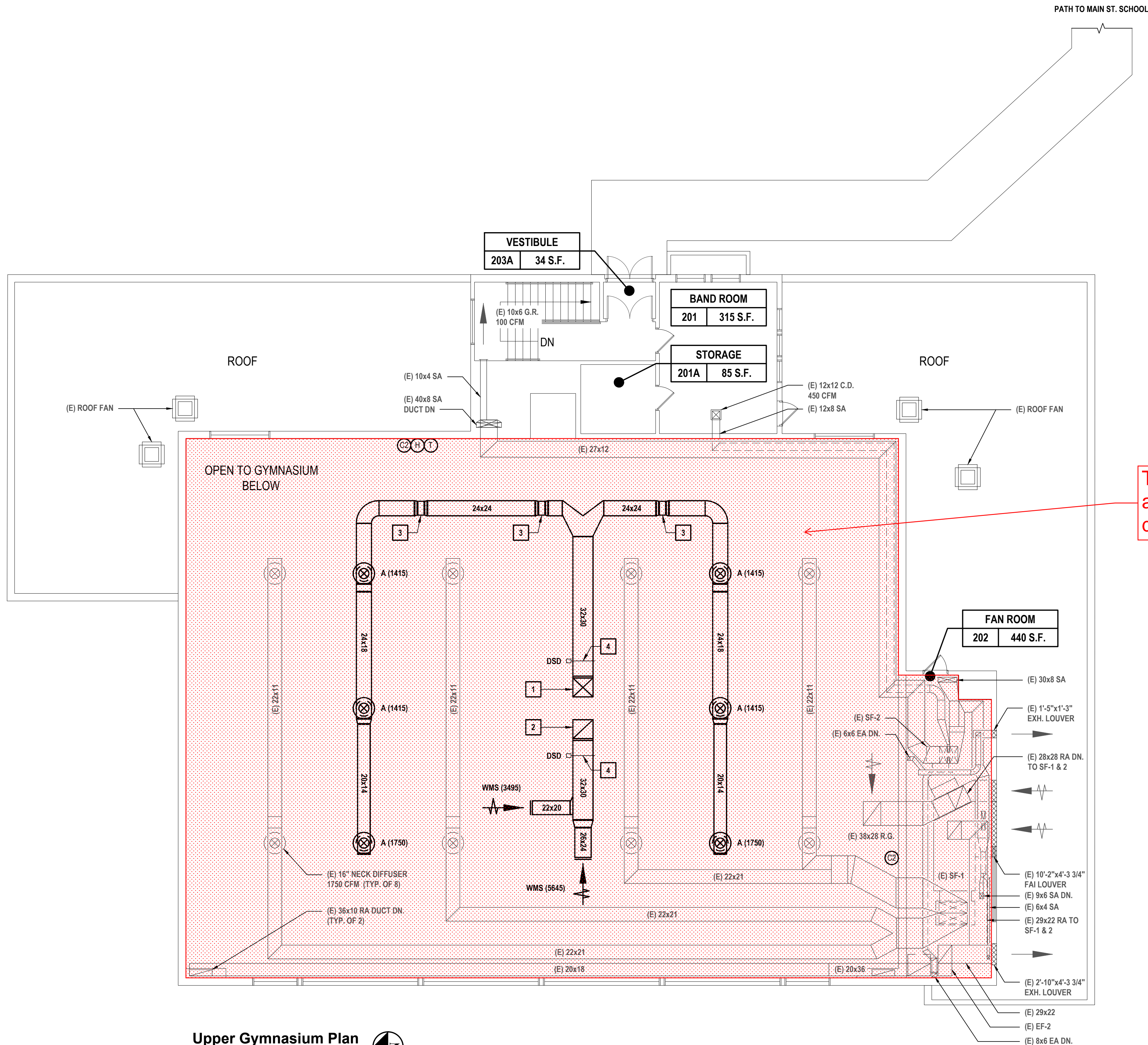
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CONTRACT
**CONTRACT H
HEATING VENTILATION AND AIR
CONDITIONING**

STATUS
NOT FOR CONSTRUCTION

SHEET TITLE
**HVAC UPPER
GYMNASIUM
CONSTRUCTION
PLAN**

DRAWING No.
H1.1



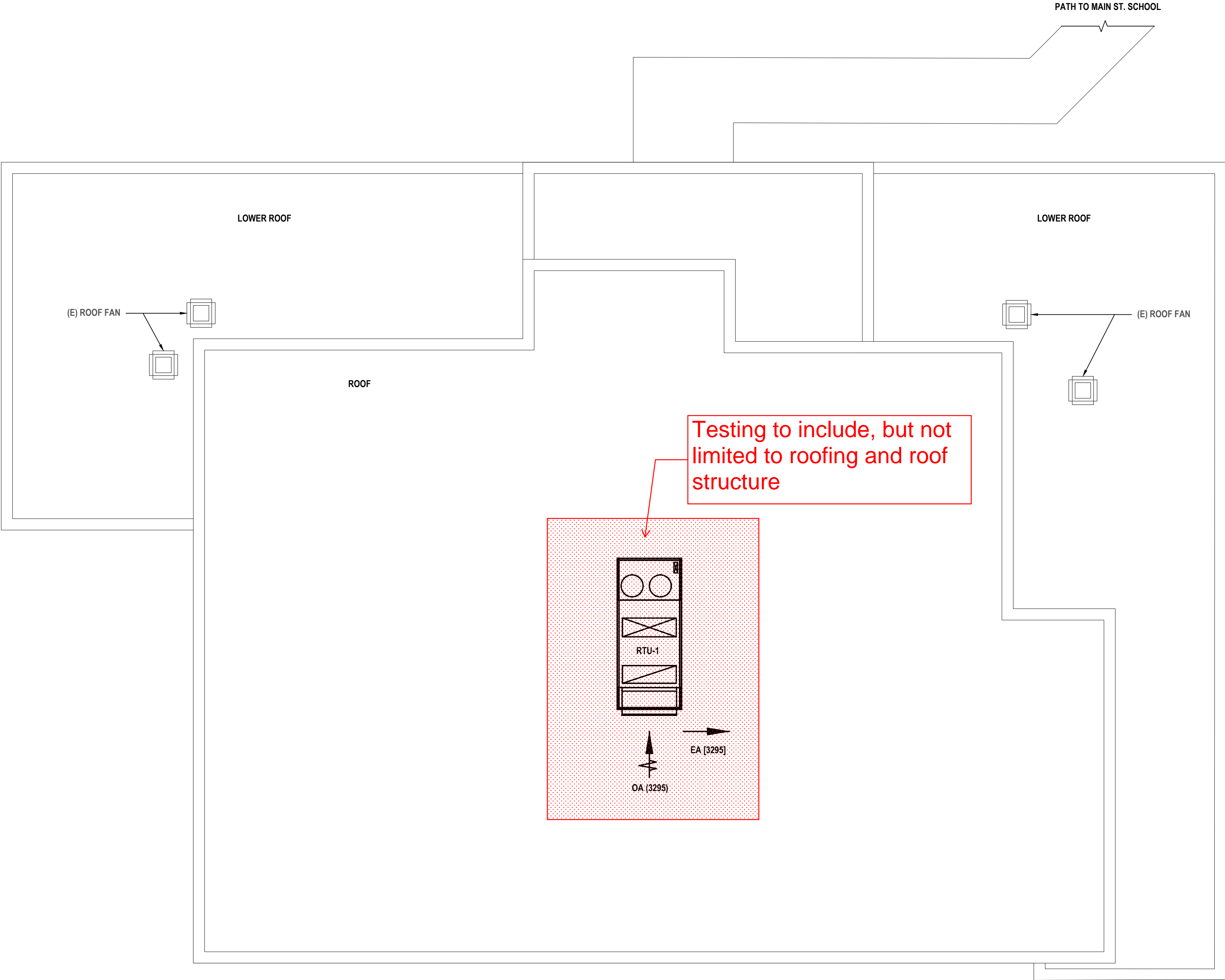
Upper Gymnasium Plan
SCALE: 1/8"=1'-0"

KEYED NOTES:

1. PROVIDE AND INSTALL NEW SUPPLY AIR DUCT DOWN FROM NEW ROOFTOP UNIT. PROVIDE AND INSTALL REQUIRED TRANSITION FROM ROOFTOP UNIT OUTLET TO LISTED SUPPLY DUCT SIZE. MOUNT DUCTWORK AT ELEVATION OF EXISTING DUCTWORK TO MAINTAIN AESTHETIC.
2. PROVIDE AND INSTALL NEW RETURN AIR DUCT UP TO NEW ROOFTOP UNIT. PROVIDE AND INSTALL REQUIRED TRANSITION TO ROOFTOP UNIT INLET FROM LISTED RETURN DUCT SIZE. MOUNT DUCTWORK AT ELEVATION OF EXISTING DUCTWORK TO MAINTAIN AESTHETIC.
3. ROUTE NEW SUPPLY DUCT THROUGH EXISTING JOISTS. TRANSITION DUCT TO 22x20 TO FIT THROUGH WEBBING AND TRANSITION BACK TO 24x24 ONCE CLEAR. COORDINATE FINAL LOCATION OF DUCTWORK MAIN WITH OPENINGS IN THE JOIST.
4. PROVIDE AND INSTALL DUCT SMOKE DETECTORS IN THE SUPPLY AND RETURN DUCT MAINS.

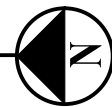
GENERAL NOTES:

1. COORDINATE ALL WORK WITH EXISTING CONDITIONS AND OTHER TRADES. LOCATIONS OF EXISTING SUPPLY DUCTS, DIFFUSERS, RETURNS, FANS, EQUIPMENT, ETC. HAVE BEEN PROVIDED FOR REFERENCE ONLY. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING LOCATIONS OF ALL EXISTING EQUIPMENT.
2. EXISTING CONDITIONS ARE BASED ON A LIMITED FIELD SURVEY. CONTRACT IS RESPONSIBLE FOR VERIFICATION OF EXISTING CONDITIONS FOR ALL CONFLICTS AND SHALL ALERT ENGINEER PRIOR TO COMMENCEMENT OF NEW WORK AND PURCHASE OF EQUIPMENT.
3. DO NOT SCALE DRAWINGS. LINE WORK SHOWN IS SCHEMATIC. CONTRACTOR SHALL PROVIDE SHOP DRAWINGS BASED ON DESIGN INTENT, SURVEY OF EXISTING CONDITIONS, AND COORDINATION WITH OTHER TRADES.
4. INSTALL ALL EQUIPMENT IN ACCORDANCE WITH MANUFACTURER'S REQUIRED MAINTENANCE CLEARANCES AND PREVAILING CODE.
5. SUBMIT EQUIPMENT / DUCTWORK SHOP DRAWINGS TO ENGINEER FOR REVIEW AND APPROVAL PRIOR TO PURCHASE / RELEASE.
6. CONTRACTOR TO COORDINATE THE PLACEMENT OF ALL TEMPERATURE / HUMIDITY / CO2 SENSORS WITH THE OWNER / DISTRICT.
7. ALL EXISTING HEATING AND VENTILATION EQUIPMENT, DUCTWORK, DIFFUSERS, ETC. ARE TO REMAIN.



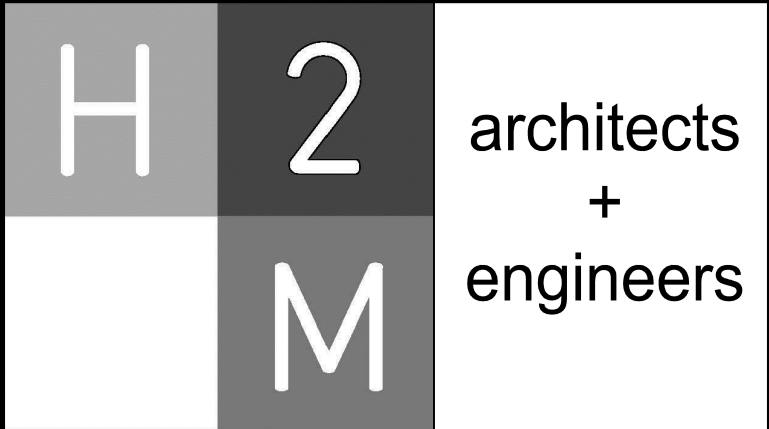
Gymnasium Roof Plan

SCALE: 1/8"=1'-0"



GENERAL NOTES:

- COORDINATE ALL WORK WITH EXISTING CONDITIONS AND OTHER TRADES. LOCATIONS OF EXISTING ROOFTOP EQUIPMENT HAVE BEEN PROVIDED FOR REFERENCE ONLY. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING LOCATIONS OF ALL EXISTING EQUIPMENT.
- CONTRACTOR TO INSTALL NEW ROOFTOP UNIT IN COMPLIANCE WITH MANUFACTURER'S REQUIRED MAINTENANCE CLEARANCES, AND APPLICABLE MECHANICAL CODE CLEARANCE REQUIREMENTS.
- SUBMIT EQUIPMENT SHOP DRAWINGS TO ENGINEER FOR REVIEW AND APPROVAL PRIOR TO PURCHASE. DO NOT SCALE DRAWINGS. LINE-WORK SHOWN IS SCHEMATIC.
- TERMINATE ROOFTOP UNIT CONDENSATE LINES AT THE NEAREST ROOF DRAIN (IF FEASIBLE).



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Irvington Union Free School District

Main Street School Renovations



**101 Main Street
Irvington, NY 10533**

SED Number:66-04-02-02-0-001-016

CONTRACT

**CONTRACT H
HEATING VENTILATION AND AIR
CONDITIONING**

STATUS

NOT FOR CONSTRUCTION

SHEET TITLE

**HVAC GYMNASIUM
ROOF
CONSTRUCTION
PLAN**

DRAWING No.

H1.2 ----

X:\SSD\Irvington\USJ\IRSD 1910\Main St School Renovations\H2M\CAD\Hvac\H1.2 HVAC GYMNASIUM ROOF CONSTRUCTION PLAN.dwg Last Modified: Jun/30/2020 2:58pm Plotted on: Jun/30/2020 4:29pm By: jessali



**APPENDIX I:
PHOTOGRAPHIC DOCUMENTATION**



Photo 1: ACM 9"x9" Floor Tile (Brown) under Ceramic Floor Tile-Main Building



Photo 2: Non-ACM Gypsum Board (Gray) and Joint Compound White)-Gym Building



Photo 3: Non-ACM Cinderblock Wall Mortar (Gray)-Gym Building



Photo 4: Non-ACM Chimney Brick Mortar (Gray) -Gym Building



Photo 5: Non-ACM Fiberglass Boiler Breeching Canvas (Beige)-Gym Building



Photo 6: Non-ACM Fiberglass Pipe Edge Cementitious Sealant (Gray) -Gym Building



Photo 7: Non-ACM Roofing Shingles and Felt Paper-Gym Building

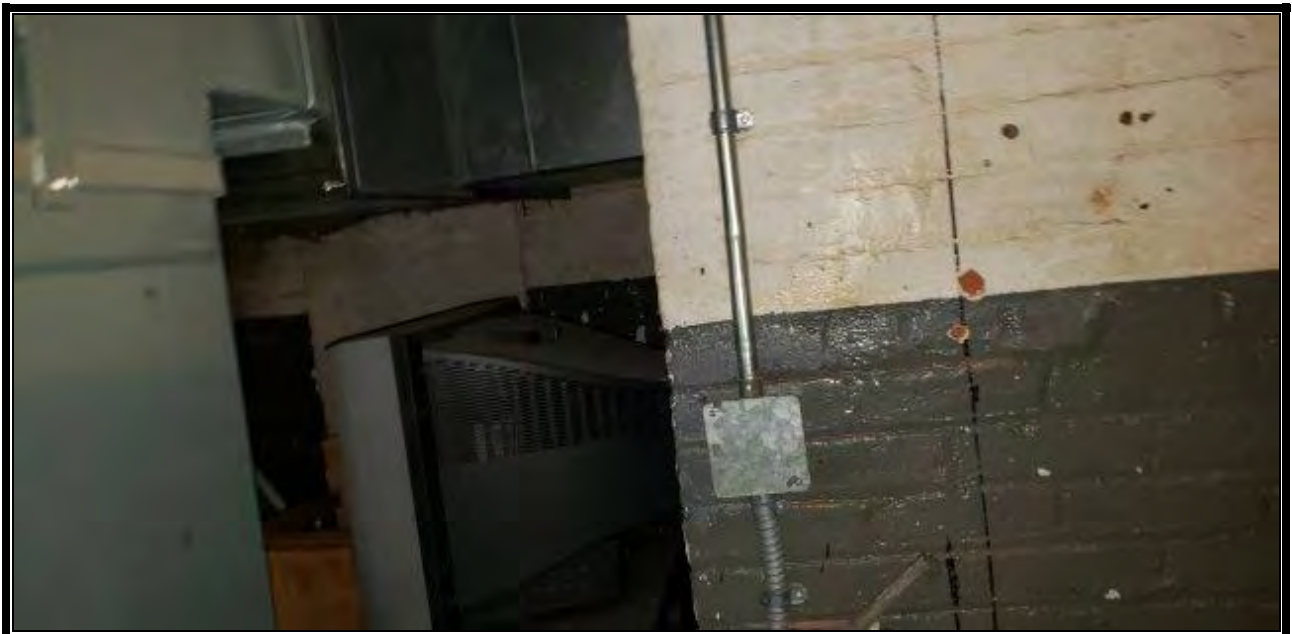


Photo 8: Non-ACM Interior Brick Mortar (Gray) and Wall Scratch Coat (White)-Main Building

