

SECTION 02070
SELECTIVE REMOVALS & DEMOLITION

PART 1 - GENERAL**1.01 DESCRIPTION OF WORK****A. Extent of Work**

Removal and demolition of selected items from selected areas of the building as indicated on the Drawings.

B. Recycling and disposal of non-hazardous waste shall be performed in accordance with Section S01524 - Construction Waste Management.**1.02 SUSTAINABILITY REQUIREMENTS****A. Sustainability requirements included in the Section are as follows:**

1. Demolition waste management.
2. Management of dust and particulate matter.

1.03 SUBMITTALS**A. Shop Drawings**

For that part of the Work that is not considered minor alterations or ordinary repairs, submit shop drawings and associated calculations. Demolition drawings and sequencing shall be signed and sealed by a Professional Engineer licensed in the State of New York and Design Drawings of such shall be filed with the Building Department.

B. Schedule

Submit a schedule indicating proposed methods and sequence of operations for selective removals and demolition Work, prior to commencement of operations. The sequence of operations shall be planned, in detail, to ensure uninterrupted progress of school sessions.

C. Submit details and procedures for dust and noise control.**D. Quality Control Submittals**

1. Contractor Qualifications

- a. Provide proof of Contractor and Professional Engineer qualifications specified under "Quality Assurance".
- b. Provide proof of Refrigerant Recovery Technician qualifications

D. Sustainability Submittals

1. Refer to Section S01524 Construction Waste Management for list of managed materials and submittal requirements.
2. Statement of the measures taken to reduce air with dust and particulate matter.

1.04 RESPONSIBILITY, PROTECTION, DAMAGES, RESTRICTIONS

A. Condition of Space

The Authority assumes no responsibility for actual condition of the space in which removals and demolition Work is performed.

B. Protections

Provide temporary barricades and other forms of protection required to protect Authority and Department of Education property, personnel, students and general public from injury due to selective removals and demolition work.

1. Provide protective measures as required to provide free and safe passage of students, Authority personnel, Department of Education personnel, and the general public.
2. Protect from damage existing finish work that is to remain in place and which becomes exposed during operations.
3. Protect floors with building paper or other suitable covering.

C. Damages

Promptly repair any and all damages to all property and finishes caused by the removals and demolition work; to the Authority's satisfaction and at no extra cost to the Authority.

D. Explosives

The use of explosives is prohibited.

E. Power-driven Tools (for interior removals and demolition).

Only hand-held electric power-driven tools conforming to the following criteria shall be used to cut or drill concrete and masonry:

1. Electric Chiselling Hammer

- a. Power Data 115 Volts AC
7-8 Amps
Three-wire grounded connection
- b. Percussion 2400-2600 Impacts/Minute
- c. Type/Size Hand-held (+ 18-inch length)
- d. Unit Weight 12-15 pounds (minus chisel bit)

2. Electric Hammer Drill

- a. Power Data 115 Volts AC
5-8 Amps
Three-wire grounded connection
- b. Percussion 2400-3200 Impacts/Minute
- c. Type/Size Hand-held (+ 18-inch length)
- d. Unit Weight 12-15 pounds (minus chisel bit)
- e. Speed Data 0-0500 RPM (Under load)

1.05 QUALITY ASSURANCE

A. Qualifications

- 1. Company specializing in performing the Work of this Section shall have a minimum of 3 years experience and shall have worked on 3 projects of similar size.
- 2. Preparation of details of demolition of items not constituting minor alterations or ordinary repairs shall be under the direct supervision of and bear the seal of a Licensed Professional Engineer of the State of New York experienced in the design of such work, who shall also be responsible for construction supervision of such.

B. Regulatory Requirements

1. Work of this Section shall conform to all requirements of the NYC Building Code and all applicable regulations and guidelines of all governmental authorities having jurisdiction, including, but not limited to, safety, health, and anti-pollution regulations. Where more stringent requirements than those contained in the Building Code or other applicable regulations are given in this Section, the requirements of this Section shall govern.
2. Conform to the requirements of "Safety and Health Standards, Subpart P - Excavations, Trenching and Shoring" - OSHA.

PART 2 - PRODUCTS - NOT APPLICABLE**PART 3 - EXECUTION****3.01 INSPECTION**

- A. Prior to commencement of the selective removals and demolition Work, inspect the areas in which the Work will be performed. Determine and list the existing conditions of rooms or area surfaces and equipment. After the Work in each respective area is completed, determine if adjacent surfaces or equipment have been damaged as a result of the Work; if so, the damage shall be corrected at the Contractor's expense.
- B. Create a safety zone around the demolition area as per Section BC 3306.2.1 of the 2014 NYC Building Code. Fences/barriers shall be erected to prevent persons other than workers from entering.

3.02 REMOVALS AND DEMOLITION WORK

- A. The Contractor shall engage the services of a third party Registered Professional Engineer (not a direct employee) to prepare the details and sequencing of the demolition, complying with all items included in Section BC 3306.5, for that part of the Work that does not constitute a minor alteration or ordinary repair (Refer to Section §28-105.4.2 of the NYC Administrative Code for the items that do not constitute minor alterations or ordinary repairs i.e. items that affect structural, fire or health safety). The Contractor's Engineer shall file Form PW-1 with the Building Department, thereby becoming the Engineer of Record for such demolition work. These submittal

documents must be kept at the site as per Section BC 3306.5.2.

- B. Perform selective demolition Work in a systematic manner and use such methods as are required to complete the Work indicated, and in accordance with the Specifications and governing City, State, and Federal regulations.
- C. When walls, partitions, floors, and ceilings (or portions thereof) are indicated to be removed; unless indicated otherwise:
 - 1. Remove all items attached to the surfaces of the construction to be removed.
 - 2. Remove all plumbing piping, fixtures, accessories and rough-in occurring on or in the construction to be removed; cap piping and/or re-route lines as indicated or required.
 - 3. Remove all connectors, piping, ductwork and other HVAC items and accessories occurring on or in the construction to be removed; cap and/or re-route piping and ductwork as indicated or required.
 - 4. Remove all electrical wiring, to include, but not limited to, lighting, communications, alarms and all related appurtenances, conduits, devices, fixtures, and other electrical items and accessories occurring on or in the construction to be removed; disconnect power and remove wiring and conduit back to source.

3.03 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove debris, rubbish and other materials resulting from the removals and demolitions from the building immediately; transport and legally dispose of materials off-site. Disposal method shall be in accordance with City, State, and Federal regulations. Items to be retained by the Department of Education shall be delivered to locations indicated in the Article titled "Ownership of Materials".
- B. Burning of removed materials is not permitted on the job site.

3.04 CLEAN-UP AND REPAIR

- A. Upon completion of removals and demolition Work, remove tools, equipment and all remaining demolished materials from the site.

- B. Repair all damaged areas caused by the removals and demolition Work. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.
- C. All areas in which Work was performed under this Section shall be left "broom-clean."

3.05 OWNERSHIP OF MATERIALS

- A. All equipment, materials, and items removed shall remain the property of the Department of Education, if desired; equipment, material and items not desired to be re-used or retained by the Authority and the Department of Education shall be removed from the site by the Contractor. The Authority's Representative will designate which equipment, materials and items will be retained.

END OF SECTION

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LIST OF SUBMITTALS

<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>
Shop Drawings: for work not Considered minor alterations or Ordinary Repairs	_____	_____
Schedule:		
1. Schedule of proposed Methods		
2. Sequence of operations:	_____	_____
Details & procedures for dust & noise control:	_____	_____
Receipt for salvaged items:	_____	_____
Qualifications:	_____	_____
1. Contractor		
2. Professional Engineer		
Sustainability:	_____	_____
1. Demolition waste calculations.		
2. Air with dust and particulate matter reduction statement.		

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SECTION 02081
ASBESTOS ABATEMENT

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Remove all asbestos-containing materials (ACM) that will be impacted by the proposed renovation and at all areas that will be affected or impacted by the work in this Contract. All asbestos material is to be disposed of as ACM waste. The Asbestos Contractor shall provide all plant, labor, equipment and materials complete for performance of the Work in accordance with the Contract Documents.

1. Any materials not listed or addressed in the table in Part 4 of this Specification Section must be assumed to be asbestos-containing materials. The Contractor shall notify the Project Officer immediately if any materials that are not listed are encountered, who will then notify the Authority's Industrial Hygienist and Environmental Consultant. Work shall cease immediately and the work area vacated. Bulk sampling of this material will be conducted by the Authority's Environmental Consultant. Work shall not commence until the results of the bulk sample analysis has been provided in writing by the Authority's representative indicating that the material is non-asbestos. If bulk sampling indicates that the material is asbestos-containing, the Authority's Industrial Hygienist will provide procedures for the abatement of this material. This Work will be paid through a change order to the Contract. The change order will only address the difference between removing the material as asbestos containing and removing the material as non-asbestos containing.

2. Should the Contractor proceed to work without notifying the Authority of these untested materials encountered or other discrepancies, this will result in the Contractor being invoiced for the cost of the resulting environmental clean-up of the school and other associated costs, including, but not limited to, the relocation of students,

disposal and replacement of contaminated perishable items and non-perishable items such as books, computers, rugs, etc. The Authority reserves the right to utilize any of its certified "Requirements" Asbestos Contractors to conduct any such clean-up in an effort to provide a safe environment for the students and teachers.

- B. Material indicated by the table in Part 4 of this Section as ACM or assumed to be asbestos containing shall be treated and handled in accordance with this section. The Contractor may only remove assumed ACM as non-ACM if written approval has been received by the Authority indicating that the material is non-Asbestos.
 - 1. For bidding purposes only, the removal of material indicated by the table as assumed ACM shall be priced as if the material were ACM. If the assumed ACM is confirmed to be non-ACM, a credit change order shall be provided utilizing the Authority's change order process.
 - 2. The Contractor shall schedule the removal of all assumed ACM indicated in Part 4 of this Section as if it were ACM to meet the Contract duration. Neither time extensions nor acceleration will be granted in any instances where assumed ACM is determined to be ACM.
- C. The asbestos abatement contractor shall not proceed with asbestos abatement work in areas until the electrical contractor or GC provides an electrician with an Asbestos Handlers license to be in the work area to ensure that safe conditions are in place.
- D. The abatement contractor shall have its supervisors hold and document a pre-abatement safety tool-box meeting, with project monitors, the Project Officer or his/her designee, and the GC to review safe work practices and emergency communication program for the project. The abatement contractor's supervisor and the Authority's Environmental Consultant's project monitor shall also ensure proper fire extinguishing equipment is present, a competent person is knowledgeable in the use of fire extinguishing equipment, and emergency exit plans and phone numbers are posted in the immediate vicinity of work areas.

- E. The Authority's environmental consultant will sample all materials identified as assumed ACM in Part 4 of section 02081. The Contractor shall provide access to the consultant to perform the testing and no additional costs will be paid by the Authority for the time it takes to perform the testing. The Authority shall receive a credit change order for any materials that are identified as non-ACM through bulk sample analysis. This credit change order shall be calculated by the Authority's Change Order Unit utilizing current market rates and work procedures outlined in section 02081.
- F. Perform the following abatement Work:
1. Pipe/ Pipe Joint Insulation
 - a. Remove asbestos-containing Thermal System Insulation in selected areas in the school.
 - b. Method #1: Remove asbestos-containing materials using full containment procedures (large projects) as described in this specification. The Contractor shall field verify amount of ACM in the School before the submission of their bid.
 - c. Method #2: Remove asbestos-containing material using Tent Procedures".
 2. Replacement of Thermal System Insulation
 - a. The Contractor shall be responsible for installing thermal insulation on all pipes, ducts, tanks, boilers or other equipment that are to remain in the work area and from which thermal insulation was removed.
 - b. Replacement thermal insulation shall be approved by the Authority, and shall be new and asbestos-free materials.
 - c. Replacement thermal insulation shall be installed in accordance with the terms and conditions of the following NYCSCA Standard Specification Sections within Division 15 - Mechanical:

- 1) 15413 - Insulation (P&D)
 - 2) 15512 - Piping Insulation (HVAC)
 - 3) 15513 - Equipment Insulation (HVAC)
 - 4) 15514 - Ductwork Insulation
- d. Exposed thermal insulation edges that exist at the termination of asbestos abatement activities shall be sealed airtight with a wettable cloth or equivalent. An appropriate sealing compound shall be applied over the dry cloth to cover to create an airtight seal and to smooth rough edges.
 - e. Installation of replacement thermal insulation shall be performed following the conclusion of asbestos abatement activities, associated new work, if any, or at the direction of the Authority.
 - f. Following completion of replacement thermal insulation installation, a final completion walk-through inspection shall be conducted by the Contractor supervisor, NYCSCA representative and school custodial staff to evaluate the thermal insulation replacement.
3. Built-up Roof and Flashing Removal:
 - a. Remove asbestos-containing built-up roofing and flashing located on the roof as described in this Specification.
4. Procedures for installation of electrical conduits, risers and power source equipment.
 - a. Complete penetrations through ceilings and floors, shall be done using the procedures hereinafter identified as Method One. (The quantity of ACM that may be impacted will be determined by the contractor's routing. The contractor will be responsible for the total removal cost)

- b. Drilling completely through walls and to install fastening devices, carriers, supports, floor outlets, cabinets, and other related equipment and devices and complete penetrations of vertical surfaces, shall be done in accordance with the procedures hereinafter identified Method Two.
- 4. See Section 3.06 for additional items for an elevated containment.
- G. The Contractor shall field verify the amount of ACM and familiarize himself in all variable field conditions in the school in the School before the submission of their bid.
- H. ACM shall be properly handled, packaged, and transported for disposal in an asbestos-only landfill.
- I. All work shall be accomplished in strict adherence to the project Specification and Drawings, applicable Federal, State, and Local Regulations. Whenever there is a conflict or overlap of the above references, the more stringent provision shall apply.
- J. The Contractor's industrial hygiene practices during asbestos abatement will be monitored by the Authority's Environmental Consultant. The Contractor shall be responsible for monitoring his own construction safety work practices for compliance with the OSHA regulations.
- K. The Asbestos Contractor shall provide the best available technology, and state-of-the-art procedures and methods of execution, clean-up, disposal, and safety.
- L. The Contractor will be required to obtain at his own expense appropriate variances from regulatory agencies as required to complete the safe removal of asbestos containing material as described in this specification. An approved variance, except for a variance from subdivision § 1-22 (b) of Title 15, Chapter 1 of the Rules of the City of New York (15RCNY), is valid for a period of six months from the start date. An application to renew an existing variance must be submitted to DEP two weeks prior to the expiration date of the variance.

- M. All moveable items such as furniture, cabinets, etc. within the work areas shall be relocated by the Contractor prior to initiating abatement activities.
- N. The abatement contractor will be responsible for any damage to the school and neighboring properties. This includes, but is not limited to damage to building components, vehicles, etc.
- O. An asbestos work permit authorizing the performance of construction work shall be required for asbestos projects involving one or more of the following:
 - 1. Obstruction of an exit door leading to an exit stair or the exterior of the building;
 - 2. Obstruction of an exterior fire escape or access to that fire escape;
 - 3. Obstruction of a fire-rated corridor leading to an Exit door;
 - 4. Removal of handrails in an exit stair or ramp within the work area;
 - 5. Removal or dismantling of any fire alarm system component including any fire alarm-initiating device (e.g., smoke detectors, manual pull station) within the work area;
 - 6. Removal or dismantling of any exit sign or any component of the exit lighting system, including photo luminescent exit path markings within the work area;
 - 7. Removal or dismantling of any part of a sprinkler system including piping or sprinkler heads within the work area;
 - 8. Removal or dismantling of any part of a standpipe system including fire pumps or valves within the work area;
 - 9. Any abatement activities to be performed within a building concurrently with the full demolition of such building or concurrently with the removal of one or more stories of such building.

10. Removal of any non-load bearing/non-fire-rated wall (greater than 45 square feet or 50 per cent of a given wall);
 11. Any plumbing work other than the repair or replacement of plumbing fixtures within the work area;
 12. Removal of any fire-resistance rated portions of a wall, ceiling, floor, door, corridor, partition, or structural element enclosure including spray-on fire-resistance rated materials within the work area;
 13. Removal of any fire damper, smoke damper, fire stopping material, fire blocking, or draft stopping within fire-resistance rated assemblies or within concealed spaces;
 14. Obstruction of an interior stairway leading to an exit or exit passageway of a building.
- P. If the containment area of an asbestos project covers the entire floor of the affected building, or an area greater than 15,000 square feet on any given floor, the installation of a negative air cut off switch or switches shall be required at a single location outside the work place, such as inside a stairwell one floor below the lowest floor containing a work place, or at a secured location in the ground floor lobby when conditions warrant (such as when the work place is in a basement or below). The required switch or switches must be installed by a licensed electrician pursuant to a permit issued by the Department of Buildings. If negative pressure ventilation equipment is used on multiple floors the cutoff switch must be able to turn off the equipment on all floors.
- Q. For projects requiring an asbestos abatement permit due to one or more of the activities listed in O (1) - O (14), the building owner or its authorized representative must submit, together with the asbestos project notification, a work place safety plan (WPSP) and any other applicable construction documents, which must be prepared by a registered design professional, and a permit fee. If the WPSP is being submitted, pursuant to subsection O (9), it must also set forth the sequencing of the proposed work and must provide for a

buffer of four floors or an adequate buffer between the abatement and the demolition or floor removal work. The Contractor shall solely be responsible for filling the required variance applications, phasing, etc. and obtain a permit from the DEP for the project.

R. WPSP requirements. The WPSP shall include, but not be limited to, the following items, depending on the size and scope of the asbestos project:

1. Floor plans showing the locations of all asbestos project work areas and decontamination enclosure systems in the building.
2. Floor plans indicating the locations of any components of the fire alarm system which have been deactivated, and setting forth mitigation measures to be implemented for the duration of the project.
3. Floor plans indicating the locations of obstructed or removed exit signage and lighting and setting forth mitigation measures to be implemented for the duration of the project.
4. Floor plans indicating the locations of any obstructed means of egress or required exit and setting forth mitigation measures to be implemented for the duration of the project.
5. Floor plans or riser diagrams indicating the locations of any disengaged or removed components of the fire protection system and setting forth mitigation measures to be undertaken for the duration of the project.
6. A written description of all measures taken to mitigate compromised fire protection systems or means of egress, including but not limited to surveillance by a fire watch and an action plan setting forth procedures to be taken for the safety of building occupants in the event of an emergency.
7. If the asbestos project is being performed in a building where any dwelling unit is to be occupied for the duration of the permit, the WPSP shall

include a tenant protection plan as required by chapter 1 of Title 28 of the Administrative Code.

8. A list of all non-asbestos contractors who will perform work on the project.
- S. For projects requiring an asbestos abatement permit, a final inspection shall be performed by a registered design professional after all work authorized by the permit is completed. The registered design professional shall note all failures to comply with the Building Code or approved asbestos abatement permit and shall promptly notify the Authority in writing.
- T. All inspections required pursuant to Title 28 of the Administrative Code, including but not limited to Special Inspections required by Chapter 17 of the Building Code, will be by a Special Inspection agency engaged by the Authority.
- U. Final inspection reports shall be filed with the DEP on A-TR1 form. Records of final inspections made by registered design professionals shall be maintained by such persons for a period of six years after final inspection or for such other period as the commissioner shall require, and shall be made available within 72 hours. These records may be maintained in an electronic recordkeeping system instead of in paper form.
- V. If additional ACM is added to a project that has an approved WPSP, a registered design professional must submit a letter to the Asbestos Technical Review Unit affirming that the professional has visited the work place and that the additional asbestos abatement is consistent with the approved WPSP and that proposed changes will not impact egress or fire protection requirements.
- W. Provide scaffolding as necessary to accomplish the work of this contract. Scaffolding may be of standing type such as metal tube and coupler, tubular welded frame, pole or outrigger type or cantilever type. The type, erection and use of all scaffolding shall comply with all applicable OSHA provisions. Provide a nonskid surface on all scaffold surfaces subject to foot traffic. Follow Local Law 52 and obtain permit from the Building Department for any supported scaffold that is

forty (40 feet) or more in height. The scaffolding design must be approved/sign-off by a professional engineer and approved by the SCA's safety unit.

- X. As per paragraph A.1 above, the Authority shall conduct a site assessment and sample all suspect materials. Results of the assessment inclusive of bulk sampling results will be forwarded to the Contractor.
1. It is the Contractor's sole responsibility to recognize all affected suspect ACM *and assumed ACM and remove the quantities indicated in Part 4 of 02081 necessary to complete the construction.*
 2. The Authority does not represent a position regarding the ease of removal of ACM from substrates. The Contractor shall be responsible for verification of existing site conditions and all costs associated with labor, materials, equipment and supplies relative to specified work. No additional compensation or Contract extensions shall be granted to the Contractor for failure to verify site conditions.
 3. The Contractor shall include in its Bid all costs associated with labor, materials, equipment and supplies for work associated with the abatement of asbestos containing materials not readily accessible, i.e., multiple layers of floor tile, mechanical insulation within chases and wall cavities, nailcrete, etc.
 4. The Contractor shall provide the Authority's Environmental Consultant with all labor, equipment and materials, as necessary, to access suspect ACM and to obtain the necessary bulk samples.

1.02 PHASING OF WORK

- A. The Asbestos Contractor shall perform and complete the abatement activities of asbestos-containing materials during non-school hours. No abatement operations will be allowed when teachers or students are in the building. It is the Contractor's responsibility to ensure that all work including successful air clearance testing and analysis, as required, is completed prior to the return of building occupants.

- B. The General Contractor shall provide a detailed scope of work and plans showing the limits of work areas to the Environmental Consultant retained by the SCA and request for an ACP-5 Form in order to receive partial permit from the Department of Buildings for project areas where abatement is not required.

1.03 AUTHORITY TO STOP WORK

- A. The Authority's representative and the Authority's Environmental Consultant shall have the authority to stop the abatement work at any time a determination is made that conditions are not within Specification and applicable regulations. The stoppage of work shall continue until conditions have been corrected to the satisfaction of the Authority's representative and Authority's Environmental Consultant. Standby time to resolve the problems shall be at the Contractor's expense.

1.04 SITE REQUIREMENTS

- A. Noise Control: Provide mufflers on all equipment to be used by the Contractor. Observe local laws regarding noise control.
- B. Wastewater: All water used by the Contractor during asbestos abatement activities shall be collected and passed through a water filtration system capable of filtering particles down to 5 microns prior to being discharged into the sanitary sewer. The Contractor shall contact the Building Superintendent to determine the acceptable location(s) to access the sanitary sewer. The Contractor shall be responsible for connection to the sanitary sewer, and for providing piping, pumps, water filtration systems, and other items necessary to collect, transport, filter, and dispose of the wastewater.
- C. The Contractor must maintain a copy of the following information at the work place:
 - 1. A copy of the U.S. Environmental Protection Agency Regulations for Asbestos, 40 CFR 61 Subparts A and M and a copy of OSHA Asbestos Regulations, 29 CFR 1926.1101, and 12 NYCRR Part 56.

2. A list of telephone numbers for local hospital, location of hospital and/or emergency squad, local fire department, the building owner (or representative) and the N.Y.C. Asbestos Control Program.
3. A copy of these Rules, the most recent Asbestos Abatement Notice (Form ACP-13), asbestos abatement (ATRU) permits, any variance application (Form ACP-9) and DEP approval thereof.
4. A copy of all Material Safety Data Sheets (MSDS) for chemicals used during the asbestos project.
5. Original New York City Asbestos handler and supervisor certificates of all workers in the work site.
6. A copy of the current New York State Department of Labor asbestos handling license of the abatement contractor and air monitoring company.
7. A copy of any asbestos survey performed in the affected building in accordance with 12 NYCRR Part 56.

1.05 HEALTH AND SAFETY

- A. Toxic Effects: The Contractor shall assume all responsibility for any toxic effects to workers from the air supplied to respirators, or from toxic or damaging vapors or residues resulting from the use of encapsulant and/or wetting agents or other substances used by the Contractor during construction.
- B. Chemical/Biological Hazards: The known chemical/biological hazards on site include asbestos-containing material and debris. The Contractor shall provide materials, equipment and training to its workers to ensure their protection from these and any other chemical/biological hazards which may be identified during the course of this work.
- C. Physical Hazards: The Contractor shall provide safety equipment and training to his workers to ensure their protection from any physical hazards including but not

limited to trip/fall hazards, working at elevation, heat stress, contact with energized (hot) active equipment, noise, overhead bump hazards, and electrical shock that may be present during the Work.