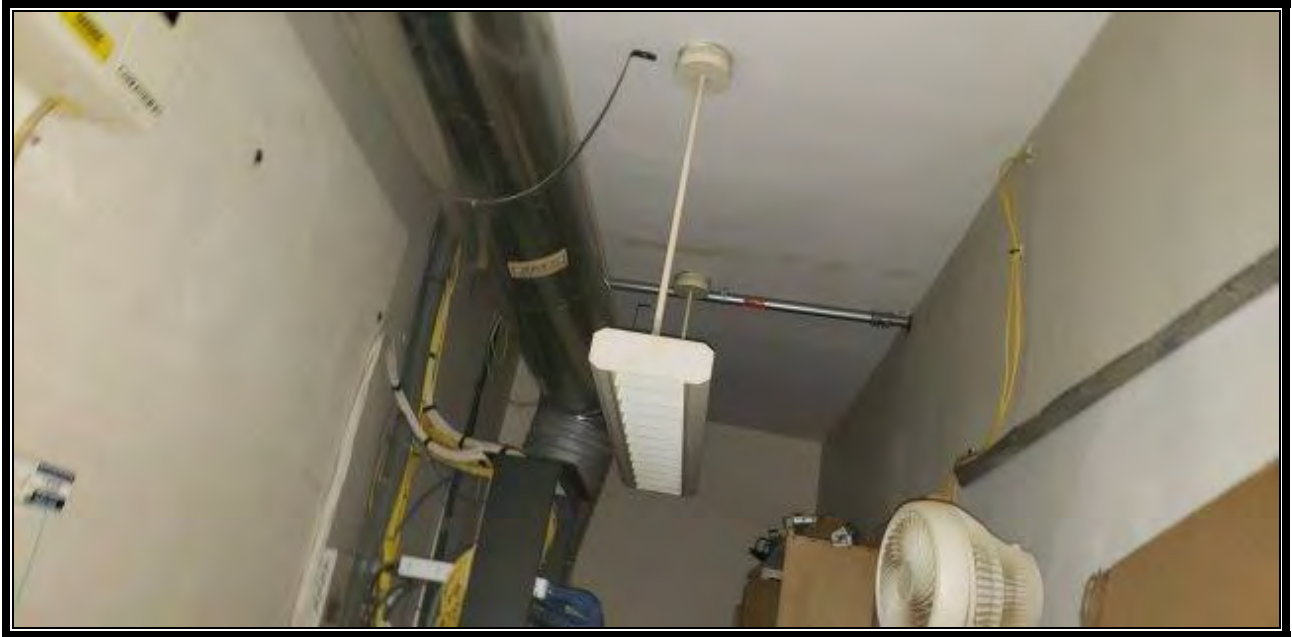


Photo 9: Non-ACM Wall Plaster (White and Brown Coats)-Main Building



Photo 10: Non-ACM Wall Plaster (White and Brown Coats)-Main Building



Photo 11: Non-ACM Cementitious Ceiling Material (Gray)-Main Building

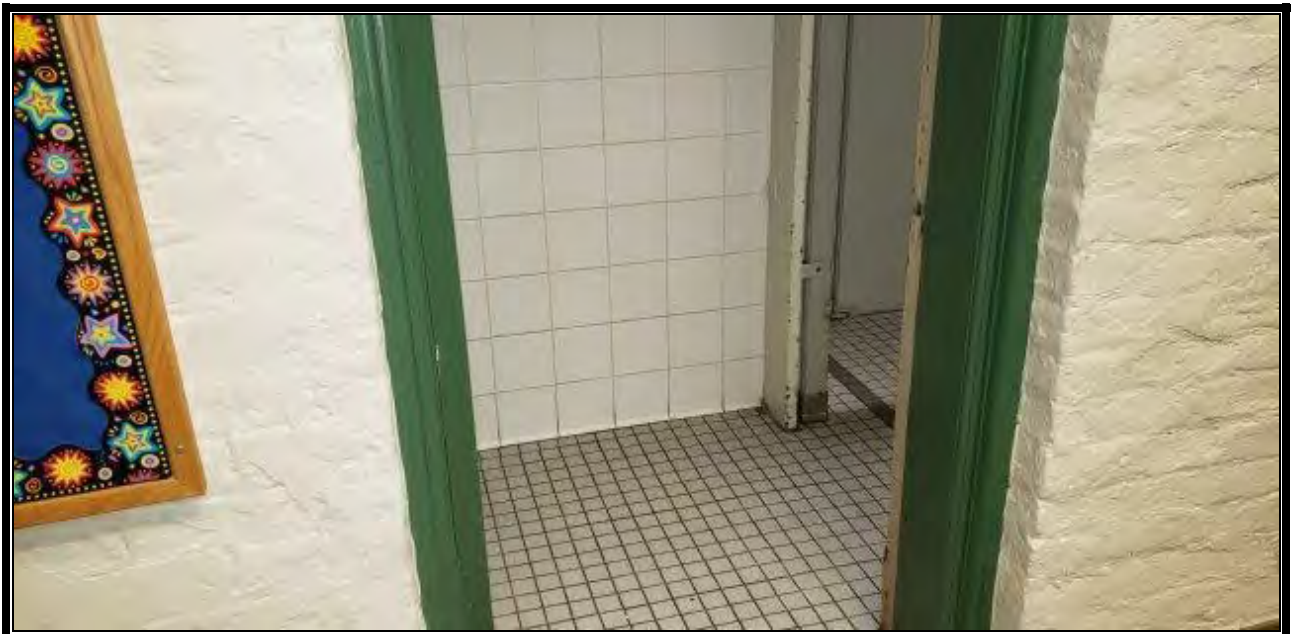


Photo 12: Non-ACM Ceramic Wall Tile Grout (White) and
Ceramic Floor Tile Mortar (Dark Gray)-Main Building



Photo 13: Non-ACM 2'x4' Fissured Ceiling Tile (White),
Gypsum Board (Gray) and Joint Compound (White)-Main Building

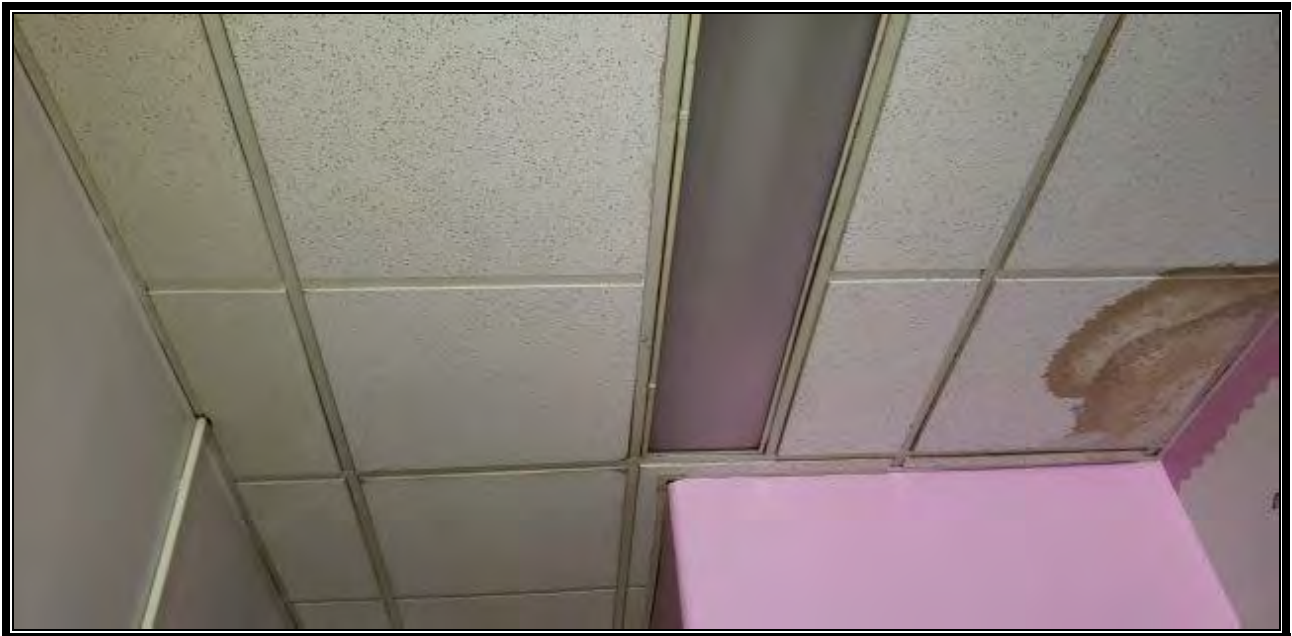


Photo 14: Non-ACM 2'x4' (2'x2' Design) Ceiling Tile (White)



Photo 15: Non-ACM Stone Lab Countertop (Black)

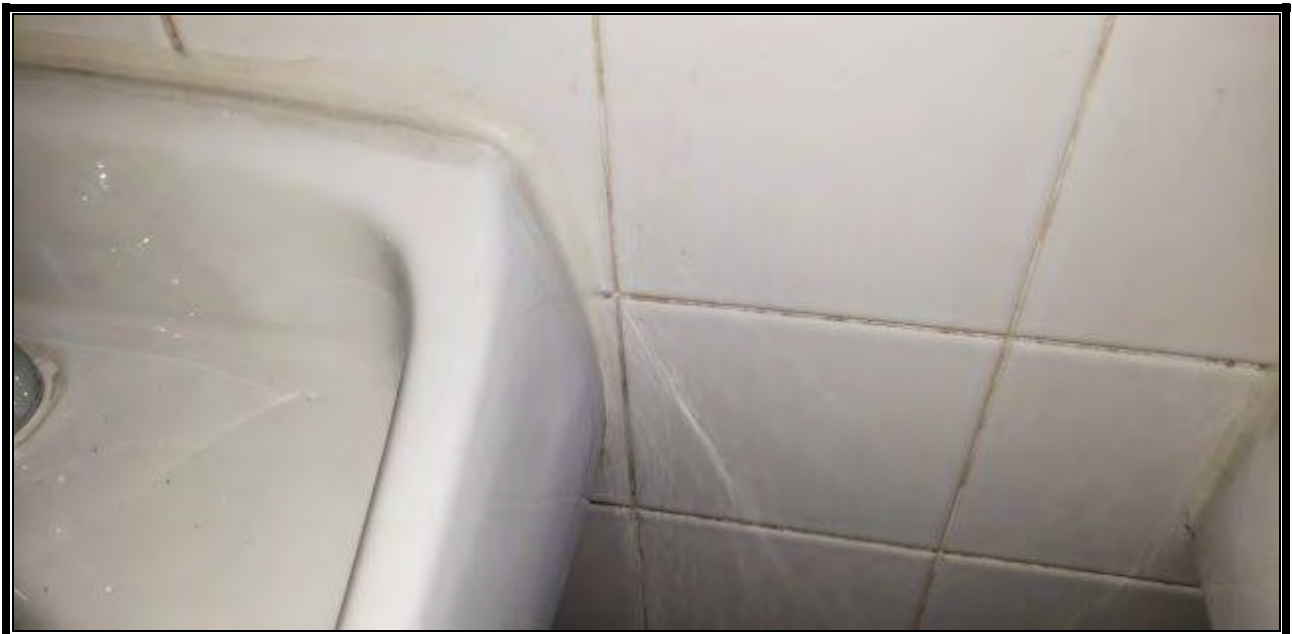


Photo 16: Non-ACM Fixture Caulking (White)

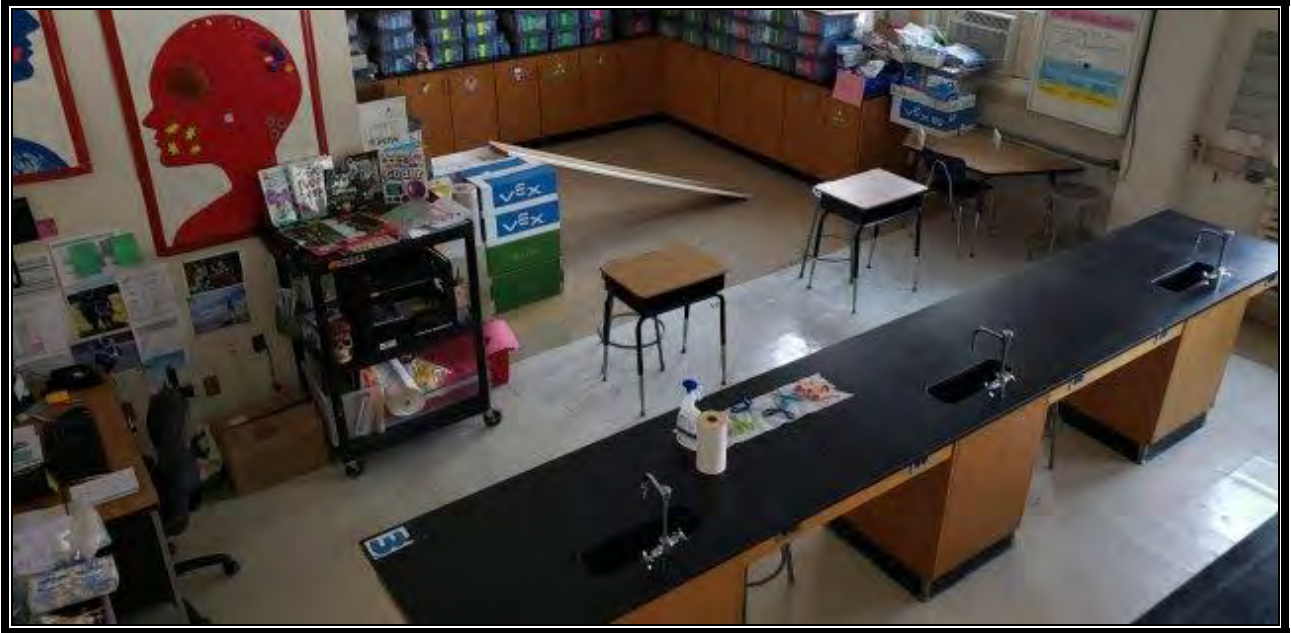


Photo 17: Non-ACM 12"x12" Floor Tiles (Brown & Beige) and Associated Mastic (Brown)



Photo 18: Non-ACM 12"x12" Floor Tiles (White) and Associated Mastic (Brown/Yellow)



Photo 19: Non-ACM Roofing System



Photo 20: Bell Tower Louvers



Photo 21: Metal Ductwork



Photo 22: Fiberglass Pipe Insulation and Metal Pipes

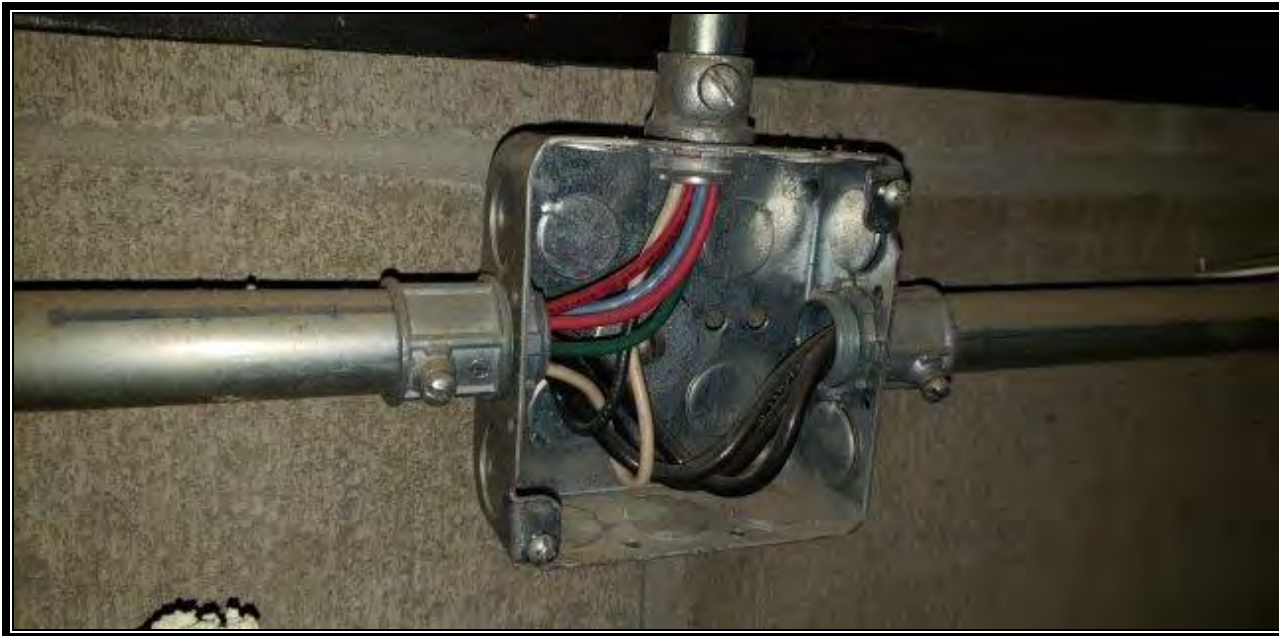


Photo 23: Electrical Wires

REPORT OF GEOTECHNICAL INVESTIGATION

**PROPOSED SCHOOL BUILDING ADDITIONS & ALTERATIONS
IRVINGTON MIDDLE/HIGH SCHOOL (40 NORTH BROADWAY)
MAIN STREET SCHOOL (101 MAIN STREET)
DOWS LANE ELEMENTARY SCHOOL (SIX DOWS LANE)
IRVINGTON, TOWN OF GREENBURGH,
WESTCHESTER COUNTY, NEW YORK**



Prepared for:

**IRVINGTON UNION FREE
SCHOOL DISTRICT
Six Dows Lane
Irvington, New York 10533**

Prepared by:

**WHITESTONE ASSOCIATES, INC.
35 Technology Drive
Warren, New Jersey 07059**



**Mudar Khantamr, P.E.
Project Manager**



**Laurence W. Keller, P.E.
Principal, Geotechnical Services**

**Whitestone Project No.: GJ1916829.000
January 29, 2020**

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ROCKY HILL, CT
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303.670.6905



MT. BETHEL CORPORATE CENTER
35 TECHNOLOGY DRIVE
WARREN, NJ 07059
908.668.7777
whitestoneassoc.com

January 29, 2020

via email

IRVINGTON UNION FREE SCHOOL DISTRICT

Six Dows Lane
Irvington, New York 10533

Attention: Ms. Carol Stein
Assistant Superintendent for Business & Operations

**Regarding: REPORT OF GEOTECHNICAL INVESTIGATION
PROPOSED SCHOOL BUILDING ADDITIONS & ALTERATIONS
IRVINGTON MIDDLE/HIGH SCHOOL (40 NORTH BROADWAY)
MAIN STREET SCHOOL (101 MAIN STREET)
DOWS LANE ELEMENTARY (SIX DOWS LANE)
IRVINGTON, TOWN OF GREENBURGH,
WESTCHESTER COUNTY, NEW YORK
WHITESTONE PROJECT NO.: GJ1916829.000**

Dear Ms. Stein:

Whitestone Associates, Inc. (Whitestone) is pleased to submit the attached *Report of Geotechnical Investigation* for the above-referenced project. The attached report presents the results of Whitestone's soils exploration efforts and presents recommendations for design of the proposed structural foundations, floor slabs, pavements, and related earthwork.