- D. Safety Act: The Williams-Steiger Occupational and Safety Health Act (OSHA) of 1970, as amended, shall be strictly complied with during the course of this project. This Act shall govern the conduct of the Contractor's workmen, tradesmen, materialmen, and subcontractors, and of visitors to the project site.
- E. Accident Prevention: In order to protect the lives and health of his employees, the Contractor shall comply with all pertinent provisions of the latest edition of the "Manual of Accident Prevention in Construction" issued by the Associated General Contractors of America, Inc. and shall maintain an accurate record of all accidents which occur during the project. An injury or loss of life must be immediately reported by the Contractor to the Authority, and a copy of the Contractor's report to his insurer of an accident must be provided to the Authority.
- F. Emergency Response: The Contractor shall establish an Emergency Response Team made up of members of his work force. Team members shall be trained, organized, and capable of responding in the event of an accident, fire, or other emergency. The Contractor shall designate a site Safety Coordinator to train team members regarding the location and use of site-specific fire/life safety equipment. As a minimum requirement, members of the Emergency Response Team shall be knowledgeable in standard first aid and CPR techniques, fire extinguisher use, and evacuation procedures.
- G. Workmen Protection: The Contractor shall provide and maintain all safety measures necessary to properly protect workmen.
- H. Emergency Actions: In an emergency affecting the safety of life, the work, or adjoining property, the Contractor, to prevent such threatened loss or injury without special instruction or authorization from the Authority or the Engineer, is hereby permitted to act at his discretion.

- I. Hazard Communication Act: The Contractor shall comply with the Hazard Communication Standard promulgated by the Occupational Safety and Health Administration (OSHA No. 29 CFR 1910.1200). This program ensures that all employers provide the information they need to inform and train employees properly and to design and put in place employee protection program. It also provides necessary hazard information to employees so they can participate in, and support, the protective measures needed at their work place. The contractor shall ensure that labels or other forms of warning are legible in English. Employer having employees who speak other languages may add the information in their languages. See OSHA 29 CFR 1910.1200 for more details.

1.06 WORK SUPERVISION AND COORDINATION

- A. Abatement Contractor's Supervisor: From the start of work through to the project completion, the Contractor shall have on-site a responsible and competent supervisor who possesses valid NYSDOL and NYCDEP Supervisor certifications. As a minimum, the Asbestos Contractor's Supervisor shall meet the qualifications as required by Article 1.12, for a job supervisor. The Supervisor shall be on site during all working hours. When the Supervisor must leave site during work, a temporary Supervisor shall be appointed.
- B. Quality of Work: The Supervisor shall supervise, inspect and direct the Work competently and efficiently, devoting such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. The Supervisor shall be responsible to see that Work complies accurately with the Contract Documents, and that all Work installed is of good quality and workmanship.

1.07 SUBMITTALS

- A. Pre-Project Submittal:
1. Provide Certificates of Insurance naming the Authority, Department of Education, and the City of New York as additional insured.
 2. Health and Safety Plan: Provide a written Health and Safety Plan addressing procedures for work

place safety. As a minimum, the following topics shall be addressed in the plan:

- a. Hazard Communication. Procedure on how physical and health hazards associated with the WORK are identified and communicated to employees, and name of the person responsible for implementation of the Hazard Communication Program.
 - b. Guidelines for assessment and prevention of heat stress.
 - c. Procedures for using ladders safely.
 - d. Electrical safety procedures.
3. Emergency Action Plan: Provide a written Emergency Action Plan that outlines the contingency actions to be performed for emergencies including fire, accident, power failure, supplied air system failure, breach of work area containment, unexpected asbestos contamination in the site area and on the adjoining grounds, or spilling of asbestos material being hauled to storage and/or disposal. This Plan shall identify the manner in which emergencies are announced, emergency escape procedures and routes, and procedures to account for all employees after evacuation. The Plan shall identify those persons responsible for fire/life safety duties including the Site Safety Coordinator, persons responsible for fire prevention equipment and the control of fuel source hazards, and the members of the Emergency Response Team (see Paragraph "Emergency Response" of this Section). This Plan shall be readily available for review by all workers.
 4. Fall Protection Plan: Provide a written Fall Protection Plan that outlines the actions to be performed to protect personnel when they are working at elevation. The plan shall detail specific fall protection devices to be utilized, training provided to personnel for same and training of designated competent person in charge of and responsible for the elevated work site.

5. Provide proof of written notifications required by the Paragraph "Permits, State Licenses and Notifications" of this Section. Provide proof that all required permits and variances have been obtained.
6. Provide documentation of compliance with all requirements of the paragraph "Requirements and Qualifications" of this Section. Submittal shall include:
 - a. Proof that the job supervisors, foremen, and asbestos abatement workers meet State certification and license requirements.
 - b. Proof of a current medical surveillance program for all Contractor's personnel to work on this project.
7. Provide proof of a respiratory protection program. Submit level of respiratory protection intended for each operation required by the project.
8. Provide proof of historic airborne fiber data for similar types of project. Submit airborne asbestos fiber monitoring data from an independent air monitoring firm to substantiate selection of respiratory protection proposed. Data shall include the following for each procedure required by the work: 1) date of measurement; 2) type of work task monitored; 3) methods used for sample collection and analysis, and; 4) number, duration and results of samples taken.
9. Provide proof that a landfill site has been located, and arrangements for transport and disposal of asbestos-containing or asbestos-contaminated materials have been made. Provide the name and location of the landfill, and waste transport company, if applicable. Landfill shall be an asbestos-only receptor.
10. Provide manufacturer's literature on all proposed job related equipment and products to be used on this project. Include Safety Data Sheets (SDS) for encapsulant, fire retardant plastics, and other chemicals to be used on this project.

11. Provide a detailed Asbestos Removal and Disposal Work Plan that describes all aspects of the work to be performed for this project. The Plan shall include a detailed description of the work area enclosure. Provide shop drawings (with dimensions and locations) of proposed decontamination facilities and work areas. These drawings shall indicate the following: 1) areas to be sealed off and work area boundaries; and 2) proposed layout and location of the decontamination enclosure systems. Include a detailed description of any modifications or changes to be made to the specified negative pressure work area enclosure.
12. Provide a sample of the daily log proposed for use. Minimally, the log should include the date(s) and time(s) when all personnel enter and leave the work area(s).

B. During Work Submittal:

1. Schedule of Work Changes: Any changes in the Schedule of Work proposed by the Contractor shall be submitted for approval no later than seven days prior to the commencement date of the proposed change. A revised Schedule shall be submitted at the end of each week.
2. A certified, signed, and completed copy of each "Waste Shipment Record" form used, and receipts from the landfill operator that acknowledge the Contractor's delivery(s) of material, shall be submitted within thirty (30) days following removal of ACM from building.

C. Post Project Submittal:

1. A copy of the bound logbook.
2. Compilation in chronological order of all OSHA personal air monitoring records pertaining to this project.
3. Compilation of all completed and signed Waste Shipment Record forms, bills of lading, or disposal receipts pertaining to this project.

4. Copies of notifications and checks to applicable agencies (see Subparagraph "Pre-Project Submittal Information" of this Section) that the asbestos abatement project has been completed.
5. Copies of the workers' licenses (NYS DOL and NYC DEP) that actually performed the work on the Project.

1.08 FIRE PROTECTION AND EMERGENCY EGRESS

- A. The Contractor shall be responsible to the security and safeguarding of all areas turned over by the Authority to the Contractor. The Contractor shall designate to his workers and other building occupants the means of egress in case of emergency.
- B. The Contractor shall established emergency and fire exits from the work area. First aid kit, 2 full sets of protective clothing and respirators shall be provided for use by qualified emergency personnel in the clean room of the decontamination facility.
- C. The Contractor shall provide fire watch and logbook throughout the entire term of the project, to protect against fire and unauthorized entry into and around the work area. Any intrusion or incident shall be documented in the log book. Fire watch personnel shall be present during off-hours shift such as night shift, weekends and holidays when abatement work is not in progress. Fire watch shall be a certified asbestos handler by NYS and NYC DEP and possess a NYC Fire Department Certificate of Fitness.
- D. Notify the local police department and fire department that asbestos abatement work is being conducted. As a minimum, the notification letter shall include the address of the Facility, dates work is to be performed, and drawings indicating the areas to undergo abatement.
- E. Exit signs must be maintained during the abatement. In the case the exit signs will be blocked during the abatement, temporary exit signs shall be installed in accordance with 2008 NYC Building Code requirements. Exit signs and egress shall comply with code section BC 1026.

1. Temporary exit signs shall be installed in primary and secondary egress paths.
 2. Signs must be either battery back-up or illuminated in accordance with 2008 NYC Building Code.
 3. Existing signs with incorrect directional arrows within the work area relative to primary and secondary egress paths shall be either blocked with solid barrier or be temporarily removed during work. Following the work completion, any signs removed must be reinstalled.
- F. Cutting tools must be available for emergency egress at all locations where exit doors and corridors will be blocked with plastic during the abatement.
- G. The existing sprinkler system in the building shall be operational and shall conform to code sections BC 302, 304, & 602.
- J. Emergency and fire exit staircase doors shall comply with BC 1008 and BC 1017.2 requirements.
- K. Spaces around wall and floor penetrations shall meet code section BC 712 requirements:
1. Space around pipe, conduit and duct penetrations in floor slabs shall not exceed 1/2" and shall be filled with approved firestop material.
 2. Space around pipe, conduit and duct penetrations in walls shall not exceed 1/2" and shall be packed with mineral wool or other approved material and covered with metal escutcheons on both sides of the partition.
- L. For work areas greater than 15000 square feet, install a negative air cut-off switch as per section 1-91 (f) of the 15RCNY regulations.

1.09 CLEAN-UP

- A. Asbestos Related Clean-up: All clean-up work related to asbestos abatement work shall be in strict accordance with general technical requirements.

- B. Final Site Cleaning: Upon completion of the work, the Contractor shall remove all temporary construction, decontamination facilities, and unused materials placed on site by the Contractor; put the premises in a neat and clean condition; and sweeping, cleaning, and washing required to restore the condition of the site to its original condition.

1.10 CODES, PERMITS, AND STANDARDS

- A. The Contractor shall be solely responsible for compliance with all applicable federal, state, and local laws, ordinances, codes, rules, and regulations that govern asbestos abatement Work or hauling and disposal of asbestos waste material. The current issue of each document shall govern. All Work installed shall comply with all applicable codes and regulations as amended.
- B. Before starting the Work, the Contractor shall examine the Technical Specification for compliance with codes and regulations applicable to the work and shall immediately report any discrepancy to the Authority's Environmental Consultant.
- C. Where conflict among requirements or with these Specifications exists, the more stringent requirements shall apply.
- D. Permits, State Licenses, and Notifications: The Contractor shall be responsible for obtaining necessary permits, variances, state licenses, and certifications of personnel in conjunction with asbestos removal, hauling, and disposition and shall provide timely notification of such actions as may be required by federal, state, regional, and local authorities. Fees and/or charges for these licenses, permits, and notifications shall be paid by the Contractor. Contractor shall use all notification forms where applicable.
1. Agency Notification: At least 10 days prior to commencement of any asbestos removal, the Contractor shall prepare written notification to EPA Region 2, to the New York State Department of Labor (NYSDOL), and to the New York City Department of Environmental Protection (NYCDEP) Asbestos

Control Program and all other applicable agencies having jurisdiction. In addition, the Contractor shall be required to obtain School Opening Permits (Custodial) for work covered under this specification including permits required for air sampling.

1.11 TERMINOLOGY

The following commonly-used terms are defined in the context of these Specifications:

- A. Abatement: Procedures to control or decrease fiber release from asbestos-containing building materials or insulation material containing asbestos. Includes removal, enclosure, and encapsulation.
- B. Asbestos-Containing Material (ACM): Any material or product which contains more than 1 percent asbestos.
- C. Aggressive Sampling: Air monitoring samples collected while a leaf blower, fans, or other such devices are used to generate air turbulence within the work area.
- D. Air Filtration Device (AFD) - A portable local exhaust system equipped with HEPA filtration, capable of maintaining a constant low velocity air flow into contaminated areas from adjacent, uncontaminated areas and capable of maintaining a negative air pressure with respect to the adjacent, uncontaminated areas.
- E. Air Lock: A system for permitting ingress or egress to the work area while permitting minimal air movement between a contaminated area and an uncontaminated area, typically consisting of two curtained doorways placed a minimum of three feet apart.
- F. Air Monitoring: The process of measuring the fiber content of a specific volume of air in a stated period of time. Personal air sampling results shall be calculated to reflect the employee's eight-hour time weighted average (TWA) exposure. Area sampling results are reported directly, without calculating the TWA.
- G. Amended Water: Water to which a surfactant has been added.