Whitestone's geotechnical division appreciates the opportunity to be of service to Irvington Union Free School District. Please note that Whitestone has the capability to perform the additional geotechnical engineering services recommended herein.

Please contact us at (908) 668-7777 with any questions or comments regarding the enclosed report.

Sincerely,

WHITESTONE ASSOCIATES, INC.

Mudar Khantamr, P.E.
Project Manager

Laurence W. Keller, P.E.
Principal, Geotechnical Services

MK/pwd L:\Job Folders\2019\1916829GJ\Reports and Submittals\16829 ROGI.docx
Enclosures
Copy: Veronica Byrnes, R.A., LEED AP, H2M Architects & Engineers
Cole Podolsky, LEED AP, H2M Architects & Engineers

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REPORT OF GEOTECHNICAL INVESTIGATION
PROPOSED SCHOOL BUILDING ADDITIONS & ALTERATIONS
40 North Broadway, 101 Main Street, and Six Dows Lane
Irvington, Town of Greenburgh, Westchester County, New York

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**REPORT OF GEOTECHNICAL INVESTIGATION
PROPOSED SCHOOL BUILDING ADDITIONS & ALTERATIONS
40 North Broadway, 101 Main Street, and Six Dows Lane
Irvington, Town of Greenburgh, Westchester County, New York**

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(Continued)**

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FIGURE 1 Boring Location Plan

APPENDICES

APPENDIX A Records of Subsurface Exploration

APPENDIX B Laboratory Test Results

APPENDIX C Supplemental Information (USCS, Terms & Symbols)

SECTION 1.0

Summary of Findings

Whitestone has performed an exploration and evaluation of the subsurface conditions for the proposed school building additions and alterations located at the Irvington High School/Middle School Complex (40 North Broadway), Main Street School (101 Main Street), and Dows Lane Elementary School (Six Dows Lane) in Irvington, Town of Greenburgh, Westchester County, New York. The sites of the proposed construction are shown on the *Boring Location Plan* included as Figure 1. At the time of Whitestone's exploration, the areas of proposed redevelopment included paved and sloping grass areas surrounding the school buildings.

Based on information provided by H2M Architects & Engineers (H2M), the proposed site redevelopment at the combined Irvington High School and Middle School location includes a new press box and bleachers, a concession and sports storage building, an equipment building and grading for fire-truck access, retaining walls, and a new entry vestibule as well as associated pavement improvements. For the Main Street School location, proposed construction has not been indicated, however, is expected to include building addition(s) and pavement improvements. For the Dows Lane Elementary School, a stand-alone bathroom and storage shed are proposed along with anticipated pavement improvements.

The subsurface exploration included drilling 27 soil test borings and collecting soil samples for laboratory analyses. A portion of the soil borings encountered variable existing fill materials with trace amounts of debris. Below the existing fill materials and/or surface cover, the subsurface tests encountered natural site soils that generally consisted of a mixture of sand, silt, and gravel (USCS: SP-SM, SM, and ML) with occasional cobbles/boulders. The natural site soils were underlain by weathered rock followed by bedrock. Static groundwater was not encountered within the soil borings with the deepest depth explored of approximately 30.0 feet below ground surface (fbgs).

In general, the results of the investigation indicate the proposed new structures may be supported on conventional shallow foundations designed to bear within the underlying improved natural site soils, competent weathered rock/bedrock, and/or on structural fill placed over the on-site natural materials provided the soils are properly evaluated, placed, and compacted as described herein. Existing fill materials should be overexcavated where encountered at or below proposed foundation bearing elevations.

Weathered rock and rock were encountered across the subject properties at variable depths that can present difficult excavation. Based on top of weathered rock/bedrock elevations encountered during this investigation, removal of weathered rock and bedrock may be required for portions of the proposed redevelopment, particularly at the High School/Middle School Complex. The amount of weathered rock/bedrock removal will be dependent on final grades.

SECTION 2.0

Introduction

2.1 AUTHORIZATION

Ms. Carol Stein issued authorization to Whitestone to perform a geotechnical investigation at the subject sites relevant to the proposed redevelopments. The geotechnical investigation was performed in general accordance with Whitestone's October 31, 2019 proposal.

2.2 PURPOSE

The purpose of this subsurface exploration and analysis was to:

- ▶ ascertain the various soil profile components at test locations;
- ▶ estimate the engineering characteristics of the proposed foundation bearing and subgrade materials;
- ▶ provide geotechnical criteria for use by the design engineers in preparing the foundation, floor slab, and pavement design;
- ▶ provide recommendations for required earthwork and subgrade preparation;
- ▶ record groundwater and/or bedrock levels (where encountered) at the time of the investigation and discuss the potential impact on the proposed construction; and
- ▶ recommend additional investigation and/or analysis (if warranted).

2.3 SCOPE

The scope of the exploration and analysis included the subsurface exploration; field testing and sampling; laboratory analysis; and a geotechnical engineering analysis and evaluation of the subsurface materials. This *Report of Geotechnical Investigation* is limited to addressing the site conditions related to the physical support of the proposed construction. Any references to suspicious odors, materials, or conditions are provided strictly for the client's information.

2.3.1 Field Exploration

Field exploration of the project site was conducted by means of 27 soil borings (identified as B-1 through B-27) with a track-mounted drill rig using either hollow stem augers or mud-rotary, split-spoon sampling, and rock coring techniques. The soil borings were backfilled to the surface with soils from the investigation and soil borings performed within existing paved areas were superficially patched with asphaltic pavement cold patch, as necessary.

The locations of the subsurface tests are shown on the accompanying *Boring Location Plan* included as Figure 1. *Records of Subsurface Exploration* are provided in Appendix A. The test locations and termination depths are summarized in the following table.

BORING LOCATION/TERMINATION DEPTH SUMMARY TABLE		
Location	Boring No.	Termination Depth (fbgs)
Irvington Middle/High School	B-1 through B-17	1.0 to 30.0
Dows Lane Elementary	B-18 through B-22	1.0 to 28.0
Main Street School	B-23 through B-27	1.3 to 23.1

The subsurface tests were conducted in the presence of a Whitestone geologist who performed field tests, recorded visual classifications, and collected samples of the various strata encountered. The tests were located in the field using normal taping procedures and estimated right angles. These locations are presumed to be accurate within a few feet.

Soil borings and standard penetration tests (SPTs) were conducted in general accordance with ASTM International (ASTM) designation D-1586. The SPT resistance value (N) can be used as an indicator of the consistency of fine-grained soils and the relative density of coarse-grained soils. The N-value for various soil types can be correlated with the engineering behavior of earthworks and foundations. Rock was sampled using a NQ-sized diamond bit. The rock core description, recovery, Rock Quality Designation (RQD), and other pertinent information were recorded on the boring logs and are included in Appendix A on the *Records of Subsurface Exploration*. The RQD values reflect the quality and fracture spacing of the rock and are calculated by summing all unbroken samples that are four inches or longer divided by the total length of the run. The percentage of core recovery and RQD values provide an understanding of the physical and engineering properties of the rock.

Groundwater level observations, although not encountered, were recorded during and at the completion of field operations prior to backfilling the tests. Seasonal variations, temperature effects, and recent rainfall conditions may influence the levels of the groundwater, and the observed levels will depend on the permeability of the soils. Groundwater elevations derived from sources other than seasonally observed groundwater monitor wells may not be representative of true groundwater levels.

2.3.2 Laboratory Program

In addition to the field investigation, a supplemental laboratory program was conducted to determine additional, pertinent engineering characteristics of representative samples of on-site soils. The laboratory program was performed in general accordance with applicable ASTM standard test methods and included physical/textural testing of representative samples of various strata.

Physical/Textural Analysis: Representative samples of selected strata encountered were subjected to a laboratory program that included moisture content determinations (ASTM D-2216) and washed gradation analyses (ASTM D-422) in order to perform supplementary engineering soil classifications in general accordance with ASTM D-2487. The soil strata tested were classified by the Unified Soil Classification System (USCS) and results of the laboratory testing are summarized in the following table.

PHYSICAL/TEXTURAL ANALYSIS SUMMARY							
Boring	Sample Number	Depth (fbgs)	Natural Moisture (%)	Liquid Limit (%)	Plastic Index (%)	Passing No. 200 Sieve (%)	USCS Classification
B-4	S-3	4.0 - 6.0	14.5	NP	NP	51.6	ML
B-9	S-2	6.0 - 8.0	17.4	NP	NP	27.0	SM
B-20	S-4	6.0 - 8.0	3.0	NP	NP	13.9	SM

Notes: NP = Non-Plastic

The engineering classifications are useful when considered in conjunction with the additional site data to estimate properties of the soil types encountered and to predict the soil's behavior under construction and service loads. Laboratory test results are provided in Appendix B.

SECTION 3.0

Site Description

3.1 LOCATION AND DESCRIPTION

The subject properties include the Irvington High School/Middle School Complex (40 North Broadway), Main Street School (101 Main Street), and Dows Lane Elementary School (Six Dows Lane) in Irvington, Town of Greenburgh, Westchester County, New York. The sites of the proposed construction are shown on the *Boring Location Plan* included as Figure 1.

3.2 EXISTING CONDITIONS

Surface Cover/Development: At the time of Whitestone's exploration, the areas of proposed redevelopment included paved and sloping grass areas surrounding the school buildings.

Topography: A topographic survey of the subject sites was not available at the time of Whitestone's investigation. Based on visual observations, the sites contained variable grade changes.

Utilities: At the time of Whitestone's investigation, the subject sites were serviced aboveground and underground by various utilities including, but not limited to, electric, telephone, natural gas, water, communication, stormwater and sanitary sewer lines. Other utilities may be present at or near the sites. The utility information contained in this report is presented for general discussion only and is not intended for construction purposes.

Site Drainage: Surface run-off for the sites generally followed existing topography draining towards inlets located within paved portions of the site. The termini of the inlets are unknown.

3.3 SITE GEOLOGY

The High School/Middle School Complex site is mapped within the Fordham Gneiss. Fordham Gneiss is comprised of metamorphic rock with variable mineral content that generally consists of garnet, biotite, quartz, plagioclase, sillimanite, amphibolite, and hornblende. The Main Street School and Dows Lane Elementary School are mapped within the Inwood Marble. Inwood Marble is comprised of dolomite marble, calc-schist, granulite, and quartzite, overlain by calcite marble. The subject sites are overlain by glacial deposits as well as residual soils formed from the weathering of the underlying bedrock. Overburden materials also include man-made fill associated with past and present development of the subject site.

3.4 PROPOSED CONSTRUCTION

Based on information provided by H2M, the proposed site redevelopment at the combined Irvington High School and Middle School location includes a new press box and bleachers, a concession and sports storage building, an equipment building and grading for fire-truck access, retaining walls, and a new entry vestibule as well as associated pavement improvements. For the Main Street School location, proposed construction has not been indicated, however, is expected to include building addition(s) and pavement improvements. For the Dows Lane Elementary School, a stand-alone bathroom and storage shed are proposed along with anticipated pavement improvements.

Detailed grading has not been finalized and the finished floor elevation (FFE) of the proposed additions, stand-alone structures, and pavement grades are not known at this time. However, Whitestone anticipates that the proposed building addition FFEs will match the adjacent building FFE resulting in minimal cuts/fills. Whitestone also anticipates that any pavement improvements will be redeveloped at or near existing grades. Details pertaining to proposed site retaining wall heights/lengths was not provided at the time of this report. No new stormwater management areas are anticipated for the proposed redevelopments.

The anticipated maximum loads for the proposed structures are expected to be as follows:

- ▶ column loads - 150 kips;
- ▶ wall loads - 2.0 kips/linear foot; and
- ▶ floor slab loads - 125 pounds per square foot (live load).

The scope of Whitestone's investigation and the professional advice contained in this report were generated based on the project details and loading noted herein. Any revisions or additions to the design details enumerated in this report should be brought to the attention of Whitestone for additional evaluation as warranted.

SECTION 4.0 Subsurface Conditions

4.1 SUBSURFACE SOIL CONDITIONS

Details of the subsurface materials encountered are presented on the *Records of Subsurface Exploration* presented in Appendix A of this report. The subsurface soil conditions encountered in the subsurface tests consisted of the following generalized strata in order of increasing depth.

Surface Cover: The soil borings were performed within either existing grass-covered areas, paved areas (asphalt and concrete), or encountered existing fill materials at the surface as detailed below. The borings performed within existing grass-covered areas encountered approximately four inches to 10 inches of topsoil at the surface. The borings performed within existing asphalt paved areas encountered approximately 1.5 inches to six inches of asphaltic concrete pavement at the surface underlain by approximately two inches to eight inches of variable subbase materials. The boring performed within an existing concrete sidewalk encountered approximately four inches of Portland cement concrete at the surface (no apparent subbase).

Existing Fill Materials: At or underlying the surface cover materials, a portion of the soil borings encountered existing fill materials that generally consisted of either sandy silt with occasional trace amounts of debris (wood) and variable amounts of gravel or silty sand with gravel. The existing fill materials, where encountered and specifically within the non-pavement borings, extended to depths ranging from approximately one fbgs to 13.0 fbgs. SPT N-values within the existing fill materials ranged between four blows per foot (bpf) and 13 bpf and averaged approximately seven bpf.

Glacial Deposits: Beneath the surface cover and/or existing fill materials, the borings encountered natural glacial deposits. The glacial deposits generally consisted of silty sand (USCS: SM) with variable amounts of gravel, poorly graded sand with silt (USCS: SP-SM), and/or silt (USCS: ML) with variable amounts of sand. Apparent cobbles/boulders were sporadically encountered within the natural glacially deposited soils. Borings B-21, B-26, and B-27 were terminated within the glacial deposits at a depth of approximately three fbgs. Within the remaining borings, the glacial deposits, where encountered, extended to depths ranging from approximately four fbgs to 28.0 fbgs. SPT N-values within coarse-grained portions of this stratum ranged between five bpf and refusal (refusal defined as greater than 50 blows per six inches of split-spoon sampler advancement), generally indicating loose to very dense relative density and averaging approximately 32 bpf.

Weathered Rock: Below the glacial deposits, the majority of the borings encountered weathered rock materials. The top of weathered rock was encountered at depths ranging from approximately four fbgs to 28.0 fbgs. SPT N-values within this stratum were generally in the refusal range.

Intact Rock: Beneath weathered rock materials, the majority of the borings encountered refusal on top of apparent intact rock at depths ranging between approximately 4.5 fbgs to 28.0 fbgs. The bedrock was sampled with rock coring techniques within borings B-1 through B-3, B-7 through B-10, and B-19 and generally consisted of schist. Rock core recoveries in the intact rock ranged from approximately 50 percent to 100 percent and RQD values ranged from approximately 50 percent to 100 percent.

4.2 GROUNDWATER

Static groundwater was not encountered within the soil borings with the deepest depth explored of approximately 30.0 fbgs. Groundwater conditions likely will fluctuate seasonally and following periods of precipitation.

SECTION 5.0

Conclusions and Recommendations

5.1 GENERAL

Whitestone recommends supporting the proposed structures on conventional shallow foundations designed to bear within the underlying improved natural soils, weathered rock/bedrock, and/or controlled structural fill soils that are properly inspected, placed and compacted in accordance with Sections 5.2, 5.3, and 5.11 of this report. Existing fill materials should be overexcavated where encountered at or below proposed foundation bearing elevations.

Weathered rock and rock were encountered across the subject properties at variable depths that can present difficult excavation. Based on top of weathered rock/bedrock elevations encountered during this investigation, removal of weathered rock and bedrock may be required for portions of the proposed redevelopment, particularly at the High School/Middle School Complex. The amount of weathered rock/bedrock removal will be dependent on final grades. Based on the geologic structure of the mapped bedrock, large excavation machinery equipped with ripping tools and/or pneumatic hammers is expected only to be effective for removing the upper few feet of the weathered rock strata.

5.2 SITE PREPARATION AND EARTHWORK

Surface Cover Stripping and Demolition: Prior to stripping operations, all utilities should be identified and secured. The existing pavements and surficial vegetation should be stripped within and at least five feet beyond the limits of any areas requiring structural fill, if possible. The earthwork contractor should be required to perform all earthwork in accordance with the recommendations in this report.

Excavation Difficulties/Weathered Rock and Bedrock Removal: Weathered rock and rock was encountered across the subject properties at variable depths that can present difficult excavation. Excavation difficulties should also be anticipated due to relatively shallow naturally deposited cobbles and boulders that were sporadically encountered at the subject sites. Based on top of weathered rock/bedrock elevations encountered during this investigation, removal of weathered rock and bedrock may be required for portions of the proposed redevelopment (potentially for structure foundations), particularly at the High School/Middle School Complex. Weathered rock/bedrock removal may also be required for portions of the proposed utility excavations at the High School/Middle School Complex. The amount of weathered rock/bedrock removal will be dependent on final grades. Heavy excavating equipment with ripping tools will typically be effective in removing dense/hard weathered soils, transition materials, and cobble/boulder-sized rock fragments during site mass grading. The speed and ease of excavation will depend on the type of grading equipment, the skill of the equipment operators, and the geologic structure of the material itself, such as the direction of planes of weakness and spacing between discontinuities. Confined excavations, such as for footing and utility trenches, may require ripping tools,

pneumatic hammers, pre-spitting, and/or expansive grout. Rock removal techniques should be performed in accordance with applicable Town of Greenburgh, state and federal regulations.

The approximate depths for the top of weathered rock and refusal encountered are provided on the *Boring Location Plan* included as Figure 1 of this report.

Surface Preparation/Proofrolling: Prior to placing any fill or subbase materials to raise or restore grades to the desired subgrade elevations, the existing exposed soils should be compacted to a firm surface with several passes in two perpendicular directions of a minimum 10-ton vibratory roller. The roller should be operated in the static mode or a kneading “sheepsfoot” roller should be used if silt and/or clay soils are encountered at subgrade elevations. The surface then should be proofrolled with a loaded tandem axle truck in the presence of the geotechnical engineer to help identify soft or loose pockets which may require removal and replacement or further investigation. Proofrolling should be performed after a suitable period of dry weather to avoid degrading an otherwise stable subgrade. Any fill or backfill should be placed and compacted in accordance with Section 5.3.

Bedrock Subgrade Preparation: Bedrock slopes should not be steeper than 4:1 (horizontal:vertical). Bedrock steeper than 4:1 (horizontal:vertical) should be stepped. Loose bedrock should be removed from the subgrade prior to placement of crushed stone. Bedrock fractures and joints should be tight. Bedrock joints, fractures, or fissures greater than 0.25-inch in width should be filled with lean concrete. Only minus 0.75-inch crushed stone should be placed directly over the bedrock. Structural fill (sand and gravel) should not be placed directly on the bedrock surface to reduce the likelihood of migration of fines into the bedrock.

Weather Performance Criteria: Because portions of the site soils are highly moisture sensitive (fine-grained soils) and may soften when exposed to water, every effort must be made to maintain drainage of surface water runoff away from construction areas by grading and limiting the exposure of excavations and prepared subgrades to rainfall. Accordingly, excavation and fill placement procedures should be performed during favorable weather conditions. Overexcavation of saturated soils and replacement with controlled structural fill per Section 5.3 of this report may be required prior to resuming work on disturbed subgrade soils.

Subgrade Protection and Inspection: Every effort should be made to minimize disturbance of the on-site materials by construction traffic and surface runoff. The on-site soils will deteriorate when subjected to repeated wetting and construction traffic and likely will require extensive drying or overexcavation and replacement. However, if properly protected and maintained during warm, dry weather as recommended herein, the site soils will provide adequate support for the proposed construction. The site contractors should employ necessary means and methods to protect the subgrade including, but not limited to the following:

- ▶ leaving the existing pavement in place as long as practical to protect the subgrade from freeze-thaw cycles and exposure to inclement weather;
- ▶ sealing exposed subgrade soils on a daily basis with a smooth drum roller operated in static mode;
- ▶ regrading the site as needed to maintain positive drainage away from construction areas;
- ▶ removing wet surficial soils immediately; and
- ▶ limiting exposure to construction traffic especially following inclement weather and subgrade thawing.

5.3 STRUCTURAL FILL AND BACKFILL

Imported Fill Material: Any imported material placed as structural fill or backfill to raise elevations or restore design grades should consist of clean, relatively well graded sand or gravel with a maximum particle size of three inches and five percent to 10 percent of material finer than a #200 sieve. Silts, clays, and silty or clayey sands and gravels with higher percentage of fines and with a liquid limit less than 40 and a plasticity index less than 20 may be considered subject to the owner's approval, provided that the required moisture content and compaction controls are met. The material should be free of clay lumps, organics and deleterious material. Imported structural fill material should be approved by a qualified geotechnical engineer prior to delivery to the site.

On-Site Materials: Based on the conditions disclosed by the soil borings, Whitestone anticipates that the majority of the existing fill materials and the underlying natural soils may be suitable for selective reuse as structural fill and/or backfill below proposed foundations, floor slabs, and pavements provided any objectionable debris are segregated and moisture contents are controlled within two percent of the optimum moisture content. Reuse of the existing fill will be contingent on careful inspection in the field by the owner's geotechnical engineer by visual observation and/or test pit excavations either prior to or during construction in accordance with Section 5.11 of this report.

Laboratory results indicate that the existing site silty soils (USCS: ML) are highly moisture sensitive. The reuse of these fine-grained soils and granular site materials with more than approximately 12 percent fines (USCS: SM) typically is possible only during ideal weather conditions. Reuse of these soils is expected to require mixing with a granular material, extensive moisture conditioning, and/or drying to facilitate their reuse, workability, and compaction in fill areas.

The on-site soils will become increasingly difficult to reuse and compact where wetted beyond the optimum moisture content. Immediate re-use of on-site soil should not be anticipated. Materials that are, or become, exceedingly wet likely will require discing and aerating that may not be practical during wet seasons. Alternatively, imported fill materials may be used to attain the desired grades and expedite earthwork operations. The stripped asphaltic concrete pavement and topsoil should not be used as fill or backfill.

Cobble- and boulder-sized weathered rock/bedrock materials or similarly sized materials greater than three inches in diameter will need to be separated from on-site soils to be placed as structural fill or backfill. Cobble-sized materials between three inches to 12 inches may be crushed or individually placed in structural fill or backfill layers deeper than two feet below proposed foundation and pavement subgraded levels. Care must be taken to individually seat any large particles and to compact soil around large particles with hand operated equipment to minimize risk of void formation. Boulder-sized greater than 12 inches in diameter need to be crushed prior to replacement as structural fill materials. Materials greater than three inches in size should be placed a minimum of three feet from utilities.

Submerged Fill: Where necessary, up to two feet of an open-graded, crushed, three-quarter inch stone may be placed in the wet to provide a working mat, expedite dewatering efforts and enable subsequent placement of structural fill or backfill in the dry. Prior to placing submerged fill materials, free water and disturbed materials should be removed to the extent recommended by the geotechnical engineer. A separation geotextile, such as Mirafi 140N or equivalent, should be placed at the base and sides of the overexcavation to separate the stone from underlying and adjacent soils. The fabric also should be placed on top of the stone prior to subsequent fill placement if fill soils with a substantial amount of fines are to be used to restore grade.

Compaction and Placement Requirements: All fill and backfill should be placed in maximum eight inch loose lifts and compacted to 95 percent of the maximum dry density within two percent of the optimum moisture content as determined by ASTM D 1557 (Modified Proctor). Whitestone recommends using a vibratory drum roller to compact the on-site soils or a small hand held vibratory compactor within excavations.

Structural Fill Testing: A sample of the imported fill material or any on-site material proposed for reuse as structural fill or backfill should be submitted to the geotechnical engineer for analysis and approval at least one week prior to its use. The placement of all fill and backfill should be monitored by a qualified engineering technician to ensure that the specified material and lift thicknesses are properly installed. A sufficient number of in-place density tests should be performed to ensure that the specified compaction is achieved throughout the height of the fill or backfill.

5.4 GROUNDWATER CONTROL

Static groundwater was not encountered within the soil borings with the deepest depth explored of approximately 30.0 fbs. Therefore, Whitestone anticipates that static groundwater will be deeper than proposed foundation and utility excavations and does not anticipate the need for extensive dewatering or permanent groundwater control for the proposed structures. However, perched/trapped water may be encountered within the existing fill materials, at the existing fill materials/natural soil interface, within fine-grained portions of the site soils, and at the natural soil/weathered rock/bedrock interfaces, especially following precipitation events. As such, construction phase dewatering of perched/trapped water through the use of gravity fed sump pumps should be anticipated during at least portions of the excavation

activities for this site. Whitestone anticipates that dewatering typically would include numerous sump pumps along the excavation perimeter and/or deep well points to lower the groundwater level.

Because the subsurface soils will soften when exposed to water, every effort must be made to maintain drainage of surface water runoff away from construction areas by grading and limiting the exposure of excavations to rainfall. Overexcavation of saturated soils and replacement with controlled structural fill and/or one foot to two feet of open graded gravel (such as 3/4 inch clean crushed stone) may be required prior to resuming work on disturbed subgrade soils.

5.5 FOUNDATIONS

Shallow Foundation Design Criteria: Whitestone recommends supporting the proposed structures on conventional spread and continuous wall footings designed to bear within the underlying improved natural materials, intact weathered rock/bedrock, and/or controlled structural fill provided these materials are properly evaluated, placed and compacted in accordance with Sections 5.2, 5.3, and 5.11 of this report. Portions of the upper natural materials were relatively loose and will require improvement prior to foundation support, if encountered at or below proposed foundation bearing elevations. Foundations bearing within the improved natural site soils and/or controlled structural fill materials may be designed using a maximum allowable net bearing pressure of 3,000 pounds per square foot (psf). Foundations bearing on competent weathered rock/bedrock may be designed using a maximum allowable net bearing pressure of 6,000 psf. Higher bearing capacities of isolated foundation on intact bedrock may be considered once all loads and spans are confirmed and differential settlements can be evaluated.

All footing bottoms should be improved by in-trench compaction in the presence of the geotechnical engineer. Regardless of loading conditions, proposed foundations should be sized no less than minimum dimensions of 24 inches for continuous wall footings and 36 inches for isolated column footings.

Footings subject to overturning moments should be designed so that the maximum toe pressure due to the combined effect of vertical loads and overturning moment does not exceed the recommended maximum allowable net bearing pressure. In addition, positive contact pressure should be maintained throughout the base of the footings such that no uplift or tension exists between the base of the footings and the supporting soil. Uplift loads should be resisted by the weight of the concrete. Side friction should be neglected when proportioning the footings so that lateral resistance should be provided by friction resistance at the base of the footings. A coefficient of friction against sliding of 0.35 is recommended for use in the design of the foundations bearing within the existing site soils or imported structural fill soils.

Partial Weathered Rock/Bedrock Support: Foundations should not be supported partially on weathered rock, weathered rock-sized cobbles/boulders, or bedrock and partially on soil because of the risk of brittle fracture due to a hinging effect. If the proposed bearing elevations result with partial bearing on such materials, Whitestone recommends removing a minimum of six inches of the weathered rock/bedrock and restoring the bearing elevation with structural fill. As such, rock should be

overexcavated for a transition length of 20 feet and backfilled with structural backfill per Section 5.3 for any foundation that results in partial rock and partial soil conditions.

Foundation Inspection/Overexcavation Criteria: Whitestone recommends that the suitability of the bearing soils along and below the footing bottoms be verified by a geotechnical engineer prior to placing concrete for the footings. Where areas of unsuitable materials are encountered in footing excavations, such as existing fill materials, overexcavation and recompaction or replacement may be necessary to provide a suitable footing subgrade in accordance with Section 5.2. Any overexcavation to be restored with structural fill will need to extend at least one foot laterally beyond footing edges for each vertical foot of overexcavation. Lateral overexcavation can be reduced if the grade is restored with lean concrete or approved flowable fill. The bottom of overexcavation should be compacted with vibrating plates or plate tampers (“jumping jacks”) to compact locally disturbed materials.

Settlement: Whitestone estimates post construction settlements of proposed foundations on the order of less than one inch if the recommendations outlined in this report are properly implemented. Differential settlements of foundations should be less than one-half inch.

Frost Coverage/Adjacent Foundations: Footings subject to frost action should be placed at least 42 inches below adjacent exterior grades or the depth required by local building codes to provide protection from frost penetration. Interior footings not subject to frost action may be placed at a minimum depth of 18 inches below the slab subbase. New foundations in areas adjacent to the existing buildings will require special consideration. New footings should be bear at the same elevation as the adjacent foundations. Care should be exercised during construction to avoid undermining the existing foundations.

Because competent rock is not susceptible to frost heaving conditions, foundations bearing directly on top of competent rock, as verified during construction by the geotechnical engineer, are not required to extend to typical frost protection depths.

5.6 FLOOR SLAB

Contingent upon supplemental evaluation of existing fill materials, Whitestone anticipates that the improved and approved existing fill materials, underlying natural soils, and/or controlled structural fill materials will be suitable for support of the proposed floor slabs provided these materials are properly evaluated, placed, compacted and proofrolled in accordance with Sections 5.2, 5.3, and 5.11 of this report. Localized areas of overexcavation may be anticipated due to the variability that exists within the existing fill materials, evidenced by the debris encountered, and/or if the subgrades are exposed to precipitation. Any areas that become softened or disturbed as a result of wetting and/or repeated exposure to construction traffic should be removed and replaced with compacted structural backfill. The properly prepared on-site soils are expected to yield a minimum subgrade modulus (k) of 150 psi/in.

A minimum four-inch layer of stone should be installed below the floor slabs to provide a capillary break. An impervious membrane also should be provided as a moisture vapor barrier beneath all floor slabs. Post construction settlements of floor slabs installed in accordance with the recommendations outlined in this report are estimated to be on the order of one quarter inch.

5.7 PAVEMENT DESIGN CRITERIA

General: Whitestone anticipates that either improved and approved existing fill materials, the underlying natural materials, and/or compacted structural fill and/or backfill placed to raise or restore design elevations are expected to be suitable for support of the proposed pavements provided these materials are properly evaluated, compacted, and proofrolled in accordance with Sections 5.2, 5.3, and 5.11 of this report during favorable weather conditions. Localized overexcavation of unsuitable existing fill materials may be anticipated due to existing fill materials including variable amounts of debris.

Alternatively, subgrade stabilization with a biaxial geogrid, such as Tensar BX1200 or equal, should be anticipated to limit overexcavation. Where unimproved existing fill materials remain below proposed subgrades, increased maintenance, possibly including crack sealing, patching or more frequent re-paving, may be necessary. If the risk of increased maintenance is not acceptable, more extensive subgrade preparation recommendations can be developed. The following pavement section recommendations are based on the assumption that such an increased risk is acceptable. Whitestone would be pleased to prepare alternative recommendations for the more substantial subgrade improvements.

Design Criteria: A California Bearing Ratio value of five has been assigned to the properly prepared subgrade soils for pavement design purposes. This value was correlated with pertinent soil support values and assumed traffic loads to prepare flexible and rigid pavement designs per the AASHTO *Guide for the Design of Pavement Structures*.

Design traffic loads were assumed based on typical volumes for similar facilities and correlated with 18-kip equivalent single axle loads (ESAL) for a 20-year life. An estimated maximum load of 25,000 ESAL was used for all pavement areas assuming the pavement primarily will accommodate both automobile and limited heavier truck traffic. Actual pavement loads should be less than this value.

Pavement Sections: The recommended flexible pavement section is presented below:

FLEXIBLE PAVEMENT SECTION		
Layer	Material	Thickness (Inches)
Asphalt Surface	NYSDOT Type 7 or 7F Top	1.5
Asphalt Base	NYSDOT Type 3 Binder	2.5
Granular Subbase	NYSDOT Type 2 Subbase	6.0

A rigid concrete pavement should be used to provide suitable support at areas of high traffic or severe turns (such as at ingress/egress areas, utility pads, etc.). The recommended rigid pavement is presented below in tabular format:

RIGID PAVEMENT SECTION		
Layer	Material	Thickness (Inches)
Surface	4,000 psi air-entrained concrete	5.0
Base	NYSDOT Type 2 Subbase	6.0

Additional Design Considerations: The pavement section thickness designs presented in this report are based on the design parameters detailed herein and are contingent on proper construction, inspection, and maintenance. Additional pavement thicknesses may be required by local code. The designs are contingent on achieving the minimum soil support value in the field. To accomplish this requirement, all subgrade soil and supporting fill or backfill must be placed, compacted, and evaluated in accordance with Sections 5.2, 5.3, and 5.11 of this report. Proper drainage must be provided for the pavement structure including appropriate grading and surface water control.

The performance of the pavement also will depend on the quality of materials and workmanship. Whitestone recommends that NYSDOT standards for materials, workmanship, and maintenance be applied to this site. Project specifications should include verifying that the installed asphaltic concrete material composition is within tolerance for the specified materials and that the percentage of air voids of the installed pavement is within specified ranges for the respective materials. All rigid concrete pavements should be suitably air-entrained, jointed, and reinforced.

5.8 LATERAL EARTH PRESSURES

General: The proposed redevelopments are anticipated to include site retaining walls. While the design and investigation of the retaining structures are beyond Whitestone's current scope of work, Whitestone would be pleased to assist with the calculation of lateral earth pressures based on the soil parameters presented herein during the structural design phase when final grading and wall geometries are available.

Lateral Earth Pressures: Temporary retaining structures and permanent retaining/below-grade walls may be required to resist lateral earth pressures. Proposed retaining/below-grade walls must be capable of withstanding active and at-rest earth pressures. Retaining/below-grade walls free to rotate generally can be designed to resist active earth pressures. Retaining/below-grade walls corners and restrained walls need to be designed to resist at-rest earth pressures. Such structures should be properly designed by the Owner's engineer. The soil parameters in the following table apply to the encountered subsurface strata and may be used for design of the proposed temporary and permanent retaining structures.

LATERAL EARTH PRESSURE PARAMETERS		
Parameter	On-Site Soils	Imported Granular Backfill
Moist Density (γ_{moist})	140 pcf	140 pcf
Internal Friction Angle (ϕ)	28°	30°
Active Earth Pressure Coefficient (K_a)	0.36	0.33
Passive Earth Pressure Coefficient (K_p)	2.77	3
At-Rest Earth Pressure Coefficient (K_o)	0.53	0.5

Lateral earth pressure will depend on the backfill slope angle and the wall batter angle. A sloped backfill will add surcharge load and affect the angle of the resultant force. The effect of other surcharges will also need to be included in earth pressure calculations, including the loads imposed by adjacent structures and traffic. The effects of proposed sloped backfill surface grades, and proposed slopes beyond the toe of the retaining structure, if applicable, must be considered when calculating resultant forces to be resisted by the retaining structure. A coefficient of friction of 0.35 against sliding can be used for concrete on the existing site soils. Retaining/below-grade wall footings should be designed so that the combined effect of vertical and horizontal resultants and overturning moment does not exceed the maximum soil bearing capacity provided in Section 5.5.