- H. Asbestos project: Asbestos project shall mean any form of work performed in a building or structure or in connection with the replacement or repair of equipment, pipes, or electrical equipment not located in a building or structure which will disturb (e.g., remove, enclose, encapsulate) more than 25 linear feet or more than 10 square feet of asbestos-containing material.
- I. Asbestos Removal Encapsulant: A chemical solution used in place of amended water during asbestos removal to penetrate, bind, and encapsulate the asbestos-containing material.
- J. Authorized Visitor: Authority's Environmental Consultant or representatives of any regulatory or other agency having jurisdiction over the project.
- K. Authority shall be the New York City Construction Authority, its agents, servants, employees, or designees as the case maybe.
- L. Authority's Environmental Consultant: The Authority's agent who is authorized to exercise general contract administration and industrial hygiene inspection of the work under the direction of the Authority.
- M. Building materials: Building materials shall mean any and all materials listed as Presumed Asbestos Containing Materials (PACM) and Suspect Miscellaneous ACM in NYSDOL ICR 56, including but not limited to interior and exterior finishes, equipment, plaster, roofing, flooring, caulking, sealants, tiles, insulation, and mortar and refractory bricks used in the construction of boilers.
- N. Certified Industrial Hygienist (CIH): One certified in the comprehensive practice of industrial hygiene by the American Board of Industrial Hygiene.
- O. Class II asbestos work: Activities involving the removal of ACM which is not thermal system insulation or surfacing material. This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastic. Class I asbestos work includes the removal of thermal system or surfacing materials.

- P. Competent Person: Definition and responsibilities as set down in 29 CFR 1926.1101(b) and as outlined herein.
- Q. Curtained Doorway: A device to allow ingress or egress from one room to another while permitting minimal air movement between the rooms.
- R. Decontamination Enclosure System: A series of connected rooms for the decontamination of workers (a Personnel Decontamination Enclosure System) or of materials and equipment (Equipment Decontamination Enclosure System).
- S. Equipment Decontamination Enclosure System: A decontamination system for waste materials and equipment, typically consisting of a designated area of the work area, a washroom, and a holding area, with an air lock between any two adjacent rooms and a curtained doorway between the holding area and the non-work area. Not to be used for personnel entry/exit.
- T. Encapsulant (Sealant): A liquid material which can be applied to ACM and which controls the possible release of asbestos fibers from the material, either by creating a membrane over the surface (bridging encapsulant) or by penetrating into the material and binding its components together (penetrating encapsulant).
- U. Encapsulation: Application of an encapsulant to asbestos-containing building materials to control the possible release of asbestos fibers into the ambient air.
- V. Enclosure: Procedures necessary to completely enclose ACM behind air-tight, impermeable, permanent barriers.
- W. Excursion Limit (EL): The EL is an airborne concentration of asbestos to which no employee shall be exposed when not using respiratory protection. The EL is 1.0 f/cc as averaged over a 30 minute period.
- X. Exit: Portion of a means of egress system which is separated from other interior spaces of a building or structure by fire-resistance-rated construction to provide a protected path of egress travel between the exit access and the exit discharge.

- Y. Fixed Object: A unit of equipment or furniture in the work area which cannot be removed from the work area.
- Z. Friable: Any material which, when dry, may be crumbled, pulverized, or reduced to powder by hand pressure.
- AA. Full Facepiece High Efficiency Respirator (FFHER): A respirator which covers the wearer's entire face from the hairline to below the chin and which is equipped with a HEPA filter.
- AB. Half Mask High Efficiency Respirator (HMHER): A respirator which covers one-half of the wearer's face, from the bridge of the nose to below the chin, and is equipped with HEPA filters.
- AC. HEPA Filter: A high efficiency particulate air (HEPA) filter capable of trapping and retaining 99.97 percent of the fibers of 0.3 micrometer or larger in diameter.
- AD. HEPA Vacuum Equipment: High efficiency particulate air (HEPA) filtered vacuuming equipment having a UL 586 filter system capable of collecting and retaining asbestos fibers.
- AE. Large Asbestos Project: Large asbestos project shall mean an asbestos project involving the disturbance (e.g. removal, enclosure, encapsulation) of 260 linear feet or more of friable asbestos-containing material or 160 square feet or more of friable asbestos-containing material.
- AF. Lockdown: Procedure of applying an encapsulant as a protective coating or sealant to a surface from which ACM has been removed in order to control and minimize airborne asbestos fiber generation that might result from residual asbestos-containing debris.
- AG. Log: Log shall mean an official record, maintained by the abatement contractor, of all activities that occurred during the project. At a minimum, the log shall identify the building owner, agent, contractor, and workers, and other pertinent information including daily activities, cleanings and waste transfers, names and certificate numbers of asbestos handler supervisors and asbestos handlers; results of inspections of

decontamination systems, barriers, and negative pressure ventilation equipment; summary of corrective actions and repairs; work stoppages with reason for stoppage; manometer readings at least twice per work shift; daily checks of emergency and fire exits and any unusual events.

AH. Minor Asbestos Project: Minor project shall mean a project involving the disturbance (e.g. removal, enclosure, encapsulation, repair) of 25 linear feet or less of friable asbestos-containing material or 10 square feet or less of friable asbestos-containing material.

AI. Monitor Representative: Authority's Third Party Monitor who is authorized to perform industrial hygiene inspection of the work.

AJ. Movable Object: A unit of equipment or furniture which can be removed from the work area.

AK. Obstruction: Obstruction shall mean the blocking of a means of egress with any temporary structure or barrier. A corridor shall not be considered obstructed when there is a clear path measuring at least three (3) feet wide permitting access to all required vertical exits and/or exit doors. Abatement worker egress from the work area through Polyethylene sheeting covering an egress used only by abatement workers shall not be considered an obstruction when it is prominently marked with exit signage or paint and cutting tools (knife, razor) are attached to the work area side of the sheeting for use in the event that the sheeting must be cut to permit egress.

AL. Plasticize: To cover floors and walls with plastic sheeting as herein specified.

AM. Permissible Exposure Limit (PEL): The PEL is an airborne concentration of ACM to which no employee shall be exposed when not using respiratory protection. The OSHA PEL is 0.1 f/cc expressed on an 8-hour time weighted average (TWA).

AN. Personnel Decontamination Enclosure System: A decontamination system for personnel and limited equipment, typically consisting of an equipment room,

shower room, and clean room, with an air lock between any two adjacent rooms, and a curtained doorway between the equipment room and the work area, and a curtained doorway between the clean room and the non-work area. The decontamination system serves as the only entrance/exit for the work area.

- AO. Pre-demolition Abatement Activities: Pre-demolition abatement activities shall mean any and all asbestos abatement activities required to be performed and completed prior to the partial or total structural demolition of a building or structure, including successful clearance air monitoring.
- AP. Powered Air Purifying Respirator (PAPR): Either a full face-piece, helmet, or hooded respirator that powers breathing air to the wearer after the air has been purified through a HEPA filter.
- AQ. Regulated area: An area established by the employer to demarcate areas where Class I, II and III asbestos work is conducted, and any adjoining area where debris and waste from such asbestos work accumulate; and a work area within which airborne concentrations of asbestos, exceed or there is a reasonable possibility they may exceed the permissible exposure limit.
- AR. Removal: The act of removing and transporting asbestos-containing or asbestos-contaminated materials from the work area to a suitable disposal site.
- AS. Small Asbestos Project: Small asbestos project shall mean an asbestos project involving the disturbance (e.g. removal, enclosure, encapsulation) of more than 25 and less than 260 linear feet of friable asbestos-containing material or more than 10 and less than 160 square feet of friable asbestos-containing material.
- AT. Start date: Start date shall mean the date when a worker decontamination enclosure system is installed and functional.
- AU. Surfactant: A chemical wetting agent added to water to improve penetration, thus reducing the quantity of water required for a given operation or area.

- AV. Tent Procedure: A method of limited application for the removal at any one time of less than 260 linear feet or 160 square feet of ACM. Tent procedures shall be accomplished in a constructed or commercially available plastic tent, plasticizing and sealing all surfaces not being abated within the periphery forming an enclosure. The tent shall be of 2 layers of 6-mil plastic at a minimum, with seams stapled and taped airtight and then taped flush with the adjacent tent wall. Engineering control shall include a HEPA unit to continuously exhaust the work area. Negative air shall be demonstrated by smoke test.
- AX. Type C Respirator: A respirator which supplies air to the wearer from a source outside the work area by means of a compressor.
- AY. Wet Cleaning: The process of eliminating asbestos contamination from building surfaces and objects by using cloths, mops, or other cleaning tools which have been dampened with amended water or asbestos removal encapsulant and by afterwards disposing of these cleaning tools as asbestos-contaminated waste.
- AZ. Work Area: Designated rooms, spaces, or areas of the project where asbestos abatement actions are to be undertaken or which may become contaminated as a result of such abatement actions. A contained work area has been sealed, plasticized, and equipped with an airlock entrance or a decontamination enclosure system. A non-contained work area is an isolated or controlled-access area that has not been plasticized.
- BA. Work place safety plan: Work place safety plan shall mean documents prepared by a registered design professional and submitted for review by DEP in order to obtain an asbestos abatement permit. Such plan shall include, but not be limited to, plans, sections, and details of the work area clearly showing the extent, sequence, and means and methods by which the work is to be performed.

1.12 REQUIREMENTS AND QUALIFICATIONS

- A. Minimum Experience: The Contractor shall have experience with abatement work, as evidenced through

participation in at least two asbestos abatement projects of complexity comparable to this project.

- B. Experience and Training: The Contractor's job supervisors, foremen, and workers shall be adequately trained and knowledgeable in the field of asbestos abatement. All personnel engaged in asbestos abatement or related activities shall have both New York State DOL and NYC DEP certifications. All phases of the work shall be executed by skilled craftsmen experienced in each respective trade. Proof of such experience shall be submitted upon request by the Authority. Improperly trained, untrained, or inexperienced personnel shall not be allowed in the work area(s). Personnel shall meet minimum training and experience requirements outlined in this Section.
1. The Contractor's on-site job supervisor shall have successfully completed, within the last twelve months, the NYSDOH-approved course "Supervision of Asbestos Abatement Projects", and shall be qualified as a NYCDEP and NYSDOL-certified Contractor/Supervisor. Course must be provided by an NYSDOH-approved training provider. The supervisor shall have experience with abatement work, as evidenced through participation in at least two asbestos abatement projects of complexity comparable to this project.
 2. The job supervisors and foremen shall be thoroughly familiar with and experienced in asbestos removal and related work and shall meet the requirements of a competent person set down in OSHA Standard 29 CFR 1926.1101.
 3. All asbestos abatement workers shall be knowledgeable, qualified, and trained in the removal, handling, and disposal of asbestos material and in subsequent cleaning of the affected environment. All asbestos abatement workers shall be certified as having attended and satisfactorily completed asbestos worker training in accordance with OSHA Standard 29 CFR 1926.1101(k)(3). Course must be provided by an NYSDOH-approved training provider.

4. The Contractor's job supervisors, foremen, and asbestos abatement workers shall be certified and licensed as required by the NYCDEP and NYSDOL.
 5. Prior to commencement of work, all personnel who are to enter the work area shall be instructed in and shall be knowledgeable of the appropriate procedures for personnel protection and asbestos abatement. On-site training in the use of equipment and facilities unique to this job site shall be performed. Emergency evacuation procedures from the work area shall also be included in worker training.
- C. Supervision Requirements: The Contractor shall provide adequate job supervision for all phases of the asbestos abatement work.
1. The Contractor shall have a NYSDOL and NYCDEP job supervisor present on site whenever work described in this Section is in progress. If the job supervisor leaves the site for any reason a qualified and certified supervisor, who meets the requirements of this Section and is familiar with the current status of the work, shall be designated. The Authority's Designated Representative shall be informed of the substitution. The supervisor must be familiar and experienced with asbestos removal and its related work, safety procedures, and equipment.
- D. Worker Medical Examinations: The Contractor shall provide medical examinations for all employees engaged in asbestos removal and disposal operations, in accordance with OSHA Standards 29 CFR 1910.134(b), 1926.1101, and applicable state regulations. The Contractor shall ensure that all employee examination results are on file in his office and available for review and are maintained in accordance with OSHA Standard 29 CFR 1926.1101 (n)(3).
- E. Certificate of Worker's Release: Each asbestos abatement worker, workers of other trades, or any supervisory personnel who enter the work area, or otherwise contact ACM, shall submit a Certificate of Worker's Release, as required in the Section "Submittal".