Backfill Criteria: Whitestone recommends that granular soils be used to backfill behind the proposed retaining/below-grade walls. The granular backfill materials should consist of clean, relatively well graded sand or gravel with a maximum particle size of three inches and five percent to 15 percent of material finer than a #200 sieve. The material should be free of clay lumps, organics, and deleterious material. Limited portions of the on-site soils encountered consisted of poorly graded sand with silt (USCS: SP-SM) that are anticipated to be satisfactory for retaining/below-grade wall backfill, if encountered during site excavations. The remaining portions of the existing site soils are not anticipated to be suitable for retaining/below-grade wall backfill. Weathered rock/bedrock fragments and cobbles/boulders greater than three inches should also not be used as backfill. Accordingly, imported granular soils may be required. A maximum density of 140 pcf should not be exceeded to avoid creating excessive lateral pressure on the walls during compaction operations.

Whitestone recommends that backfill directly behind any walls be compacted with light, hand-held compactors. Heavy compactors and grading equipment should not be allowed to operate within a zone of influence measured at a 45-degree angle from the base of the walls during backfilling to avoid developing excessive temporary or long-term lateral soil pressures.

Wall Drainage: Positive gravity drainage of the backfill should be provided at the base of the retaining/below-grade walls by a series of perforated pipes surrounded by at least 12 inches of clean crushed stone that discharges into a stormwater sewer or daylight to appropriate site surface drainage. Whitestone recommends that a two-foot wide zone of clean crushed stone or washed sand, separated from the backfill by a filter fabric, be constructed adjacent to the back of the wall. This zone should prevent

the buildup of hydrostatic pressures and pressures from freezing moisture in the backfill. The vertical drain should be tied into the gravity drainage system (perforated pipe) installed at the base of the wall. Alternatively, temporary retaining walls may include weep holes instead of a drain tied to the site drainage system. If wall drainage is not provided, the wall should be designed to withstand full hydrostatic pressure.

Whitestone should be notified if any other retaining structures or design considerations requiring lateral earth pressure estimations are proposed. Specific recommendations for temporary retaining structures are beyond Whitestone's scope of work.

5.9 SEISMIC AND LIQUEFACTION CONSIDERATIONS

Based on a review of the subsurface conditions relevant to the *New York State International Building Code (2015)*, the subject sites may be assigned a Site Class C. Based on the seismic zone and soil profile, liquefaction considerations are not expected to have a substantial impact on design. A higher site class is likely, however, shear wave velocity testing would be required to confirm.

5.10 EXCAVATIONS

Temporary excavations less than 20 feet in height should be performed and evaluated in accordance with 29 CFR Part 1926 (OSHA). Based on the results of this investigation, soil conditions and preliminarily estimated soil types are outlined in the table below. Actual conditions encountered during construction should be evaluated by a competent person (as defined by OSHA) to ensure that safe excavation methods and/or shoring and bracing requirements are implemented.

TEMPORARY EXCAVATION SLOPE RECOMMENDATIONS		
Material Type	Soil Type	Maximum Allowable Slope ¹
Existing Fill	Type C	1.5 (H) : 1.0 (V)
Dry to Moist, Natural Soil, Free of Water	Type B	1.0 (H) : 1.0 (V)
Dry to Moist, Weathered Rock/Bedrock, Free of Water	Stable Rock	Vertical

Note 1 - As required by OSHA, each soil and rock deposit shall be classified daily by a competent person as Stable Rock, Type A, Type B, or Type C in accordance with 29 CFR Part 1926.

The classification of the deposits shall be made based on the results of at least one visual and at least one manual analysis. Such analyses shall be conducted by a competent person. In a layered system, the system shall be classified in accordance with its weakest layer. However, each layer may be classified individually where a more stable layer lies under a less stable layer.

5.11 SUPPLEMENTAL POST INVESTIGATION SERVICES

Construction Phase Evaluation of Existing Fill Materials: Based on the conditions disclosed by the soil borings, Whitestone anticipates that the existing fill materials encountered throughout the subject sites will not be suitable for foundation support in its present condition without risk of intolerable total and differential settlement. However, the existing fill materials may be suitable for floor slab and pavement support with limited overexcavation, due to the variability within existing fill materials evidenced by the debris encountered, and with increased risk of future maintenance within proposed pavement areas where marginal unimproved existing fill remains. Whitestone also anticipates that the majority of the existing fill materials will be suitable for reuse as structural fill provided they are free of deleterious debris and implementation of moisture control operations are utilized. Reuse of the existing fill materials will be contingent on careful inspection in the field by the owner's geotechnical engineer by visual observation and/or test pit excavations during construction as recommended herein. Due to the inherent variability that exists within existing fill, Whitestone recommends confirming further the condition of the existing fill for floor slab and pavement support and/or re-use as structural fill by means of supplemental evaluation either prior to or during the early stages of construction, as discussed further herein, to identify areas requiring removal and possible uncontrolled conditions or deleterious materials not disclosed by the soil borings conducted during this exploration.

Construction Inspection and Monitoring: The owner's geotechnical engineer with specific knowledge of the subsurface conditions and design intent should perform inspection, testing, and consultation during construction as described in previous sections of this report. Monitoring and testing should also be performed to verify that the existing surface cover materials are properly removed, and suitable materials, used for controlled fill, are properly placed and compacted over suitable subgrade soils. The overexcavation of existing fill materials beneath proposed foundations and proofrolling of all subgrades prior to foundation, floor slab, and pavement support should be witnessed and documented by the owner's geotechnical engineer.

Vibrations and Pre-/Post-Construction Surveys: The subject sites are situated within developed areas including site buildings, various structures, and roadways. Therefore, care should be maintained while commencing the rock removal operations associated with the redevelopment.

While the exact rock removal method is not known at this time, steady state vibrations that are typically generated by ripping tools, pneumatic hammers, etc. are transmitted to the varying distances from the point of impact. When performing the rock removal operations within the interior of a large site, the off-site effects of the ground vibrations are usually negligible. However, when performing the rock removal operations near the existing site structures, ground vibrations can be transmitted into the adjacent facilities and in some instances may cause annoyance or structural damage. Therefore, Whitestone recommends monitoring vibrations during construction especially during rock removal operations to ensure that vibrations don't affect or damage the adjacent structures.

Based on the U.S. Bureau of Mines studies, risk of structural damage is minimized if the peak velocities generated due to rock removal operation do not exceed 0.75 inches per second (in/sec) within the range of 10 HZ and 40 HZ for modern structures, 0.25 in/sec within 1 HZ and 10 HZ for historic buildings, and three in/sec within the range of 10 HZ and 100 HZ for buried utilities. Higher allowable peak velocities could be allowed, based on field testing and site-specific subsurface conditions.

Whitestone also recommends pre-construction and post-construction surveys of the structures adjacent to the proposed redevelopments. These surveys should include documentation, photographs and/or videotapes of the existing conditions of the adjacent structures prior to construction activities at the subject site and a comparison to a post-construction survey should be performed to determine possible construction impacted settlements and/or damage to the adjacent structures. These surveys should be conducted to monitor the potential progression of building cracks.

SECTION 6.0

General Comments

Supplemental recommendations may be required upon finalization of construction plans or if significant changes are made in the characteristics or location of the proposed structure. Soil bearing conditions should be checked at the appropriate time for consistency with those conditions encountered during Whitestone's geotechnical investigation.

The recommendations presented herein should be utilized by a qualified engineer in preparing the project plans and specifications. The engineer should consider these recommendations as minimum physical standards which may be superseded by local and regional building codes and structural considerations. These recommendations are prepared for the sole use of Irvington Union Free School District for the specific project detailed and should not be used by any third party. These recommendations are relevant to the design phase and should not be substituted for construction specifications.

The possibility exists that conditions between borings may differ from those at specific boring locations, and conditions may not be as anticipated by the designers or contractors. In addition, the construction process may alter soil and rock conditions. Therefore, experienced geotechnical personnel should observe and document the construction procedures used and the conditions encountered.

Whitestone assumes that a qualified contractor will be employed to perform the construction work, and that the contractor will be required to exercise care to ensure all excavations are performed in accordance with applicable regulations and good practice. Particular attention should be paid to avoiding damaging or undermining adjacent properties and maintaining slope stability. Whitestone recommends that the services of the geotechnical engineer be engaged to test and evaluate the soils in the footing excavations prior to concreting in order to determine that the soils will support the bearing capacities. Monitoring and testing also should be performed to verify that suitable materials are used for controlled fills and that they are properly placed and compacted over suitable subgrade soils.

The exploration and analysis of the foundation conditions reported herein are considered sufficient in detail and scope to form a reasonable basis for the foundation design. The recommendations submitted for the proposed construction are based on the available soil information and the design details furnished by Irvington Union Free School District. Deviations from the noted subsurface conditions encountered during construction should be brought to the attention of the geotechnical engineer.

The geotechnical engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been promulgated after being prepared in accordance with generally accepted professional engineering practice in the fields of foundation engineering, soil mechanics, and engineering geology. No other warranties are implied or expressed.



FIGURE 1

Boring Location Plan



**WHITESTONE
ASSOCIATES, INC.**

Environmental & Geotechnical Engineers & Consultants

35 TECHNOLOGY DRIVE, WARREN, NJ 07059

908.668.7777 WHITESTONEASSOC.COM

DRAWING TITLE:
BORING LOCATION PLAN

CLIENT:

IRVINGTON UNION FREE SCHOOL DISTRICT

PROJECT:

PROPOSED BUILDING ADDITIONS & ALTERATIONS

40 NORTH BROADWAY, 101 MAIN STREET & 6 DOWS LANE

15 PARKING (ENCLOSURE) TO PARKING STREET & BOWLS DRIVE
IRVINGTON, TOWN OF GREENBURGH, WESTCHESTER COUNTY, NY

PROJECT #:

GJ1916829.000

DESIGNED BY: **G**

PROJ. MGR.:
MK

DATE: 1/27/20

FIGURE:

SCALE:
 $1'' = 80'$

1A

LEGEND



BORING LOCATION (APPROX.)

[4.0'/6.0']

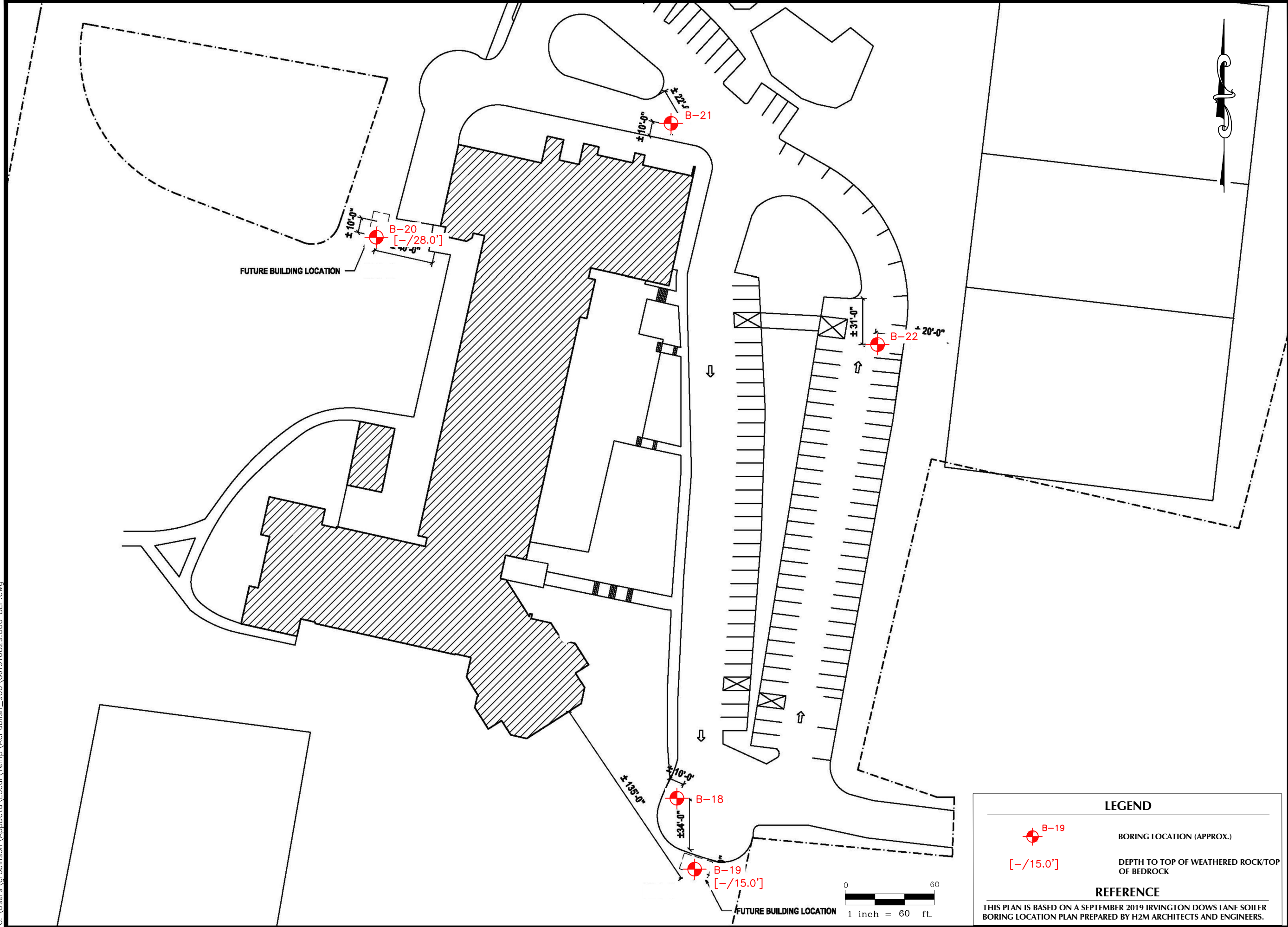
NE

NOT ENCOUNTERED

REFERENCE

THIS PLAN IS BASED ON A SEPTEMBER 2019 IRVINGTON CAMPUS SOILER BORING LOCATION PLAN PREPARED BY H2M ARCHITECTS AND ENGINEERS.

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LEGEND

B-19

BORING LOCATION (APPROX.)

[- / 15.0']

DEPTH TO TOP OF WEATHERED ROCK / TOP OF BEDROCK

REFERENCE

THIS PLAN IS BASED ON A SEPTEMBER 2019 IRVINGTON DOWS LANE SOILER BORING LOCATION PLAN PREPARED BY H2M ARCHITECTS AND ENGINEERS.

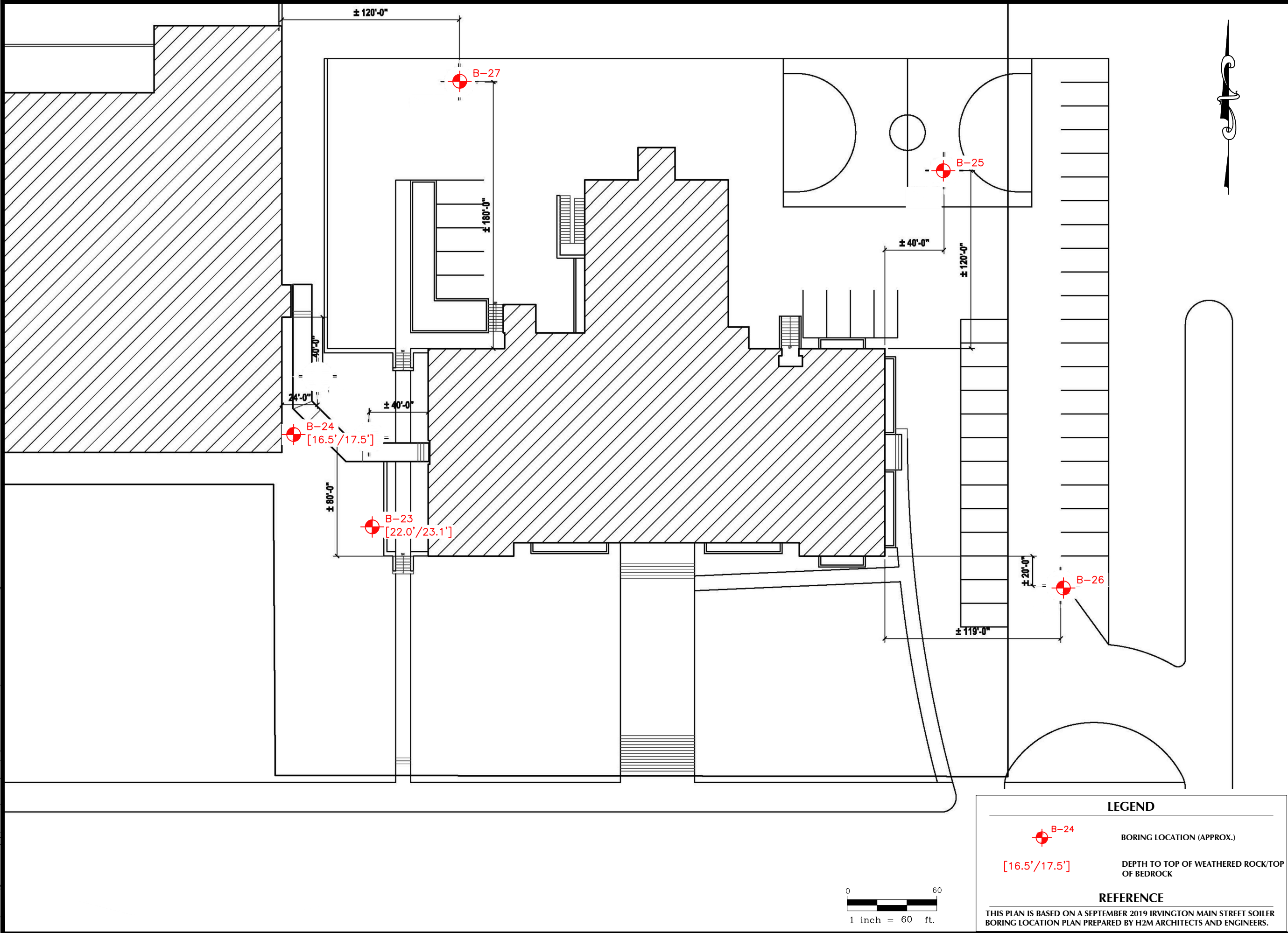
DRAWING TITLE: BORING LOCATION PLAN			
CLIENT: IRVINGTON UNION FREE SCHOOL DISTRICT			
PROJECT: PROPOSED BUILDING ADDITIONS & ALTERATIONS 40 NORTH BROADWAY, 101 MAIN STREET & 6 DOWS LANE IRVINGTON, TOWN OF GREENBURGH, WESTCHESTER COUNTY, NY			
PROJECT #: GJ1916829.000			
DESIGNED BY: GR	PROJ. MGR.: MK		
DATE: 1/27/20	FIGURE: 1B		
SCALE: 1" = 60'			




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LEGEND

 B-24
[16.5'/17.5']

BORING LOCATION (APPROX.)