1.13 TESTING AND INSPECTION REQUIREMENTS AND RESPONSIBILITIES

- A. Visual inspections and air monitoring will be performed before, during, and after asbestos abatement to document airborne asbestos fiber concentrations as defined in this specification. For window sash abatement projects utilizing approved NYCDEP protocol, no area monitoring is required provided that all OSHA results are below 0.01 f/cc.
- B. The Authority's Responsibilities
 - 1. The Authority will employ an industrial hygiene (IH) testing laboratory for air monitoring and clearance testing.
 - 2. Area air samples will be collected and analyzed using NIOSH Method 7400. Air samples will be collected during each shift from the work area as required at the decontamination enclosure clean room, and in adjacent non-work areas.
 - 3. Clearance testing by Phase Contrast Microscopy (PCM) and Transmission Electron Microscopy (TEM) will be performed at the written request of the Contractor submitted on a copy of the "Request for Services" form. Air samples will be collected to demonstrate final re-occupancy clearance for work areas within the building. The fiber concentration of each sample must comply with the specified clearance level. The Authority will provide for collection and analysis of one round of samples required to demonstrate clearance in each discrete work area. For the removal of window sash with putty intact, post abatement clearance air monitoring by Phase Contrast Microscopy shall be performed if any individual (not TWA) OSHA samples exceed 0.01 f/cc.
 - 4. The Authority's Environmental Consultant will perform inspections of the work area, as specified, upon written request of the Contractor. Submit request on a copy of the "Request for Services" form.

5. The Authority's Environmental Consultant will submit copies of all results to the Contractor, the school, and the Authority and issue a letter to the school that areas are safe to reoccupy.

C. Contractor's Responsibilities

1. At the beginning of the Project, the Contractor shall provide the Authority's representative with a schedule of the proposed abatement. Once the Authority, assigns an Environmental Consultant, the Contractor shall be responsible for coordinating its activities with the Environmental Consultant and shall make all notifications of the removal schedule to applicable agencies and the Environmental Consultant within the specified time frame required by the regulatory requirements and as specified herein.
2. PCM and TEM air samples that fail to meet the re-occupancy clearance standard shall be paid for by the Contractor. Should a delay occur, due to failure(s) of clearance air testing, all associated expenses such as PCM and TEM analysis, and air testing, shall be the responsibility of the asbestos contractor.
3. The Contractor, at his expense, shall provide OSHA monitoring and all other all tests required by specified applicable regulations, codes, and standards and any other tests for his use. The use of a testing laboratory by the Authority does not release the Contractor from providing tests required for the protection and safety of his employees.
4. The Contractor shall employ an independent IH testing laboratory for collection and analysis of (OSHA) personal air monitoring samples. The laboratory used for air sample analysis shall be successfully participating in the "Proficiency Analytical Testing (PAT) Program for Laboratory Quality Control for Asbestos." The monitoring shall be supervised by an Industrial Hygienist certified by the American Board of Industrial

Hygiene (A.B.I.H.). Each testing laboratory shall be ELAP and NVLAP certified.

5. From each work area, the Contractor, at his expense, shall collect and analyze (OSHA) personal air monitoring samples. Sampling shall be repeated during each different work activity. Sample collection and analysis shall be performed using the OSHA Reference Method as outlined in 29 CFR 1926.1101, Appendix A.
 6. If readings are above 0.01 f/cc, the area must be recleaned and ambient air monitoring shall be conducted by the Authority's Environmental Consultant.
 7. The Contractor shall be advised whenever questions arise concerning compliance with standards of quality and completeness of the work, and shall use his best efforts to resolve any such questions to the satisfaction of the Authority's Environmental Consultant.
 8. Where air monitoring tests and/or inspections are specified or required, the Contractor shall notify the Authority's Environmental Consultant, in writing, in advance of the required test and/or inspection.
 9. The Contractor is responsible for ensuring the Work is complete to the level that meets the criteria of the inspection. The Contractor shall perform an inspection of the Work to evaluate completeness prior to requesting an inspection by the Authority's Environmental Consultant.
- D. Time Requirements for Authority's Environmental Consultant's Inspections and Testing: Where visual inspections or air testing is required to be performed by the Authority's Environmental Consultant, the Contractor shall allow for the following response/analytical time for completion of the inspection/test.
1. Where visual inspections are required, allow 24 hours beginning from the time the Contractor's written request is received by the Authority's

Environmental Consultant, for the performance of the inspection.

2. Where PCM and TEM clearance air monitoring tests are required, allow 24 hours beginning from the time the Contractor's written request is received by the Authority's Environmental Consultant, to the beginning of the air test.
3. Where air-monitoring tests for sash removal are required, allow 24 hours beginning from the time the Contractor's written request is received by the Authority's Environmental Consultant, to the beginning of the air test.

1.14 SPECIAL REQUIREMENTS AND RESPONSIBILITIES

- A. The Contractor must assume that all components in direct contact with concealed and exposed ACM/assumed ACM is contaminated and is to be disposed of as ACM-contaminated waste. This shall include, but not limited to, brick, mortar, window frames, sashes, doorframes, etc. In lieu of disposing of these materials such, the contractor may opt to decontaminate only Non-Porous components and dispose of them as regular C&D waste, at no additional cost to the Authority.
- B. The Contractor shall provide all material, manpower and equipment to access all assumed ACM materials for sampling by the Authority's Environmental Consultant at no additional cost to the Authority. Materials deemed to be non-ACM through bulk sample analysis conducted by the Authority's Environmental Consultant, shall be credited to the Authority.
- C. Radiators to be impacted by the work must be assumed to have concealed ACM associated with them. Thus, any dismantling or removal of these radiators must be conducted exclusively by the asbestos contractor, cautiously and under controlled conditions, within full containment/tents, in the presence of the Authority's Environmental Consultant, at no additional cost to the Authority.

- D. All selective demolition into inaccessible spaces must be conducted exclusively by the asbestos abatement contractor, under controlled conditions, within tents or full containments, in the presence of the Authority's Environmental Consultant.
- E. All caulk and putty (concealed and exposed) must be assumed to be PCB-containing, unless otherwise indicated in section 02082. Contractor must refer to section 02082 for additional handling and disposal requirements.
- F. Any suspect material not listed or addressed in this specification and would be impacted by the planned work activities must be assumed to be Asbestos-Containing Materials. The Contractor shall notify the Project Officer immediately if any materials that are not listed are encountered, who will then notify the Authority's Industrial Hygienist for directive.
- G. All selective demolition into inaccessible spaces (including but not limited to pipe chases, ceiling plenums, soffits, etc.) must be conducted exclusively by the Abatement Contractor in modified tents or in full containments under controlled conditions in the presence of the Authority's environmental consultant.
- H. Connections and Disconnection of electrical wiring in the vicinity of ACM/assumed ACM shall be performed by a Licensed Electrician with an Asbestos Handlers Certification.
- I. Protective metal jacket surrounding the pipe insulation risers and horizontal runs which would be impacted by the scope of work must be removed by the abatement contractor under controlled condition within full containment or tent enclosures. This work must be performed as part of abatement in the presence of the Authority's environmental consultant.
- J. Unless otherwise specified in section 02081, the contractor shall assume the existence of concealed ACM vapor barrier flashing/tar materials between respective wythes of facade walls and factor this into his/her bid estimate. Any impact on ACM vapor barrier flashing/tar materials must be addressed following proper abatement procedures.

PART 2 - PRODUCTS**2.01 MATERIALS**

- A. General: Materials provided under this section shall be standard products of manufacturers regularly engaged in the production of the items and shall conform to OSHA Standard 29 CFR 1926.1101; EPA Standard 40 CFR 61, Subpart M; Department of Transportation Standards 49 CFR 171, 172, and 173; applicable state regulations; and requirements specified herein. Materials listed under this section "or equal" shall be provided for work under contract.
- B. Plastic: Provide fire retardant plastic of 6-mil thickness shall be provided in rolls of sizes which will minimize the frequency of joints. Fire retardant plastic sheet shall be used for plasticizing the enclosed work area, for preparation of the decontamination enclosure system, and for waste packaging.
- C. Reinforced Fire Retardant Plastic: Provide reinforced polyethylene sheet for the floor area of the decontamination enclosure system. Reinforced plastic sheet provided for this project shall be a 19 mil, 3-ply, high density flame resistant-reinforced-polyethylene sheet. Plastic color shall be opaque. Provide Griffolyn T-55 as manufactured by Reef Industries, Inc., Houston, Texas (1-800-231-6074), or equal.
- D. Duct Tape: Duct tape shall be capable of sealing joints of adjacent sheets of plastic and of attaching plastic sheeting to finished surfaces without damage to existing finish and shall be capable of adhering under both dry and wet conditions, including use of amended water. When used on windows the tape shall be ultra violet light stable and shall not leave residue when removed. Nashua 357 Black Duct Tape shall be used for all window applications. This tape can be used for all applications relative to this project.
- E. Surfactant: Surfactant (Wetting Agent) shall consist of resin materials in a water base, which have been tested to ensure materials are non-toxic and non-hazardous.

Surfactants shall be installed according to the manufacturer's written instructions.

- F. Lockdown Encapsulants: Encapsulants used after asbestos removal to lockdown fugitive fibers shall carry a Class "A" fire resistance rating and shall have an ASTM E-162 flame spread index of 15 or less. A tint shall be given to the encapsulant by means of the addition of non-toxic, nonflammable colorings before application. The encapsulant shall be installed according to the manufacturer's written instructions.
- G. Caulking Sealant: Caulking sealant shall be single component, non-sag elastomer with 1600% elongation capacity. Sealant shall meet the requirements of Federal Specification TT-S-00230C, Class A Type II. Sealant shall be used to form an airtight seal around plywood barriers or temporary partitions, to seal along the seams of the decontamination enclosure system's plywood sheathing, and to seal around piping or other small penetrations of the work area. Sealant application shall be according to the manufactures written instructions.
- H. Foam Sealant: Foam Sealant shall be expanding urethane Class 1 foam sealant with a Underwriters Laboratories, Inc. (U.L. 723) flame spread index of 25 or less, smoke developed index of 0, and a minimum operating temperature range between -30°F and 250°F.
- I. Liquid Mastic Remover: Only soy-based liquid mastic removers shall be allowed. Mast-Away 99 or its equivalent may be utilized provided that strict adherence to the manufacturer's instructions and recommendations are followed.
- J. Plywood: Plywood used for temporary partitions, decontamination enclosure systems, and tunnels shall be an exterior grade and a minimum 3/8-inch thick.
- K. Spray Adhesive: Spray Aerosol Adhesive shall be specially formulated to stick to sheet polyethylene (3M 76, 3M 77, or equivalent).
- L. Other Materials: All other materials, such as lumber, plywood, tools, scrapers, brushes, cleaning materials, adhesive, nails, hardware, etc., which are required to

perform the work described in this Section shall be provided. Materials and equipment shall be new or used, uncontaminated by asbestos, in serviceable condition, and appropriate for the intended purpose.

- M. Disposal Bags: Plastic Disposal Bags shall be a minimum of six mils in thickness. Bags shall be labeled in accordance with this Section.
- N. Shipping Containers: Impermeable Containers shall be suitable to receive and retain any asbestos-containing or asbestos-contaminated materials until they are disposed of at an approved landfill. The containers shall be labeled in accordance with this Section. Containers shall be both airtight and watertight and conform to DOT Standard 49 CFR 178.224. Each container shall be constructed of fiber, hard plastic, or metal, with locking, airtight lids.
- O. Markings and Labels: Disposal bags and shipping containers shall bear danger labels, transportation packaging labels, and generator identification information. Labels shall be permanently affixed to all bags and shipping containers containing ACM, in accordance with OSHA Standard 29 CFR 1926.1101(k)(2), DOT Standard 49 CFR Part 171 and 172, and EPA Standard 40 CFR Part 61.150(a)(1)(v).
1. Danger label format and color shall conform to OSHA Standard 29 CFR 1926.200. Danger labels shall display the following legend/information:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG
DISEASE HAZARD
 2. DOT Marking and Labels: Markings and labels shall be permanently affixed to all bags and containers containing ACM, in accordance with DOT 49 CFR 172.304 and 172.407.
 - a. Markings shall display the following text:

RQ, ASBESTOS, NA 2212

- b. Labels shall be diamond shape and shall be located near the Marking text. Labels will consist of a diamond a minimum of 100 millimeters (mm) on each side with each side having a solid line inner boarder 5.0 to 6.3 mm from the edge. The label shall be white with seven black vertical stripes on the top half. Black stripes and white spaces shall be equally spaced. The lower half of the label shall be white with the class number "9" underlined and centered at the bottom. Refer to DOT 40 172.446 for label format.
3. Generator identification information shall be affixed to each DOT label format and color shall conform to DOT Standard 49 CFR 172.304. Generator identification information labels shall display the following legend/information:

GENERATOR'S NAME
GENERATOR'S 24 HOUR PHONE
GENERATOR'S FACILITY ADDRESS

- P. Reuse of Containers: If impermeable containers used to transport bagged asbestos waste to the landfill are to be reused, the empty containers shall display the following label:

RESIDUE:
LAST CONTAINED ASBESTOS RQ

- Q. Warning Signs: Warning Signs shall be posted at the perimeter of the work area prior to abatement operations in accordance with OSHA Standard 29 CFR 1926.1101. Warning Signs must be posted at all approaches to the work place including internal doorways which provide access to the work place. Danger sign format and color shall conform to OSHA Standard 29 CFR 1926.200. The signs shall display the legend indicated below:

**DANGER
ASBESTOS
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
AUTHORIZED PERSONNEL ONLY
WEAR RESPIRATORY PROTECTION AND
PROTECTIVE CLOTHING IN THIS AREA**

R. Acceptable Foam or Viscous Liquid

1. Shall be non-toxic, and not require special respiratory protection for handling.
2. Shall coat and maintained a stable blanket (minimum 1" thickness) for the duration of the removal process.
3. Shall wet the ACRM and remain wet through the bagging process.
4. Shall leave an identifiable colored residue when it dissipates.
5. Shall not require special disposal.