DEPTH TO TOP OF WEATHERED ROCK/TOP OF BEDROCK

REFERENCE

THIS PLAN IS BASED ON A SEPTEMBER 2019 IRVINGTON MAIN STREET SOILER BORING LOCATION PLAN PREPARED BY H2M ARCHITECTS AND ENGINEERS.

WHITESTONE ASSOCIATES, INC.
Environmental & Geotechnical Engineers & Consultants

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908.668.7777 WHITESTONEASSOC.COM

DRAWING TITLE: BORING LOCATION PLAN	
CLIENT: IRVINGTON UNION FREE SCHOOL DISTRICT	
PROJECT: PROPOSED BUILDING ADDITIONS & ALTERATIONS 40 NORTH BROADWAY, 101 MAIN STREET & 6 DOWNS LANE IRVINGTON, TOWN OF GREENBURGH, WESTCHESTER COUNTY, NY	
PROJECT #: GJ1916829.000	
DESIGNED BY: GR	PROJ. MGR.: MK
DATE: 1/27/20	FIGURE: 1C
SCALE: 1" = 60'	



APPENDIX A

Records of Subsurface Exploration

RECORD OF SUBSURFACE EXPLORATION

 Boring No.: **B-1**

 Page 1 of 1

Project: Proposed School Building Additions & Alterations			WAI Project No.: GJ1916829.000		
Location: Irvington; Town of Greenburgh, Westchester County, NY			Client: Irvington Union Free School District		
Surface Elevation: ± <u>NS</u> feet		Date Started: <u>11/19/2019</u>		Water Depth Elevation (feet bgs) (feet)	
Termination Depth: <u>7.0</u> feet bgs		Date Completed: <u>11/19/2019</u>		Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: <u>North Broadway</u>		Logged By: <u>MH</u>		During: <u>NE</u> <u>---</u> ▼	
Drill / Test Method: <u>HSA / SPT /</u>		Contractor: <u>ETD</u>		At Completion: <u>---</u> <u>---</u> ▼	
<u>ROCK CORE</u>		Equipment: <u>CME-55</u>		24 Hours: <u>---</u> <u>---</u> ▼	
At Completion: <u>---</u> <u>---</u> ▼		24 Hours: <u>---</u> <u>---</u> ▼			

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
Total Elapsed Cut Time/Cut Time Per Ft.			REC	RQD		0.0			
0 - 2	S-1	X	2 - 2 - 3 - 6	20	5	0.8	TOPSOIL	10" Topsoil	
2 - 4	S-2	X	15 - 18 - 14 - 19	22	32	2.0	GLACIAL DEPOSITS	Brown Sandy Silt, Moist, Loose (ML)	
4 - 5.1	S-3	X	21 - 30 - 50/1"	8	80/7"	4.0		Brown Silty Sand with Gravel, Moist, Dense (SM)	
						5.0	WEATHERED ROCK	Gray to Brown Weathered Rock, Moist, Very Dense (WR)	
6 - 7	R-1	NQ	5:00	12" 100%	12" 100%	7.0	ROCK	Gray Schist, Moist, Very Hard, Massive, Fresh (ROCK)	
						10.0			
						15.0			
						20.0			
						25.0			
								Boring Log B-1 Terminated at a Depth of 7.0 Feet Below Ground Surface	





NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

 Boring No.: **B-2**

 Page 1 of 1

Project: Proposed School Building Additions & Alterations			WAI Project No.: GJ1916829.000		
Location: Irvington; Town of Greenburgh, Westchester County, NY			Client: Irvington Union Free School District		
Surface Elevation: ± <u>NS</u> feet		Date Started: <u>11/19/2019</u>		Water Depth Elevation (feet bgs) (feet)	
Termination Depth: <u>16.0</u> feet bgs		Date Completed: <u>11/19/2019</u>		Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: <u>North Broadway</u>		Logged By: <u>MH</u>		During: <u>NE</u> <u>---</u> ▼	
Drill / Test Method: <u>HSA / SPT /</u>		Contractor: <u>ETD</u>		At Completion: <u>---</u> <u>---</u> ▼	
<u>ROCK CORE</u>		Equipment: <u>CME-55</u>		24 Hours: <u>---</u> <u>---</u> ▼	

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
Total Elapsed Cut Time/Cut Time Per Ft.			REC	RQD		0.0			
0 - 2	S-1		2 - 4 - 7 - 7	18	11	0.4	TOPSOIL	5" Topsoil	
							GLACIAL DEPOSITS	Brown Sandy Silt, Moist, Medium Dense (ML)	
2 - 4	S-2		7 - 12 - 13 - 18	22	25			As Above (ML)	
4 - 6	S-3		16 - 22 - 18 - 28	22	40			Brown Silty Sand with Gravel, Moist, Dense (SM)	
8 - 10	S-4		9 - 12 - 18 - 24	2	30			As Above (SM)	
						14.0	WEATHERED ROCK	Likely Weathered Rock (WR)	Hard Grinding 14.0 fbg to 16.0 fbg
15 - 16	R-1	NQ	4:30	11" 92%	6" 50%	16.0	ROCK	Gray Schist, Moist, Very Hard, Slightly Weathered, Slightly Broken (ROCK)	
								Boring Log B-2 Terminated at a Depth of 16.0 Feet Below Ground Surface	


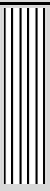


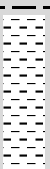

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

 Boring No.: **B-3**

 Page 1 of 1

Project: Proposed School Building Additions & Alterations						WAI Project No.: GJ1916829.000					
Location: Irvington; Town of Greenburgh, Westchester County, NY						Client: Irvington Union Free School District					
Surface Elevation: ± <u>NS</u> feet						Date Started: <u>11/19/2019</u>		Water Depth Elevation (feet bgs) (feet)		Cave-In Depth Elevation (feet bgs) (feet)	
Termination Depth: <u>17.0</u> feet bgs						Date Completed: <u>11/19/2019</u>					
Proposed Location: <u>North Broadway</u>						Logged By: <u>MH</u>		During: <u>NE</u> <u>---</u> ▼			
Drill / Test Method: <u>HSA / SPT /</u> <u>ROCK CORE</u>						Contractor: <u>ETD</u>		At Completion: <u>---</u> <u>---</u> ▼		At Completion: <u>---</u> <u>---</u> ▼	
						Equipment: <u>CME-55</u>		24 Hours: <u>---</u> <u>---</u> ▼		24 Hours: <u>---</u> <u>---</u> ▼	

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
Total Elapsed Cut Time/Cut Time Per Ft.									
				REC	RQD	0.0			
0 - 2	S-1	X	2 - 4 - 4 - 4	20	8	0.6	TOPSOIL		7" Topsoil
2 - 4	S-2	X	6 - 8 - 9 - 12	3	17	4.0	GLACIAL DEPOSITS		Brown Sandy Silt, Moist, Loose (ML) As Above (ML)
4 - 6	S-3	X	12 - 14 - 17 - 30	10	31	5.0			Brown Silty Sand with Gravel, Moist, Dense (SM)
8 - 10	S-4	X	11 - 15 - 15 - 23	22	30	10.0			As Above (SM)
						13.0	WEATHERED ROCK		Likely Weathered Rock (WR)
16 - 17	R-1	NQ	4:00	6" 50%	6" 50%	17.0	ROCK		Gray Schist, Moist, Hard, Slightly Broken, Moderately Weathered (ROCK)
						20.0	Boring Log B-3 Terminated at a Depth of 17.0 Feet Below Ground Surface		
						25.0			

RECORD OF SUBSURFACE EXPLORATION

 Boring No.: **B-4**

 Page 1 of 2

Project: Proposed School Building Additions & Alterations			WAI Project No.: GJ1916829.000		
Location: Irvington; Town of Greenburgh, Westchester County, NY			Client: Irvington Union Free School District		
Surface Elevation: ± <u>NS</u> feet		Date Started: <u>11/19/2019</u>		Water Depth Elevation (feet bgs) (feet)	
Termination Depth: <u>30.0</u> feet bgs		Date Completed: <u>11/19/2019</u>		Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: <u>North Broadway</u>		Logged By: <u>MH</u>		During: <u>NE</u> <u>---</u> ▼	
Drill / Test Method: <u>HSA / SPT /</u>		Contractor: <u>ETD</u>		At Completion: <u>---</u> <u>---</u> ▼	
<u>MUD ROTARY @ 8.0 fbs</u>		Equipment: <u>CME-55</u>		24 Hours: <u>---</u> <u>---</u> ▼	

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0	TOPSOIL	7" Topsoil	
0 - 2	S-1		1 - 3 - 5 - 5	20	8	0.6	FILL	Brown Sandy Silt, Moist, Trace Debris (FILL)	Debris: Wood Chips
2 - 4	S-2		3 - 6 - 5 - 5	20	11	2.0	GLACIAL DEPOSITS	Brown Sandy Silt, Moist, Medium Dense (ML)	
4 - 6	S-3		4 - 6 - 8 - 11	22	14	5.0		As Above (ML)	
6 - 8	S-4		10 - 9 - 41 - 45	20	50	6.0		Brown Silty Sand with Gravel, Moist, Very Dense (SM)	Boulder @ 7.0 fbs to 8.0 fbs
8 - 10	S-5		7 - 10 - 14 - 14	22	24	10.0		As Above, Medium Dense (SM)	
13 - 15	S-6		8 - 13 - 15 - 19	20	28	15.0		As Above (SM)	
18 - 20	S-7		9 - 16 - 16 - 16	22	32	20.0		As Above, Dense (SM)	
23 - 25	S-8		18 - 20 - 25 - 27	20	45	25.0		As Above (SM)	Interbedded Weathered Rock


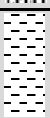
NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

 Boring No.: **B-4**

 Page **2** of **2**

Project: Proposed School Building Additions & Alterations						WAI Project No.: GJ1916829.000					
Location: Irvington; Town of Greenburgh, Westchester County, NY						Client: Irvington Union Free School District					
Surface Elevation: ± <u>NS</u> feet						Date Started: <u>11/19/2019</u>		Water Depth Elevation (feet bgs) (feet)		Cave-In Depth Elevation (feet bgs) (feet)	
Termination Depth: <u>30.0</u> feet bgs						Date Completed: <u>11/19/2019</u>					
Proposed Location: <u>North Broadway</u>						Logged By: <u>MH</u>		During: <u>NE</u> <u>---</u> ▼		At Completion: <u>---</u> <u>---</u> ▼	
Drill / Test Method: <u>HSA / SPT /</u> <u>MUD ROTARY @ 8.0 fbgs</u>						Contractor: <u>ETD</u>		At Completion: <u>---</u> <u>---</u> ▼		At Completion: <u>---</u> <u>---</u> ▼	
						Equipment: <u>CME-55</u>		24 Hours: <u>---</u> <u>---</u> ▼		24 Hours: <u>---</u> <u>---</u> ▼	







SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS	
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
						25.0	GLACIAL DEPOSITS		Brown Silty Sand with Gravel, Moist (SM)	Hard Grinding 22.0 fbgs to 28.0 fbgs
						28.0				
28 - 30	S-9	X	20 - 30 - 35 - 48	16	65	30.0	WEATHERED ROCK		Gray to Brown Weathered Rock, Moist, Very Dense (WR)	
									Boring Log B-4 Terminated at a Depth of 30.0 Feet Below Ground Surface	
						35.0				
						40.0				
						45.0				
						50.0				

RECORD OF SUBSURFACE EXPLORATION

 Boring No.: **B-5**

 Page 1 of 1

Project: Proposed School Building Additions & Alterations						WAI Project No.: GJ1916829.000					
Location: Irvington; Town of Greenburgh, Westchester County, NY						Client: Irvington Union Free School District					
Surface Elevation: ± <u>NS</u> feet						Date Started: <u>1/9/2020</u>		Water Depth Elevation (feet bgs) (feet)		Cave-In Depth Elevation (feet bgs) (feet)	
Termination Depth: <u>6.5</u> feet bgs						Date Completed: <u>1/9/2020</u>					
Proposed Location: <u>North Broadway</u>						Logged By: <u>MH</u>		During: <u>NE</u> <u>---</u> ▼			
Drill / Test Method: <u>HSA / SPT</u>						Contractor: <u>PR</u>		At Completion: <u>---</u> <u>---</u> ▼		At Completion: <u>---</u> <u>---</u> ▼	
						Equipment: <u>Geoprobe</u>		24 Hours: <u>---</u> <u>---</u> ▼		24 Hours: <u>---</u> <u>---</u> ▼	

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS	
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
						0.0	PAVEMENT		2" Asphalt, 3" Stone Subbase	
						0.4	GLACIAL DEPOSITS			
1 - 3	S-1		8 - 10 - 10 - 11	20	20				Brown Silty Sand, Moist, Medium Dense (SM)	
3 - 5	S-2		9 - 13 - 10 - 9	18	23				As Above (SM)	
5 - 6.1	S-3		16 - 25 - 50/1"	12	75/6"				As Above (SM)	
						6.5	WR		Gray Weathered Rock, Moist, Very Dense (WR)	
									Boring Log B-5 Terminated at a Depth of 6.5 Feet Below Ground Surface Due to Auger Refusal	

RECORD OF SUBSURFACE EXPLORATION

 Boring No.: **B-6**

 Page **1** of **1**

Project: Proposed School Building Additions & Alterations			WAI Project No.: GJ1916829.000		
Location: Irvington; Town of Greenburgh, Westchester County, NY			Client: Irvington Union Free School District		
Surface Elevation: ± <u>NS</u> feet		Date Started: <u>1/9/2020</u>		Water Depth Elevation (feet bgs) (feet)	
Termination Depth: <u>7.0</u> feet bgs		Date Completed: <u>1/9/2020</u>		Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: <u>North Broadway</u>		Logged By: <u>MH</u>		During: <u>NE</u> <u>---</u> ▼	
Drill / Test Method: <u>HSA / SPT</u>		Contractor: <u>PR</u>		At Completion: <u>---</u> <u>---</u> ▼	
		Equipment: <u>Geoprobe</u>		24 Hours: <u>---</u> <u>---</u> ▼	
				At Completion: <u>---</u> <u>---</u> ▼	
				24 Hours: <u>---</u> <u>---</u> ▼	

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0	TOPSOIL	4" Topsoil	
0 - 2	S-1		10 - 12 - 9 - 9	20	21	0.3	GLACIAL DEPOSITS	Brown Silty Sand with Gravel, Moist, Medium Dense (SM)	Hard Augering 2.0 fbs to 7.0 fbs
2 - 4	S-2		15 - 19 - 15 - 12	4	34			Low Recovery, Presumed Boulder	Gravel in Spoon Tip
4 - 6	S-3		6 - 4 - 4 - 4	NR	8	5.0		No Recovery, Presumed As Above, Loose (SM)	
6 - 6.6	S-4		11 - 50/1"	3	50/1"	6.5			
7 - 7	S-5		50/2"	--	50/2"	7.0	WR	Gray Weathered Rock, Moist, Very Dense (WR)	
								Boring Log B-6 Terminated at a Depth of 7.0 Feet Below Ground Surface Due to Auger and Spoon Refusal	
						10.0			
						15.0			
						20.0			
						25.0			






NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

 Boring No.: **B-7**

 Page 1 of 1

Project: Proposed School Building Additions & Alterations						WAI Project No.: GJ1916829.000					
Location: Irvington; Town of Greenburgh, Westchester County, NY						Client: Irvington Union Free School District					
Surface Elevation: ± <u>NS</u> feet						Date Started: <u>11/20/2019</u>		Water Depth Elevation (feet bgs) (feet)		Cave-In Depth Elevation (feet bgs) (feet)	
Termination Depth: <u>9.0</u> feet bgs						Date Completed: <u>11/20/2019</u>					
Proposed Location: <u>North Broadway</u>						Logged By: <u>MH</u>		During: <u>NE</u> <u>---</u> ▼			
Drill / Test Method: <u>HSA / SPT /</u> <u>ROCK CORE</u>						Contractor: <u>ETD</u>		At Completion: <u>---</u> <u>---</u> ▼		At Completion: <u>---</u> <u>---</u> ▼	
						Equipment: <u>CME-55</u>		24 Hours: <u>---</u> <u>---</u> ▼		24 Hours: <u>---</u> <u>---</u> ▼	