2.02 EQUIPMENT

- A. General: Equipment provided under this section shall conform to applicable federal and state regulations, local codes, and the requirements specified herein.
- B. Communication Equipment: Devices suitable for inter-room communications, such as "walkie-talkies" or "radio band" communicators shall be provided.
- C. Spraying Equipment: Equipment used to apply amended water or removal encapsulant shall be of a low-pressure type to prevent disturbance of the asbestos prior to physical controlled removal. Airless spray equipment shall be provided for the application of asbestos encapsulant.
- D. Vehicles: Trucks or Vans used for the transportation of asbestos waste shall be enclosed and suitable for loading, temporary storage, transit, and unloading of

asbestos-contaminated waste without exposure to persons or property.

- E. Fall Protection Equipment: Certified and approved equipment to be used by trained personnel when working at elevation to protect against falling from an elevated work area.
- F. Fire Extinguisher: Type "ABC" dry chemical extinguisher or a combination of several extinguisher of NFPA recommended types for the fire hazard exposures in each extinguisher location shall be provided. Minimum size of extinguisher shall be 4-A, and 40-B:C. Supply a minimum of one extinguisher for every 1,000 square feet of floor area, with a maximum travel distance to an extinguisher of 75-feet. Supply at least one extinguisher in each decontamination enclosure equipment room, and clean room.
- G. Smoke Detectors: Smoke detectors of the battery powered ionization type will be required at a rate of one per 5,000 square feet, with a minimum of one smoke detector in the decontamination enclosure clean room, and one in the work area.
- H. Water Filtration System: A system capable of filtering and retaining particles larger than 5.0 microns in size shall be provided.
- I. Carts: Provide watertight wheeled carts with tight fitting lids suitable for movement of non-contaminated waste or bagged asbestos waste from the decontamination enclosure system to the waste storage container or transport vehicle.
- J. Power Tools: Provide power tools necessary to complete the Work. Power tools used directly for asbestos removal shall be equipped with a dust collection system. Attach a shroud connected to a HEPA vacuum system for capture of dust.
- K. Ground Fault Protection: Equip all circuits for any purpose entering the Work Area with ground fault circuit interrupters (GFCI). Locate GFCI's exterior to Work Area so that all circuits are protected prior to entry to Work Area. Provide circuit breaker type GFCI equipped with test button and reset switch for all circuits to be

used for any purpose in work area, decontamination units, exterior, or as otherwise required by national electrical code, OSHA or other governing authority.

- L. Electrical Power Cords: Use only grounded extension cords; use "hard-service" cords where exposed to abrasion and traffic. Use single length or use waterproof connectors to connect separate lengths of electric cords, if single lengths will not reach areas of work.
- M. Lamps and Light Fixtures: Provide general service incandescent lamps, fluorescent lamps, or energy efficient LED lighting of wattage indicated or required for adequate illumination as required by the work or this section. Protect lamps with guard cages or tempered glass enclosures, where fixtures are exposed to breakage by construction operations. Provide vapor tight fixtures in work area and decontamination units. Provide exterior fixtures where fixtures are exposed to the weather or moisture.
- N. HEPA Filtered Fan and Vacuum Units: HEPA filtered fan and vacuum units shall be constructed of durable materials able to withstand damage from rough handling and transportation.
 - 1. Provide units whose cabinets are factory-sealed to prevent asbestos-containing dust from being released during use, transport, or maintenance.
 - 2. Arranged to provide access to and replacement of all air filters from intake end.
 - 3. Unit shall be mounted on casters or wheels.
 - 4. Unit shall have a continuous rubber gasket located between the filter and the filter housing to form a tight seal.
 - 5. Provide HEPA filters that are individually tested and certified by the manufacturer to have an efficiency of not less than 99.97 percent when challenged with 0.3 μm dioctylphthalate (DOP) particles when tested in accordance with Military Standard Number 282 and Army Instruction Manual 136-300-175A. Provide filters that bear a UL 586

label to indicate ability to perform under specified conditions.

6. All air-filtration devices shall be equipped with new HEPA filters prior to beginning of the asbestos abatement activities. Units with used HEPA filters will not be permitted.
- O. Electrical Equipment and Sampling Supplies: Provide necessary electrical equipment and supplies to perform pre, during and post abatement air sampling including but not limited to cords, cables, and power with GFCI.
- P. Adequate toilet facilities must be provided in the vicinity of the clean room external to the work place. Where such facilities do not exist, portable service must be provided.

2.03 WORKER PROTECTIVE CLOTHING AND EQUIPMENT

- A. General: Protective clothing and equipment shall conform to OSHA Standard 29 CFR 1926.1101
- B. Protective Clothing: Workers shall be provided with sufficient sets of properly fitting, full-body, disposable coveralls, head covers, gloves, and 18-inch high boot-type foot covers. Disposable coveralls, head covers, and 18-inch high boot-type foot covers shall be constructed of material equal to DuPont "TYVEK-Type 14" or Kimberly-Clark "Kleenguard", as a minimum requirement.
 1. The Contractor shall provide authorized visitors and the Authority's Environmental Consultant suitable properly fitting protective disposable clothing, headgear, hard hats, eye protection, respiratory protection, and footwear (up to four sets per 8-hour shift) whenever they are required to enter the work area. Safety shoes and hard hats must be in accordance with most recent ANSI standards.
- C. Equipment: Eye protection and hard hats required for job conditions or by applicable safety regulations shall be provided.

- D. Respiratory Protection: The Contractor shall be solely responsible for providing adequate respiratory protection at all times for all individuals in the work area. Types of respirators used shall be approved by MSHA/NIOSH for asbestos in accordance with OSHA Standard 29 CFR 1926.1101 and 29 CFR 1910.134. The Contractor shall provide a level of respiratory protection which supplies an airborne fiber level inside the respirator below 0.01 fibers per cubic centimeter (f/cc), as the minimum level of protection allowed. Determine the proper level of protection by dividing the actual airborne fiber count in the work area by the "protection factors" given below for each respirator type:

<u>Respirator Type</u>	<u>Protection Factor</u>
Air purifying: Negative-pressure respirator, High efficiency HEPA filter, Half-facepiece	10
Air purifying: (quantitative)	50
Negative-pressure respirator, (qualitative) High efficiency HEPA filter, Full-Facepiece	10
Powered air purifying (PAPR): Positive pressure respirator High efficiency HEPA filter, Full-facepiece	100
Type C supplied air: Positive-pressure respirator, Pressure-demand, Full-facepiece HEPA escape	1000
Type C supplied air: Positive-pressure respirator, Pressure-demand, Full-facepiece HEPA escape	1000
Type C supplied air: Pressure-demand,	1000

Full-facepiece
equipped with an auxiliary SCBA

1. The Contractor shall provide workers with individually issued and marked respiratory equipment. Respiratory equipment shall be suitable for the asbestos exposure level(s) in the work area(s), as specified in OSHA Standard 29 CFR 1926.1101, and as more stringently specified otherwise, herein.
2. During the use of supplied air systems the Contractor shall provide authorized visitors, the Authority's Environmental Consultant, and the testing laboratory representative with individually issued and marked respiratory equipment (up to six units). Respiratory equipment shall be compatible with the supplied air system in use, and shall be suitable for the asbestos exposure level(s) in the work area(s), as specified in OSHA Standard 29 CFR 1926.1101, and as more stringently specified otherwise, herein.
3. Where respirators with disposable filter parts are employed, the Contractor will provide sufficient filter parts for replacement as necessary or as required by the applicable regulation.
4. Breathing air supply systems shall conform to the USEPA NIOSH Document EPA-560-OPTS-86-001 (September 1986) entitled "A Guide to Respiratory Protection for the Asbestos Abatement Industry."
5. The Contractor shall have a minimum of two spare air hoses with connectors to permit the Authority's Environmental Consultant or testing laboratory's representative to connect his assigned Type C respirator to the air system at any time without having to wait for personnel to exit the work area in order to obtain a spare hose.

PART 3 - EXECUTION

3.01 DECONTAMINATION ENCLOSURE SYSTEMS

- A. Remote Decontamination Facility: Remote decontamination unit shall be constructed in accordance with OSHA

Standard 29 CFR 1926.1101, 12NYCRR Part 56 and as specified herein.

1. The decontamination enclosure system chambers shall be constructed to meet the criteria of the Specification. The decontamination enclosure shall be installed watertight to prevent water leaks. The interior shall be lined with two layers of 6-mil fire-retardant plastic sheeting, with a minimum overlap of 16 inches at seams and sealed (airtight) by tape and adhesive. The interior floor shall be sheathed with (2) layers of reinforced fire retardant plastic sheeting with a minimum overlap on the wall of sixteen (16) inches. Compliance with local building codes and other regulations governing temporary structures shall be ensured by the contractor.
2. Curtained Doorways: Three overlapping sheets of 6-mil polyethylene shall be placed over a framed doorway and secured along the top of the doorway. Secure the vertical edge of the outer sheets along one vertical side of the doorway and the vertical edge of the center sheet along the opposite vertical side of the doorway. The sheets shall be weighted so that they close quickly after being released.
3. Air Locks: Air locks shall consist of two curtained doorways placed a minimum of three feet apart.
4. Personnel Decontamination Enclosure System: The decontamination enclosure system shall consist of, at least, a shower room and a clean room separated from each other by an airlock as follows:
 - a. Shower Room: The shower room shall have two common air locks: one which separates it from the tent and one which separates it from the clean room. The shower room shall contain at least one shower with hot and cold water adjustable at the tap for every six workers in containment. Careful attention shall be given to the shower to ensure against leaking of any kind. The Contractor shall supply shampoo and soap in the shower room at all times.

- b. Clean Room: The clean room shall share a common air lock with the shower room and shall have a curtained doorway. The clean room shall be sized to adequately accommodate the work crew. The clean room shall not be used for storage of tools, equipment, or materials or as office space.
- B. Full (five-room) Decontamination Facility: A full decontamination enclosure system for large asbestos projects shall be constructed in accordance with OSHA Standard 29 CFR 1926.1101, 12NYCRR Part 56 and as specified herein.
- 1. Structure: Use modular systems or build using wood or metal frame studs, joists, and rafters placed at a maximum of 24 inches on-center. Interior shall be sheathed with plywood caulked or taped airtight at joints and seams. Interior and exterior shall be lined with two layers of 6-mil plastic sheeting, with a minimum overlap of 16 inches at seams and sealed (airtight) by tape and adhesive. The interior floor shall be covered with two (2) layers of reinforced fire-retardant plastic sheeting with a minimum overlap on the walls of sixteen (16) inches.
 - 2. Curtained Doorways: Two overlapping sheets of 6-mil polyethylene shall be placed over a framed doorway and secured along the top of the doorway. Secure the vertical edge of the outer sheet along one vertical side of the doorway. The sheet shall be weighted so that they close quickly after being released.
 - 3. Air Locks: Air locks shall consist of two curtained doorways placed a minimum of three feet apart.
 - 4. Decontamination Enclosure System shall be placed adjacent to the work area and shall consist of three totally enclosed chambers, separated from work area and each other by airlocks, as follows:
 - a. Equipment Room: The equipment room shall have a curtain doorway to separate it from the work area, and share a common curtain doorway with the shower room. The equipment room shall be

large enough to accommodate at least one worker (allowing them enough room to remove their protective clothing and footwear), and a 6-mil disposal bag for collection of discarded clothing and equipment.