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
Total Elapsed Cut Time/Cut Time Per Ft.									
				REC	RQD	0.0			
0 - 2	S-1	X	7 - 3 - 5 - 6	18	8	0.6	PAVEMENT		2" Asphalt, 5" Subbase Stone
2 - 4	S-2		5 - 4 - 5 - 5	4	9		FILL		Dark Gray Sandy Silt, Moist (FILL)
4 - 6	S-3		11 - 5 - 6 - 15	8	11	4.0			Low Recovery, Presumed As Above (FILL)
6 - 8	S-4		15 - 15 - 21 - 26	12	36	5.0	GLACIAL DEPOSITS		Brown Silty Sand with Gravel, Moist, Medium Dense (SM)
						7.0			As Above, Dense (SM)
8 - 9	R-1	NQ	6:00	8" 67%	7" 58%	8.0	WR		Gray Weathered Rock, Moist, Dense (WR)
						9.0	ROCK		Gray Schist, Moist, Hard, Slightly Broken, Moderately Weathered (ROCK)
						10.0			Boring Log B-7 Terminated at a Depth of 9.0 Feet Below Ground Surface
						15.0			
						20.0			
						25.0			

RECORD OF SUBSURFACE EXPLORATION

 Boring No.: **B-8**

 Page 1 of 1

Project: Proposed School Building Additions & Alterations						WAI Project No.: GJ1916829.000					
Location: Irvington; Town of Greenburgh, Westchester County, NY						Client: Irvington Union Free School District					
Surface Elevation: ± <u>NS</u> feet						Date Started: <u>11/19/2019</u>		Water Depth Elevation (feet bgs) (feet)		Cave-In Depth Elevation (feet bgs) (feet)	
Termination Depth: <u>9.0</u> feet bgs						Date Completed: <u>11/19/2019</u>					
Proposed Location: <u>North Broadway</u>						Logged By: <u>MH</u>		During: <u>NE</u> <u>---</u> ▼			
Drill / Test Method: <u>HSA / SPT /</u>						Contractor: <u>ETD</u>		At Completion: <u>---</u> <u>---</u> ▼		At Completion: <u>---</u> <u>---</u> ▼	
<u>ROCK CORE</u>						Equipment: <u>CME-55</u>		24 Hours: <u>---</u> <u>---</u> ▼		24 Hours: <u>---</u> <u>---</u> ▼	

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
Total Elapsed Cut Time/Cut Time Per Ft.									
REC									
RQD									
0 - 1.7	s-1	X	3 - 12 - 22 - 50/ 3"	16	34	0.0	TOPSOIL	4" Topsoil	
						0.3	GLACIAL DEPOSITS	Brown Silty Sand, Moist, Dense (SM)	
						1.0			
						5.0		Grinding to 4.0 fbs - Void @ 4.0 fbs to 6.0 fbs (Possible Boulders Piled Up on Each Other)	
						8.0		Grinding on Cobbles/Boulders to 8.0 fbs	
8 - 9	R-1	NQ	7:00	8" 67%	7" 58%	9.0	ROCK	Gray Schist, Moist, Hard, Slightly Broken, Moderately Weathered (ROCK)	
						10.0		Boring Log B-8 Terminated at a Depth of 9.0 Feet Below Ground Surface	
						15.0			
						20.0			
						25.0			

RECORD OF SUBSURFACE EXPLORATION

 Boring No.: **B-9**

 Page 1 of 1

Project: Proposed School Building Additions & Alterations						WAI Project No.: GJ1916829.000					
Location: Irvington; Town of Greenburgh, Westchester County, NY						Client: Irvington Union Free School District					
Surface Elevation: ± <u>NS</u> feet						Date Started: <u>11/21/2019</u>		Water Depth Elevation (feet bgs) (feet)		Cave-In Depth Elevation (feet bgs) (feet)	
Termination Depth: <u>12.0</u> feet bgs						Date Completed: <u>11/21/2019</u>					
Proposed Location: <u>North Broadway</u>						Logged By: <u>MH</u>		During: <u>NE</u> <u>---</u> ▼			
Drill / Test Method: <u>HSA / SPT /</u> <u>ROCK CORE</u>						Contractor: <u>ETD</u>		At Completion: <u>---</u> <u>---</u> ▼		At Completion: <u>---</u> <u>---</u> ▼	
						Equipment: <u>CME-55</u>		24 Hours: <u>---</u> <u>---</u> ▼		24 Hours: <u>---</u> <u>---</u> ▼	






SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
Total Elapsed Cut Time/Cut Time Per Ft.									
REC									
RQD									
						0.0			
0 - 1.1	S-1	X	10 - 10 - 50/ 1"	11	60/7"	0.6	TOPSOIL	7" Topsoil	
							GLACIAL DEPOSITS	Gray to Brown Rock, Moist, Very Dense (Presumed Boulder) Core Barrel Broke Through Presumed Boulder	
						5.0			
6 - 8	S-2	X	4 - 4 - 4 - 4	16	8			Brown Silty Sand, Moist, Loose (SM)	
						10.0			
10 - 11	S-3	X	4 - 11 - 50/0"	12	61/6"	11.0		As Above (SM)	
11 - 12	R-1	NQ	6:00	12"	12"	12.0	ROCK	Gray Schist, Moist, Very Hard, Fresh, Massive (ROCK)	
								Boring Log B-9 Terminated at a Depth of 12.0 Feet Below Ground Surface	
						15.0			
						20.0			
						25.0			

RECORD OF SUBSURFACE EXPLORATION

 Boring No.: **B-19**

 Page 1 of 1

Project: Proposed School Building Additions & Alterations			WAI Project No.: GJ1916829.000		
Location: Irvington; Town of Greenburgh, Westchester County, NY			Client: Irvington Union Free School District		
Surface Elevation: ± <u>NS</u> feet		Date Started: <u>11/21/2019</u>		Water Depth Elevation (feet bgs) (feet)	
Termination Depth: <u>16.0</u> feet bgs		Date Completed: <u>11/21/2019</u>		Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: <u>Dows Lane</u>		Logged By: <u>MH</u>		During: <u>NE</u> <u>---</u> ▼	
Drill / Test Method: <u>HSA / SPT /</u>		Contractor: <u>ETD</u>		At Completion: <u>---</u> <u>---</u> ▼	
<u>ROCK CORE</u>		Equipment: <u>CME-55</u>		24 Hours: <u>---</u> <u>---</u> ▼	

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
Total Elapsed Cut Time/Cut Time Per Ft.			REC	RQD		0.0			
0 - 2	S-1		2 - 2 - 2 - 2	22	4	0.6	TOPSOIL	8" Topsoil	Trace Roots
2 - 4	S-2		2 - 1 - 2 - 1	22	3		GLACIAL DEPOSITS	Brown Sandy Silt, Moist, Loose (ML)	
4 - 6	S-3		3 - 5 - 5 - 5	22	10			As Above (ML)	
6 - 8	S-4		4 - 6 - 6 - 6	22	12			As Above, Medium Dense (ML)	
						10.0			
						13.0			
13 - 15	S-5		5 - 5 - 10 - 12	12	15	15.0			Casing Pounded to 15.0 fbgs
								Brown Silty Sand with Gravel, Moist, Medium Dense (SM)	
15 - 16	R-1	NQ	10:00	6" 50%	6" 50%	9.0	ROCK	Gray Schist, Moist, Hard, Weathered, Hard, Broken (ROCK)	
								Boring Log B-19 Terminated at a Depth of 160.0 Feet Below Ground Surface	
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

 Boring No.: **B-20**

 Page 1 of 2

Project: Proposed School Building Additions & Alterations						WAI Project No.: GJ1916829.000					
Location: Irvington; Town of Greenburgh, Westchester County, NY						Client: Irvington Union Free School District					
Surface Elevation: ± <u>NS</u> feet						Date Started: <u>11/22/2019</u>		Water Depth Elevation (feet bgs) (feet)		Cave-In Depth Elevation (feet bgs) (feet)	
Termination Depth: <u>28.0</u> feet bgs						Date Completed: <u>11/22/2019</u>					
Proposed Location: <u>Dows Lane</u>						Logged By: <u>SEP</u>		During: <u>NE</u> <u>---</u> ▼		At Completion: <u>---</u> <u>---</u> ▼	
Drill / Test Method: <u>MUD ROTARY / SPT</u>						Contractor: <u>ETD</u>		At Completion: <u>---</u> <u>---</u> ▼		At Completion: <u>---</u> <u>---</u> ▼	
						Equipment: <u>CME-55</u>		24 Hours: <u>---</u> <u>---</u> ▼		24 Hours: <u>---</u> <u>---</u> ▼	

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
0 - 2	S-1	X	8 - 8 - 5 - 5	20	13	1.0	FILL	[Cross-hatch pattern]	Brown Silty Sand with Gravel Overlying Apparent 4" Remnant Asphalt Layer, Moist (FILL)
2 - 4	S-2	X	10 - 10 - 12 - 16	16	22		GLACIAL DEPOSITS	[Vertical lines pattern]	Brown Silt with Fine Sand, Moist, Stiff (ML)
4 - 6	S-3	X	16 - 19 - 17 - 22	12	36	5.0			As Above (ML)
6 - 8	S-4	X	16 - 15 - 28 - 37	14	43				Yellowish-Brown Silty Sand with Coarse to Fine Gravel, Moist, Medium Dense (SM)
									As Above (SM)
						10.0			As Above, Higher Gravel Content (SM)
10.5 - 12.5	S-5	X	14 - 16 - 27 - 29	10	43				As Above, Less Gravel Content (SM)
						15.0			
18 - 20	S-6	X	18 - 24 - 21 - 25	NR	45	20.0			No Recovery, Presumed As Above (SM)
23 - 24.8	S-7	X	19 - 63 - 49 - 50/3"	8	112	25.0			As Above, Rounded/Subrounded Gravel, Very Dense (SM)


NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

 Boring No.: **B-20**

 Page 2 of 2

Project: Proposed School Building Additions & Alterations						WAI Project No.: GJ1916829.000								
Location: Irvington; Town of Greenburgh, Westchester County, NY						Client: Irvington Union Free School District								
Surface Elevation: ± <u>NS</u> feet						Date Started: <u>11/22/2019</u>			Water Depth Elevation (feet bgs) (feet)			Cave-In Depth Elevation (feet bgs) (feet)		
Termination Depth: <u>28.0</u> feet bgs						Date Completed: <u>11/22/2019</u>								
Proposed Location: <u>Dows Lane</u>						Logged By: <u>SEP</u>			During: <u>NE</u> <u>---</u> ▼					
Drill / Test Method: <u>MUD ROTARY / SPT</u>						Contractor: <u>ETD</u>			At Completion: <u>---</u> <u>---</u> ▼			At Completion: <u>---</u> <u>---</u> ▼		
						Equipment: <u>CME-55</u>			24 Hours: <u>---</u> <u>---</u> ▼			24 Hours: <u>---</u> <u>---</u> ▼		

SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
						25.0	GLACIAL DEPOSITS		Yellowish-Brown Silty Sand with Coarse to Fine Rounded/Subrounded Gravel, Moist (SM)	
						28.0				
									Boring Log B-20 Terminated at a Depth of 28.0 Feet Below Ground Surface	
						30.0				
						35.0				
						40.0				
						45.0				
						50.0				

RECORD OF SUBSURFACE EXPLORATION

 Boring No.: **B-21**

 Page 1 of 1

Project: Proposed School Building Additions & Alterations			WAI Project No.: GJ1916829.000		
Location: Irvington; Town of Greenburgh, Westchester County, NY			Client: Irvington Union Free School District		
Surface Elevation: ± <u>NS</u> feet		Date Started: <u>1/9/2020</u>		Water Depth Elevation (feet bgs) (feet)	
Termination Depth: <u>3.0</u> feet bgs		Date Completed: <u>1/9/2020</u>		Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: <u>Dows Lane</u>		Logged By: <u>MH</u>		During: <u>NE</u> <u>---</u> ▼	
Drill / Test Method: <u>HSA / SPT</u>		Contractor: <u>PR</u>		At Completion: <u>---</u> <u>---</u> ▼	
		Equipment: <u>Geoprobe</u>		24 Hours: <u>---</u> <u>---</u> ▼	
				At Completion: <u>---</u> <u>---</u> ▼	
				24 Hours: <u>---</u> <u>---</u> ▼	

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
						0.5	PAVEMENT	3" Asphalt, 3" Subbase Stone	
							GLACIAL DEPOSITS		
1 - 3	S-1	X	5 - 5 - 6 - 5	18	11	3.0		Brown Sandy Silt, Moist, Medium Dense (ML)	
								Boring Log B-21 Terminated at a Depth of 3.0 Feet Below Ground Surface	
						5.0			
						10.0			
						15.0			
						20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

 Boring No.: **B-22**

 Page 1 of 1

Project: Proposed School Building Additions & Alterations			WAI Project No.: GJ1916829.000		
Location: Irvington; Town of Greenburgh, Westchester County, NY			Client: Irvington Union Free School District		
Surface Elevation: ± <u>NS</u> feet		Date Started: <u>1/9/2020</u>		Water Depth Elevation (feet bgs) (feet)	
Termination Depth: <u>3.0</u> feet bgs		Date Completed: <u>1/9/2020</u>		Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: <u>Dows Lane</u>		Logged By: <u>MH</u>		During: <u>NE</u> <u>---</u> ▼	
Drill / Test Method: <u>HSA / SPT</u>		Contractor: <u>PR</u>		At Completion: <u>---</u> <u>---</u> ▼	
		Equipment: <u>Geoprobe</u>		24 Hours: <u>---</u> <u>---</u> ▼	
				At Completion: <u>---</u> <u>---</u> ▼	
				24 Hours: <u>---</u> <u>---</u> ▼	

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
						0.5	PAVEMENT	3.25" Asphalt, 3" Subbase Stone	
							FILL		
1 - 3	S-1	X	11 - 6 - 6 - 8	16	12	3.0		Reddish-Brown Silty Sand, Moist (FILL)	
								Boring Log B-22 Terminated at a Depth of 3.0 Feet Below Ground Surface	
						5.0			
						10.0			
						15.0			
						20.0			
						25.0			








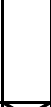
NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

 Boring No.: **B-23**

 Page 1 of 1

Project: Proposed School Building Additions & Alterations						WAI Project No.: GJ1916829.000					
Location: Irvington; Town of Greenburgh, Westchester County, NY						Client: Irvington Union Free School District					
Surface Elevation: ± NS feet						Date Started: 11/22/2019		Water Depth Elevation (feet bgs) (feet)		Cave-In Depth Elevation (feet bgs) (feet)	
Termination Depth: 23.1 feet bgs						Date Completed: 11/22/2019					
Proposed Location: Main Street						Logged By: SEP		During: NE --- ▽		At Completion: --- --- ▽	
Drill / Test Method: MUD ROTARY / SPT						Contractor: ETD		At Completion: --- --- ▽		At Completion: --- --- ▽	
						Equipment: CME-55		24 Hours: --- --- ▽		24 Hours: --- --- ▽	

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0	TOPSOIL	 4" Topsoil, Grass Mat Root	
0 - 2	S-1		2 - 2 - 2 - 3	18	4	0.3	GLACIAL DEPOSITS	Yellowish-Brown Silt with Sand, Trace Coarse to Fine Gravel, Moist, Medium Stiff (ML)	
2 - 4	S-2		4 - 3 - 2 - 4	16	5	4.0		As Above (ML)	
4 - 6	S-3		2 - 2 - 2 - 2	18	4	5.0		Pale Brown Silt and Very Fine Sand, Moist, Medium Stiff (ML)	
6 - 8	S-4		2 - 2 - 4 - 3	18	6	8.0		As Above, Fine Light Gray Mottles (ML)	
						10.0			Occasional Roller Bit Crunching on Gravel/Cobbles 8.0 fbg to 18.0 fbg
13 - 15	S-5		9 - 12 - 10 - 9	6	22	13.0		Yellowish-Brown Silty Sand with Coarse to Fine Gravel, Moist, Medium Dense (SM)	
						15.0			
18 - 20	S-6		15 - 18 - 12 - 12	10	30	18.0		Very Pale Grayish-Brown Poorly Graded Fine Sand with Silt, Moist, Dense (SP-SM)	
						20.0			
						22.0	WEATHERED ROCK	Weathered Rock (WR)	Sudden, Hard Roller Bit Advancement 22.0 fbg to 23.0 fbg
23 - 23.1	S-7		50/1"	1	50/1"	23.1		Boring Log B-23 Terminated at a Depth of 23.1 Feet Below Ground Surface Due to Roller Bit and Split Spoon Sampler Refusal	
						25.0			

RECORD OF SUBSURFACE EXPLORATION

 Boring No.: **B-24**

 Page 1 of 1

Project: Proposed School Building Additions & Alterations			WAI Project No.: GJ1916829.000		
Location: Irvington; Town of Greenburgh, Westchester County, NY			Client: Irvington Union Free School District		
Surface Elevation: ± <u>NS</u> feet		Date Started: <u>11/22/2019</u>		Water Depth Elevation (feet bgs) (feet)	
Termination Depth: <u>17.5</u> feet bgs		Date Completed: <u>11/22/2019</u>		Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: <u>Main Street</u>		Logged By: <u>SEP</u>		During: <u>NE</u> <u>---</u> ▼	
Drill / Test Method: <u>MUD ROTARY / SPT</u>		Contractor: <u>ETD</u>		At Completion: <u>---</u> <u>---</u> ▼	
		Equipment: <u>CME-55</u>		24 Hours: <u>---</u> <u>---</u> ▼	
				At Completion: <u>---</u> <u>---</u> ▼	
				24 Hours: <u>---</u> <u>---</u> ▼	

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0	TOPSOIL	4" Topsoil, Grass Mat Root	
0 - 2	S-1		2 - 2 - 2 - 1	2	4	0.3	FILL	No Recovery Except Topsoil, Presumed As Below (FILL)	
2 - 4	S-2		1 - 2 - 2 - 2	2	4			Gray Silty Sand with Coarse to Fine Gray Angular Gravel, Moist (FILL)	
4 - 6	S-3		3 - 3 - 3 - 2	6	6	5.0	PROBABLE FILL	Yellowish-Brown Silty Sand with Coarse to Fine Gravel, Very Moist (Probable FILL)	Structureless Saturated
6 - 8	S-4		1 - 2 - 2 - 2	4	4			As Above (Probable FILL)	Structureless Saturated
13 - 15	S-5		2 - 3 - 2 - 2	6	5	13.0	GLACIAL DEPOSITS	Yellowish-Brown Silty Sand with Coarse to Fine Gravel, Moist, Loose (SM)	Definitive Structure
						16.5	WEATHERED ROCK	Weathered Rock (WR)	Sudden Hard Roller Bit Advancement 16.5 fbgs to 17.5 fbgs
17.5 - 17.5	S-6		50/0"	NR	50/0"	17.5		Boring Log B-24 Terminated at a Depth of 17.5 Feet Below Ground Surface Due to Roller Bit and Split Spoon Sampler Refusal	

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

 Boring No.: **B-26**

 Page 1 of 1

Project: Proposed School Building Additions & Alterations			WAI Project No.: GJ1916829.000		
Location: Irvington; Town of Greenburgh, Westchester County, NY			Client: Irvington Union Free School District		
Surface Elevation: ± <u>NS</u> feet		Date Started: <u>1/9/2020</u>		Water Depth Elevation (feet bgs) (feet)	
Termination Depth: <u>3.0</u> feet bgs		Date Completed: <u>1/9/2020</u>		Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: <u>Main Street</u>		Logged By: <u>MH</u>		During: <u>NE</u> <u>---</u> ▼	
Drill / Test Method: <u>HSA / SPT</u>		Contractor: <u>PR</u>		At Completion: <u>---</u> <u>---</u> ▼	
		Equipment: <u>Geoprobe</u>		24 Hours: <u>---</u> <u>---</u> ▼	
				At Completion: <u>---</u> <u>---</u> ▼	
				24 Hours: <u>---</u> <u>---</u> ▼	

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0			
						0.3	PAVEMENT	2" Asphalt, 4" Subbase Stone	
							GLACIAL DEPOSITS		
1 - 3	S-1	X	8 - 10 - 7 - 11	20	17	3.0		Brown Silty Sand with Gravel, Moist, Medium Dense (SM)	Micaceous Sand
						5.0			
						10.0			
						15.0			
						20.0			
						25.0			
								Boring Log B-26 Terminated at a Depth of 3.0 Feet Below Ground Surface	

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

 Boring No.: **B-27**

 Page 1 of 1

Project: Proposed School Building Additions & Alterations			WAI Project No.: GJ1916829.000		
Location: Irvington; Town of Greenburgh, Westchester County, NY			Client: Irvington Union Free School District		
Surface Elevation: ± <u>NS</u> feet		Date Started: <u>1/9/2020</u>		Water Depth Elevation (feet bgs) (feet)	
Termination Depth: <u>3.0</u> feet bgs		Date Completed: <u>1/9/2020</u>		Cave-In Depth Elevation (feet bgs) (feet)	
Proposed Location: <u>Main Street</u>		Logged By: <u>MH</u>		During: <u>NE</u> <u>---</u> ▼	
Drill / Test Method: <u>HSA / SPT</u>		Contractor: <u>PR</u>		At Completion: <u>---</u> <u>---</u> ▼	
		Equipment: <u>Geoprobe</u>		24 Hours: <u>---</u> <u>---</u> ▼	
				At Completion: <u>---</u> <u>---</u> ▼	
				24 Hours: <u>---</u> <u>---</u> ▼	

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0	PAVEMENT	2" Asphalt, 2" Subbase Stone	
						0.4	GLACIAL DEPOSITS		
1 - 3	S-1	X	8 - 8 - 6 - 9	18	19	3.0		Brown Silty Sand, Moist, Medium Dense (SM)	Micaceous Sand
						5.0			
						10.0			
						15.0			
						20.0			
						25.0			
								Boring Log B-27 Terminated at a Depth of 3.0 Feet Below Ground Surface	

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched



APPENDIX B

Laboratory Test Results

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.2	4.1	15.8	26.3	51.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	97.8		
#10	93.7		
#20	87.5		
#40	77.9		
#60	69.0		
#140	55.4		
#200	51.6		

* (no specification provided)

Material Description

Sandy Silt

Atterberg Limits

PL= NP

LL= NP

PI= NP

Coefficients

D₉₀= 1.1092

D₈₅= 0.6869

D₆₀= 0.1462

D₅₀=

D₃₀=

D₁₅=

D₁₀=

C_u=

C_c=

Classification

USCS= ML

AASHTO= A-4(0)

Remarks

W_n = 14.5 %

Source of Sample: B-4
Sample Number: S-3

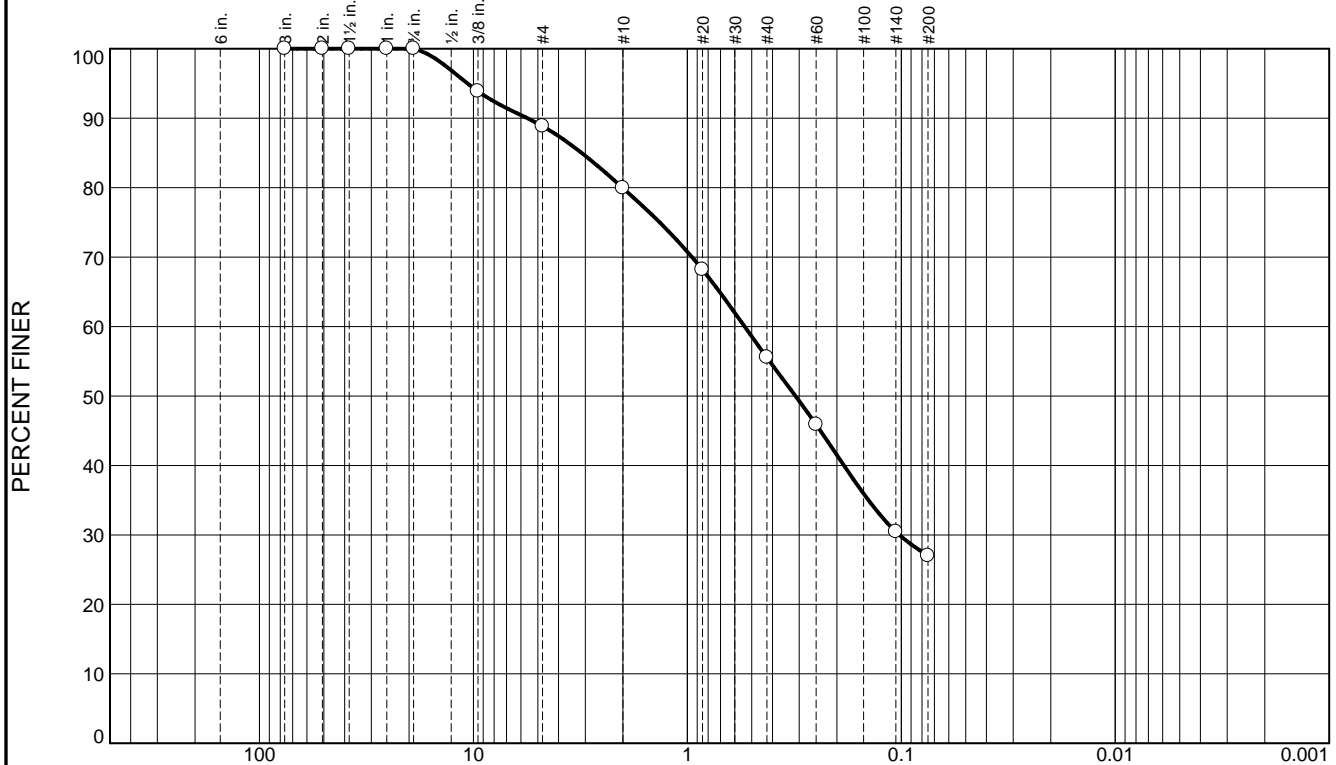
Depth: 4.0' - 6.0'

Date: 12/09/2019

**WHITESTONE
ASSOCIATES, INC.
Warren, New Jersey**

Client: Irvington Union Free School District
Project: Proposed School Building Additions & Alterations
40 N Broadway, 101 Main St, and Six Dows Ln, Irvington, NY
Project No: GJ1916829.000
Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	11.2	8.9	24.4	28.5	27.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	93.9		
#4	88.8		
#10	79.9		
#20	68.2		
#40	55.5		
#60	45.9		
#140	30.4		
#200	27.0		

* (no specification provided)

<u>Material Description</u>		
Silty Sand		
<u>Atterberg Limits</u>		
PL= NP	LL= NP	PI= NP
<u>Coefficients</u>		
D ₉₀ = 5.6029	D ₈₅ = 3.1226	D ₆₀ = 0.5397
D ₅₀ = 0.3124	D ₃₀ = 0.1022	D ₁₅ =
D ₁₀ =	C _u =	C _c =
<u>Classification</u>		
USCS= SM	AASHTO= A-2-4(0)	
<u>Remarks</u>		
W _n = 17.4 %		

Source of Sample: B-9
Sample Number: S-2

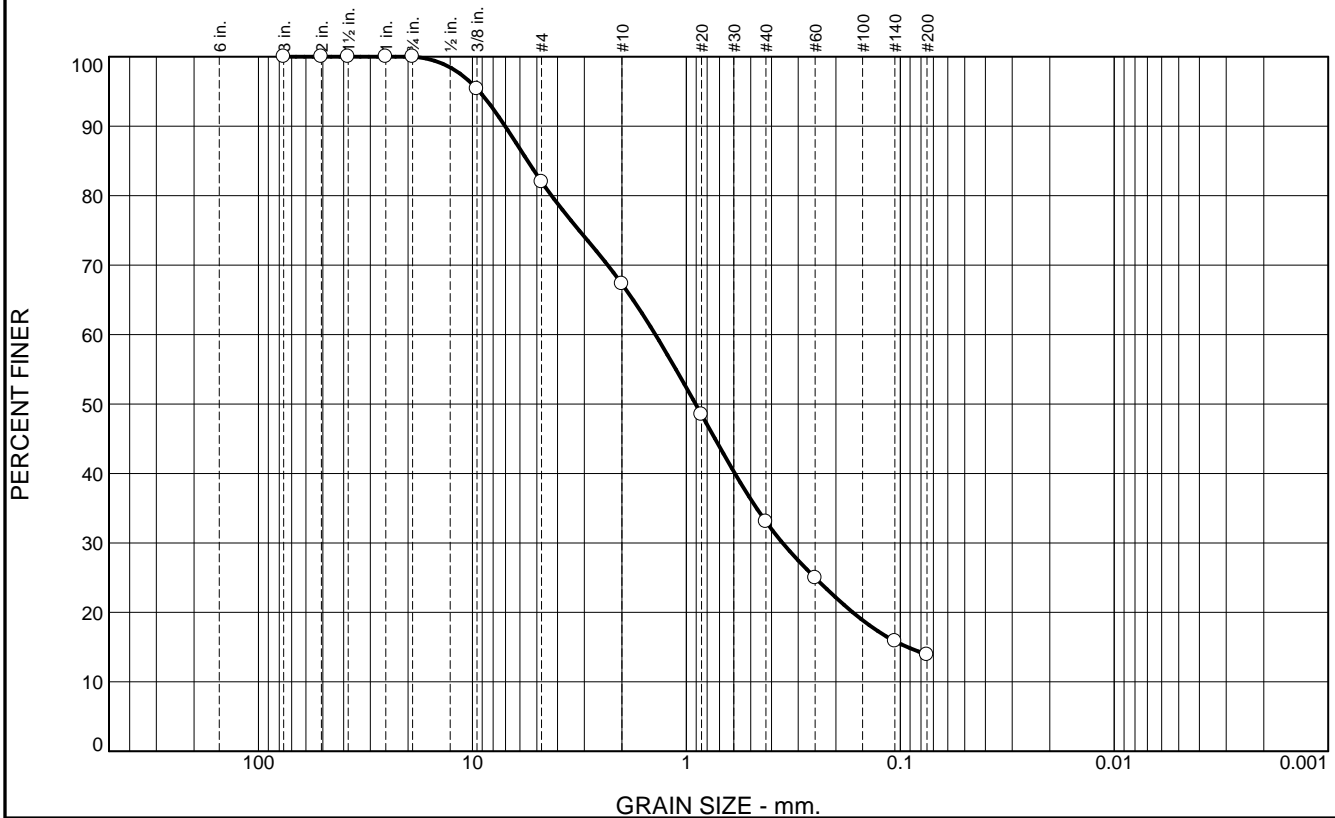
Depth: 6.0' - 8.0'

Date: 12/09/2019

**WHITESTONE
ASSOCIATES, INC.
Warren, New Jersey**

Client: Irvington Union Free School District
Project: Proposed School Building Additions & Alterations
40 N Broadway, 101 Main St, and Six Dows Ln, Irvington, NY
Project No: GJ1916829.000
Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	18.0	14.7	34.2	19.2	13.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	95.4		
#4	82.0		
#10	67.3		
#20	48.5		
#40	33.1		
#60	25.0		
#140	15.8		
#200	13.9		

* (no specification provided)

Material Description

Silty Sand with Gravel

Atterberg Limits

PL= NP

LL= NP

PI= NP

Coefficients

D₉₀= 7.0304

D₈₅= 5.5207

D₆₀= 1.3969

D₅₀= 0.9059

D₃₀= 0.3551

D₁₅= 0.0926

D₁₀=

C_u=

C_c=

Classification

USCS= SM

AASHTO= A-1-b

Remarks

W_n = 3.0 %

Source of Sample: B-20
Sample Number: S-4

Depth: 6.0' - 8.0'

Date: 12/09/2019

**WHITESTONE
ASSOCIATES, INC.
Warren, New Jersey**

Client: Irvington Union Free School District
Project: Proposed School Building Additions & Alterations
40 N Broadway, 101 Main St, and Six Dows Ln, Irvington, NY
Project No: GJ1916829.000
Figure

APPENDIX C

Supplemental Information (USCS, Terms & Symbols)

UNIFIED SOIL CLASSIFICATION SYSTEM

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION <u>RETAINED</u> ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		CLEAN SAND (LITTLE OR NO FINES)	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
	MORE THAN 50% OF MATERIAL IS <u>LARGER</u> THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GC
MORE THAN 50% OF COARSE FRACTION <u>PASSING</u> NO. 4 SIEVE			SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SM	SILTY SANDS, SAND-SILT MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMITS <u>LESS</u> THAN 50	SC	CLAYEY SANDS, SAND-CLAY MIXTURES
	SILTS AND CLAYS	LIQUID LIMITS <u>GREATER</u> THAN 50	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
MORE THAN 50% OF MATERIAL IS <u>SMALLER</u> THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS		OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
		CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	
	HIGHLY ORGANIC SOILS		OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS FOR SAMPLES WITH 5% TO 12% FINES

GRADATION*

% FINER BY WEIGHT

TRACE..... 1% TO 10%
LITTLE..... 10% TO 20%
SOME..... 20% TO 35%
AND..... 35% TO 50%

COMPACTNESS*

Sand and/or Gravel

RELATIVE DENSITY

LOOSE..... 0% TO 40%
MEDIUM DENSE.... 40% TO 70%
DENSE..... 70% TO 90%
VERY DENSE..... 90% TO 100%

CONSISTENCY*

Clay and/or Silt

RANGE OF SHEARING STRENGTH IN POUNDS PER SQUARE FOOT

VERY SOFT..... LESS THAN 250
SOFT..... 250 TO 500
MEDIUM..... 500 TO 1000
STIFF..... 1000 TO 2000
VERY STIFF..... 2000 TO 4000
HARD..... GREATER THAN 4000

* VALUES ARE FROM LABORATORY OR FIELD TEST DATA, WHERE APPLICABLE.
WHEN NO TESTING WAS PERFORMED, VALUES ARE ESTIMATED.

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Other Office Locations:

CHALFONT, PA
215.712.2700

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ROCKY HILL, CT
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703.464.5858

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GEOTECHNICAL TERMS AND SYMBOLS

SAMPLE IDENTIFICATION

The Unified Soil Classification System is used to identify the soil unless otherwise noted.

SOIL PROPERTY SYMBOLS

- N: Standard Penetration Value: Blows per ft. of a 140 lb. hammer falling 30" on a 2" O.D. split-spoon.
 Qu: Unconfined compressive strength, TSF.
 Qp: Penetrometer value, unconfined compressive strength, TSF.
 Mc: Moisture content, %.
 LL: Liquid limit, %.
 PI: Plasticity index, %.
 δd: Natural dry density, PCF.
 ▽: Apparent groundwater level at time noted after completion of boring.

DRILLING AND SAMPLING SYMBOLS

- NE: Not Encountered (Groundwater was not encountered).
 SS: Split-Spoon - 1 3/8" I.D., 2" O.D., except where noted.
 ST: Shelby Tube - 3" O.D., except where noted.
 AU: Auger Sample.
 OB: Diamond Bit.
 CB: Carbide Bit
 WS: Washed Sample.

RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION

<u>Term (Non-Cohesive Soils)</u>	<u>Standard Penetration Resistance</u>
Very Loose	0-4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	Over 50

<u>Term (Cohesive Soils)</u>	<u>Qu (TSF)</u>
Very Soft	0 - 0.25
Soft	0.25 - 0.50
Firm (Medium)	0.50 - 1.00
Stiff	1.00 - 2.00
Very Stiff	2.00 - 4.00
Hard	4.00+

PARTICLE SIZE

Boulders	8 in.+	Coarse Sand	5mm-0.6mm	Silt	0.074mm-0.005mm
Cobbles	8 in.-3 in.	Medium Sand	0.6mm-0.2mm	Clay	-0.005mm
Gravel	3 in.-5mm	Fine Sand	0.2mm-0.074mm		

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