- b. Shower Room: The shower room shall have two curtain doorways: one which separates it from the equipment room and one which separates it from the clean room. The shower room shall contain at least one shower, with hot and cold water, per six workers. Careful attention shall be given to the shower to ensure against leaking of any kind. The Contractor shall supply shampoo and soap in the shower room at all times.
 - c. Clean Room: The clean room shall share a common curtain doorway with the shower room and shall have a curtained doorway to separate it from outside non-contaminated areas. Lockable lockers for storage of workers' street clothing and shelves for storing respirators shall be provided in this area. Clean disposable clothing, replacement filters for respirators, clean dry towels, and other necessary items shall also be provided in the clean room.
5. Waste/Equipment Decontamination Enclosure System: This system is located adjacent to the work area and personnel decontamination system. The equipment decontamination enclosure system, consisting of two totally enclosed spaces, shall be constructed as follows:
- a. Equipment Washroom: An equipment washroom shall have two air locks: one adjacent to the work area and one common air lock that separates it from the holding area. The washroom shall have facilities for washing material containers and equipment. Gross removal of dust and debris from contaminated material containers and equipment shall be accomplished in the work area, prior to moving to the washroom.

- b. Holding Area: A holding area shall share a common air lock with the equipment washroom and shall have a curtained doorway to outside areas. A hinged, lockable door shall be placed at the holding area entrance to prevent unauthorized access into the work area.
- C. Decontamination Enclosure System Utilities: Lighting, heat, and electricity shall be provided as necessary by the Contractor, and as specified herein.

3.02 **PERSONNEL PROTECTION AND DECONTAMINATION PROCEDURES**

- A. General: The Contractor shall take all safety measures and precautions necessary to protect his employees and building occupants in accordance with OSHA Standard 29 CFR 1926, EPA Standard 40 CFR, Part 61, Subpart M, and applicable state regulations. The Contractor shall be solely responsible for enforcing personnel protection requirements. Table 3.1 below summarizes the minimum levels of personnel protection required during work of this Section.
 - 1. Workers shall be fully protected with respirators and protective clothing from the time of first disturbance of asbestos-containing or asbestos-contaminated materials prior to commencing actual asbestos abatement until final cleanup is completed.
 - 2. Workers or authorized visitors shall not eat, smoke, drink, or chew gum or other substances while in the work area(s) or decontamination area(s).
 - 3. Contaminated worker footwear, eye protection, and hard hats shall be stored in the equipment room when not in use in the work area and, upon completion of asbestos abatement, disposed of as asbestos-contaminated waste or decontaminated for reuse.

TABLE 3.1

MINIMUM PERSONAL PROTECTION REQUIREMENTS^a

SHOWER		RESPIRATORY DECONTAMINATION PROTECTION	DISPOSABLE CLOTHING	REQUIRED AFTER WORK	UNIT
ACTIVITY					
1.	Removal of "loose items" prior to work - no potential asbestos exposure	None	No	No	No
2.	Removal of "loose items" prior to work - potential asbestos exposure	HMHER	Yes	Yes	Yes
3.	Precleaning prior to abatement	HMHER	Yes	Yes	Yes
4.	Sealing openings prior to abatement no potential asbestos exposure	HMHER	Yes	Yes	Yes
5.	Plasticizing prior to abatement - no potential asbestos exposure	HMHER	Yes	Yes	Yes
6.	Plasticizing prior to abatement - potential asbestos exposure	HMHER	Yes	Yes	Yes
7.	Gross removal (Uncontained work area)	HMHER	Yes	Yes	Yes
8.	Gross removal (Contained work area)	PAPR	Yes	Yes	Yes
9.	Preliminary cleanup (after gross removal)	HMHER	Yes	Yes	Yes
10.	Plastic removal after initial clearance	HMHER	Yes	Yes	Yes
11.	Lockdown	HMHER	Yes	Yes	Yes
12.	Cleaning and plastic removal after lockdown before final clearance	HMHER	Yes	Yes	Yes
13.	Activities after final clearance	None	No	No	No
14.	Loading ACM on truck outside	HMHER	Yes	No	No

a. These are minimum requirements only. The Contractor is fully responsible for the personal protection of all workers at the site. Where conflict or interpretational differences arise, the text of the Specification shall apply.

PAPR Full face mask powered air purifying respirator.

HMHER Half face mask high efficiency respirator.

FFHER Full face mask high efficiency respirator.

4. Except for government inspectors with jurisdiction, no visitors except those authorized by the Authority shall be allowed in work area.

5. Asbestos workers shall not wear any jewelry; e.g. watch, necklace, etc. while in the work area or decontamination area.

B. Worker Respiratory Protection: With approval from the Authority's Environmental Consultant, historical airborne fiber level data may serve as the basis for selection of the level of respiratory protection to be used for the time interval prior to the Contractor establishing the eight-hour time weighted average (TWA)

for an abatement task. Historical data provided by the Contractor shall be based on personal air monitoring of the "breathing zone" of his employees for other asbestos abatement projects, and the data were obtained during work operations conducted under work place conditions closely resembling the processes, type of material, control methods, work practices, and environmental conditions used and prevailing in the Contractor's current operations. Documentation of aforementioned results shall be presented to the Authority's Environmental Consultant for review of applicability. (See "Submittal, Pre-Project Information." This will not relieve the Contractor in providing personal air monitoring to determine the TWA for the work under contract. The TWA shall be determined in accordance with 29 CFR 1926.1101. After the TWA is established, the Contractor may provide respirators as presented in the Specification.

1. Review safety data sheets (SDS) for products to be used during the work. Follow recommendations as given by the product manufacturer for personnel protection required to be worn during product application.
2. Personal Air Monitoring Requirements: The Contractor's CIH monitor shall be responsible for development and implementation of a personal air-monitoring program in accordance with OSHA Standard 29 CFR 1926.1101, good industrial hygiene practices, and the requirements herein for gross removal and/or glove bag-tent removal. Personal air monitoring may be performed by an IH monitor supervised by the Contractor's CIH. Documentation of air sampling shall include as a minimum, calculations of minimum sample volume to achieve necessary detection limits; sampling time; sampling location (or subject); evidence of periodic inspection of sampling equipment; documentation of daily pre- and post-calibration of sampling equipment; detailed description of worker protective devices; description of any typical environmental conditions; and a description of work practices/procedures/controls in operation during the sampling period. Documentation of sample analysis shall include, as a minimum, sample identification; total sample duration, sample flow

rate; the "Limit of Reliable Quantitation"; total air volume; total fibers counted (with work sheets); total fields counted; blank filter analysis; and reticule field area. Airborne fiber concentrations in fibers per cubic centimeter (f/cc) shall be calculated and reported at the 95 percent confidence level.

3. Full-shift personal exposure air sampling of workers shall be performed to establish the 8-hour (TLV-TWA) exposure. Such sampling shall be conducted for each employee (or representative group of employees, at least one sample per eight-man crew) expected to evidence the highest exposure in each work area for each type of activity on the first shift that site preparation, removal, or cleanup activities occur. Similarly, 30-minute personal exposure air sampling shall be conducted during activities anticipated to produce the highest airborne concentrations to determine the Excursion Limit. Personal exposure sampling shall be repeated everyday as per protocol requirements where removal and cleanup operations are conducted for the duration of the project, or at any time that conditions indicate to the Contractor or the Contractor's CIH that the most recent personal sampling results are no longer indicative of employee exposure. PCM personal samples shall be collected and analyzed according to the OSHA Reference Method in OSHA Standard 29 CFR 1926.1101, Appendix B.

C. Personnel Entrance and Decontamination Procedures for Removal Operations Utilizing Remote Decon: The following entry/exit procedures shall be used for removal work areas:

1. All individuals who enter the Work Area shall sign the entry log, located in the clean room, upon each entry and exit. The log shall be permanently bound and shall identify fully the facility, agents, contractor(s), the project, each Work Area, and worker respiratory protection employed. The job supervisor shall be responsible for the maintenance of the log during the abatement activity.

2. Each worker shall remove street clothes in the clean room; wear two disposable suits, including gloves, hoods and non-skid footwear; and put on a clean respirator (with new filters) before entering the work area.
 3. Each worker shall, before leaving the work area or tent, shall clean the outside of the respirators and outer protective clothing by wet cleaning and/or HEPA vacuuming. The outer disposable suit shall be removed in the work area and the worker shall then proceed to the shower room. The inner disposable suit and respirator shall be wet wiped and HEPA vacuumed thoroughly before removing and prior to aggressive shower.
 4. Following showering and drying off, each worker or authorized visitor shall proceed directly to the clean room, dress in street clothes, and exit the decontamination enclosure system immediately.
- D. Personnel Entrance and Decontamination Procedures for Gross Removal Operations Utilizing Full Decontamination Facility: The following entry/exit procedures shall be used for gross removal using full containment:
1. All workers and authorized visitors shall enter the work area through the worker decontamination enclosure system.
 2. All individuals who enter the work area shall sign the entry log, located in the clean room, upon each entry and exit. The log shall be permanently bound and shall identify fully the facility, agents, contractor(s), the project, each work area and worker respiratory protection employed. The site supervisor shall be responsible for the maintenance of the log during the abatement activity.
 3. Each worker or authorized visitor shall, upon entering the job site, remove street clothes in the clean room and put on a clean respirator (with new filters, if appropriate) and clean protective clothing before entering the work area through the shower room and equipment room.

4. Each worker or authorized visitor shall, each time he leaves the work area: remove gross contamination from clothing before leaving the work area; proceed to the equipment room and remove all clothing except the respirator; still wearing the respirator, proceed to the shower room; clean the outside of the respirator with soap and water while showering; remove filters, wet them, and dispose of them in the container provided for that purpose; wash and rinse the inside of the respirator; and thoroughly shampoo and wash himself/herself.
5. Following showering and drying off, each worker or authorized visitor shall proceed directly to the clean room, dress in street clothes, and exit the decontamination enclosure system immediately. Disposable clothing of the type worn inside the work area is not permitted outside the work area.

3.03 PREPARATION OF WORK AREA

The following Paragraph "General Preparations" outlines procedures applicable to all work areas. Work procedures specific for preparing each asbestos removal area is addressed in its respective Subparagraph.

- A. Prior to the start of abatement activities, the Authority's Abatement Contractor must provide notification to all occupants of the work place and immediate adjacent areas of the asbestos project, as well as posting the abatement notices for the school occupants where school announcements are posted (or if not available, on a wall adjacent to the General Office). Information provided in the notification must include contractor, project location and size, amount and type of ACM, abatement procedure, dates of expected occurrence and the Call Center "311" for government information and services. Postings of this notification must be in English and Spanish, at eye level, in a conspicuous, well-lit place, at the entrances to the work place and immediate adjacent areas. The notice must have the following heading: NOTICE OF ASBESTOS ABATEMENT, in a minimum of two-inch sans serif, gothic or block style lettering, with the balance of the lettering of the notice to be of the same type lettering in a minimum of one-inch size. The notices must be posted 7 calendar days prior to the start of the project

and must remain posted until clearance air monitoring is satisfactorily concluded.

- B. Floor plan showing the areas of the building under abatement and the location of all fire exits in said areas shall be prominently posted in the building lobby or comparable location, along with a notice stating the location within the building of the negative air cutoff switch required under section 1-91(f) of Title 15, Chapter 1 requirements, if applicable.
- C. General Procedures for Gross Removal of Asbestos Containing Materials including but not limited to Plaster Material, Fireproofing Material, Thermal System Insulation (Pipe Lagging, Duct Insulation), Non-Structural Concrete Floor Fill Material, Ceiling Tiles, Electrical Wire, etc. Using Full Containment Procedures: The Contractor shall perform the following general and gross area preparations for each work area to undergo gross removal using full containment.
 - 1. Request that the Authority's Environmental Consultant perform area monitoring and establish a background count prior to the preparatory operations for each removal area.
 - 2. Erect barricades; post notices and warning signs.
 - 3. Shut down, isolate, and lock out or tag Heating, Ventilating, and Air Conditioning (HVAC) systems that serve or which pass through the work area. Vents within the work area and seams in HVAC components shall be sealed with tape and two layers of plastic sheeting. Filters in HVAC systems shall be removed and treated as asbestos-contaminated waste.
 - 4. Shut down, disconnect, and lock out or tag all electric power to the work area so that there is no possibility of its reactivation until after clearance testing of the work area.

5. No smoking signs shall be maintained and prominently displayed within the work place. The sign shall be a minimum of 10 by 14 inches and shall bear the International "No Smoking" symbol, under the work "NO SMOKING" shall be printed in minimum 2" letter size.
6. Provide and install decontamination enclosure systems in accordance with Article 3.01 (B), "Decontamination Enclosure Systems". Prior to installation of decontamination enclosure system, the floor area shall be covered with one layer of 6-mil plastic sheeting and then 1/2 inch rigid flooring prior to normal decon construction. This procedure (when required) is necessary to protect the existing carpet from being contaminated.
7. Seal floor drains, sumps and other collection devices with two layers of 6-mil plastic and plywood, as necessary, and provide a system to collect all water used by the Contractor. Collected water shall be passed through a water filtration system prior to being discharged into the sanitary sewer.
8. Ensure that the Contractor's communication equipment is in place, in operating condition, and in operation during work described in this Section.
9. Ensure that the Contractor's approved Fall Protection Equipment is in place, in operating condition, and in operation during work described in this section.
10. Separate by means of airtight barriers (isolation barriers) parts of the building that are not included in the work area(s) from parts of the building that will undergo asbestos abatement.
11. Seal with isolation barriers all open doorways, cased openings, and corridors which will not be used for passage during work. Any opening equal to or more than 32 square feet shall be sealed with solid isolation barriers.

12. When elevators are running through the work area, the elevator door in the work area must be enclosed with conventional 2 x 4 stud framing, covered with 3/8" plywood sheathing and sealed at all edges and seams. The barrier shall be covered and lapped for eight (8) inches with two layers of 6-mil fire retardant plastic adhered individually with edges taped for air tightness. There shall be no more than a six-inch clearance between the elevator door and hard wall barrier. Elevators that remain on operation shall have elevator control modified to bypass the work area.
13. Elevator shafts shall not be used as waste chutes or to convey any ACM.
14. Signage must be posted in the main lobby stating the specific floors where the elevators are out of service due to abatement.
15. Isolation barriers shall extend from the floor to the drop ceiling and form an airtight seal. They shall be built using wood or metal framing at 24-inch on-center faced with plywood sheathing, and shall be braced as necessary. Both sides of the isolation barrier shall be covered with a double layer of 6-mil plastic sheeting, with joints staggered and sealed with tape. Edges of the temporary partition at the floor, walls, and ceiling shall be taped and caulked airtight. Isolation barriers larger than 32 square feet shall be sheathed on the work area side with 3/8 inch plywood sheathing.
16. Completely seal airtight and isolate the work area. All openings, including but not limited to doorways, windows, tunnels, ducts, grilles, cracks, diffusers, openings through which pipe conduit passes, and any other penetrations of the work area, shall be covered with plastic sheeting taped or caulked airtight.
17. Maintain emergency and fire exits from the work areas or establish alternative exits satisfactory to the local fire officials. Emergency exits and routes shall be established and clearly marked with fluorescent paint or other effective designations

to permit easy location from anywhere within the work area. Emergency exits shall be secured to prevent access from uncontaminated areas and yet permit emergency exiting. Exits shall be checked daily against exterior blockage or impediments to exiting.

18. Where the opening is an exit covered plastic, or where a partition would block egress, the partition shall consist of two sheets of fire- retardant 6-mil plastic, prominently marked as an exit with photoluminescent paint or signage. Cutting tools (e.g., knife, razor) shall be attached to the work area side of the sheeting for use in the event that the barrier must be cut open to allow egress.
19. Temporary lighting within the work area and decontamination system shall be provided as required to achieve minimum illumination levels.
20. After sealing and plasticizing the area, install and initiate operation of air filtration devices to provide a negative pressure of at least -0.02 inches of water and four (4) changes per hour within the work area relative to surrounding non-work areas. Do not shut down AFD's until the work area is released to the Owner following final clearance procedures.
21. Hand power tools used to drill, cut into, or otherwise disturb ACM shall be equipped with HEPA filtered local exhaust ventilation.
22. Scaffolds shall be provided for workers engaged in work that cannot safely be performed from the ground or other solid work area surface.
23. Work Area Precleaning Procedures: After establishing the decontamination enclosure systems, prepare and preclean the work area as specified below and as indicated by the drawing notes:
 - a. Movable and loose items not removed by the Authority from work areas shall be cleaned using HEPA vacuum equipment and/or wet cleaning methods as appropriate and shall be

removed from the work area and stored at the Owner's direction.

- b. Movable and loose items contaminated with asbestos shall be removed from the work areas and properly discarded as asbestos-contaminated waste.
 - c. Fixed objects within the work area shall be precleaned using HEPA vacuum equipment and/or wet cleaning methods as appropriate. Joints of covers or casings shall be sealed with tape and fixed objects enclosed with a minimum of two layers of 6-mil plastic sheeting sealed airtight with tape. Disassembly of these fixed objects is not required unless otherwise noted. Fixed objects shall include, but not be limited to, light fixtures, junction boxes, hangers and black carrying channels.
 - d. Prior to being plasticized, the work areas shall be cleaned using HEPA vacuum equipment and/or wet cleaning methods as appropriate. Methods that raise dust, such as dry sweeping or vacuuming with equipment not equipped with HEPA filters, shall not be used. Carpeting in all work areas will remain in place. It shall be covered with one layer of 6-mil plastic sheeting and than 1/2 inches of rigid flooring prior to normal plasticizing.
24. Plasticize the area after precleaning, using the following procedure:
- a. Cover floor with one layer of 6-mil plastic sheet, turning layer a minimum of 12 inches up wall, and seal layer to wall.
 - b. Cover walls with one layer of 6-mil plastic sheet, lapping wall layer a minimum of 12 inches, and seal layer to floor layer.
 - c. Repeat procedure for second layer. All joints in plastic sheets shall be glued and taped in such a manner as to prohibit air passage. Joints on plastic layers shall be staggered to reduce the potential for water to penetrate.

25. Suspended ceiling tiles and T-grid components shall remain in place until the preparation of the work area below the ceiling tiles are completed and personnel and equipment decontamination enclosures have been constructed.
26. As soon as the preparation of the work area below the drop ceiling are completed to the satisfaction of the Authority's representative or the consultant, the contractor and consultant shall locate and identify the limits of the boundary in the phase area they are working. They shall extend the isolation barriers up to the ceiling deck by using the following procedures:
 - a. A two-man team shall conduct spot removal where isolation barriers need to be extended up to the deck.
 - b. The Contractor shall remove at least two rows of existing drop ceiling to gain access to the plenum to identify boundary of the work area.
 - c. The Contractor shall spray-mist and remove section of the spray-applied fireproofing at least one foot wide along the work area boundary. One handler shall scrape the materials while the other handler holds the ACM waste bag directly below.
 - d. No spray-applied fireproofing shall be allowed to fall in the drop ceiling or floor area.
27. As soon as the extension of isolation barriers are completed, Contractor shall remove the existing ceiling tiles, cross runners and main runners. All materials shall be disposed as ACM waste. As demolition of ceiling tiles progresses, seal any penetrations along the perimeter in the work area as they are exposed. Seal openings with isolation barrier.
28. When removal of suspended ceiling tiles are completed, preclean and seal airtight ceiling support systems and metal ductwork prior to beginning of asbestos abatement.

29. Areas immediately adjacent to removal areas, such as corridors or hallways that are not in work areas but are necessary routes to and from work areas, shall be protected with two layers of 6-mil plastic sheet on floors and two layers of 6-mil plastic sheet on walls and ceilings.
30. An application for variance must be submitted to the NYCDEP at least two weeks prior to the commencement of work if live electrical wires are to remain inside the work area. Work involving variance shall not commence prior to the receipt of the Department's approval of the variance petition.

3.04 PRE-REMOVAL INSPECTIONS

- A. Prior to removal of any ACM, the Contractor shall notify the Authority's Environmental Consultant and request a pre-removal inspection. Posting of warning signs, plasticizing of work area, building of decontamination enclosure systems, and all other preparatory steps have been taken prior to notification of the Authority's Environmental Consultant. The Contractor shall not begin asbestos removal until the Authority's Environmental provides a written approval to proceed.

3.05 MAINTENANCE OF CONTAINED WORK AREA AND DECONTAMINATION ENCLOSURE SYSTEMS

- A. Ensure that barriers and plastic linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately upon their discovery. Visually inspect enclosures at the beginning and end of each work period.
- B. Visually inspect non-work areas and the decontamination enclosure system for water leakage. Check the floor below, ceiling and walls, and view beneath/or around the decontamination enclosure system, for signs of leakage. Perform the visual inspection a minimum of twice each 8-hour work shift.

3.06 REMOVAL OF ASBESTOS-CONTAINING MATERIAL

A. General: The Contractor shall be responsible for the proper removal of ACM from the work area using standard abatement industry removal techniques. Work shall be observed by the Authority's Environmental Consultant or his representative. Approval of the Contractor's abatement techniques is required by the Authority's Environmental Consultant to allow for the continuance of work.

B. Pipe & Pipe Joint Insulation Removal:

1. Removal of asbestos containing Thermal System Insulation using full containment procedures (large projects).

a. The Contractor shall use work methods and equipment that will keep the fiber count during abatement operations inside the work area to less than 0.1 fibers/cc of air when tested by NIOSH Method 7400. Prepare the area as described in Subparagraph "Gross Removal Area Preparations" of this Section. Spray asbestos materials with a fine mist of amended water or removal encapsulant, saturating materials to substrate. Spray the asbestos material repeatedly during work process to maintain a wet condition and to minimize asbestos fiber dispersion. Do not over saturate and cause excess dripping. Remove the saturated asbestos material in small sections.

b. Remove mounted objects: remove, clean and store outside the work area or remove and dispose as asbestos waste (as required by Project Manual) ceiling and wall mounted objects that interfere with asbestos abatement.

c. For plaster abatement, cut wire lath into manageable sections. Cut hanger wires supporting lath and remove asbestos containing material and ceiling intact without dropping them to the floor.

- d. As the asbestos material is removed, pack the material in sealable plastic bags which shall be placed in labeled drums for transport. Remove saturated asbestos material in small sections, minimizing free fall. Remove asbestos materials carefully from equipment. Materials shall not be allowed to dry out.
 - e. Provide a drop chute to contain materials through descent if fall exceeds ten feet. Vertical chutes are prohibited. Maximum inclination from horizontal shall be 60 degrees. Material shall not be allowed to dry out. Metal shovels shall not be used to pick up or move accumulated ACM waste in the vicinity of plastic floor and wall barriers.
 - f. After removal of lath and asbestos containing material, either remove any overspray on decking and any structures above using a stiff nylon bristled brush or clean by some equivalent method to remove all visible residue.
 - g. After completion of all stripping work, surfaces from which ACM have been removed shall be wet brushed and sponged or cleaned by some equivalent method to remove all visible residue. (Do not use wire brushes.)
 - h. After the ACM removal and bagging, the bagged waste shall be HEPA-vacuumed then wet cleaned and transferred into the shower room for double bagging. The goose-neck and double-bagged waste shall be transferred outside the clean room for its final transfer for storage in an enclosed waste container.
 - i. Upon completion of the abatement, the enclosed surfaces shall be wet cleaned by using rags, mops or sponges.
2. Removal of asbestos TSI utilizing Tent Procedures (For Gross Removal) as follows:
- a. All tent enclosures and contiguous spaces within a radius of 10 feet shall be roped off

and regulated to allow only certified workers and authorized visitors to enter.

- b. 15 RCNY § 1-106 shall be complied with except that (1) all tents shall be lined with two (2) layers of plastic sheeting (6-mil thickness at a minimum), (2) the amounts of ACM that may be abated in each tent shall NOT EXCEED (a) 160 square feet, or (b) 260 linear feet, or © 160 combined feet (square plus linear), and (3) the total amount of ACM that may be abated at any one time in several tents shall NOT EXCEED 1,000 combined square feet plus linear feet.
- c. Work Area Pre-cleaning Procedures: After establishing decontamination enclosure systems, prepare and pre-clean the work area as specified below:
 - 1. Movable and loose items not removed by the Owner from work areas shall be cleaned using HEPA vacuum equipment and/or wet cleaning methods as appropriate and shall be removed by the Contractor.
 - 2. Movable and loose items contaminated with asbestos shall be wrapped or placed in labeled ACM bags. Sealed ACM bags shall be removed from the work areas and properly discarded as asbestos-contaminated waste.
 - 3. Fixed objects within the work area shall be pre-cleaned using HEPA vacuum equipment and/or wet cleaning methods as appropriate. Joints of covers or casings shall be sealed with tape and fixed objects enclosed with a minimum of two layers of 6-mil plastic sheeting sealed airtight with tape. Disassembly of these fixed objects is not required unless otherwise noted.
 - 4. Prior to being plasticized, the work areas shall be cleaned using HEPA vacuum

equipment and/or wet cleaning methods as appropriate. Methods that raise dust, such as dry sweeping or vacuuming with equipment not equipped with HEPA filters, shall not be used.

- d. All tents shall be fully framed (including horizontally across the top, if applicable) with 2x3 (minimum) wood or metal studs spaced not more than 36 inch center-to-center vertically around all sides (except at the entry/exit which shall not exceed 36 inch width); and
- e. A minimum of one air volume change per 15 minutes through each tent shall be maintained.
- f. An airlock having at least 3 feet length between the two curtained doorways shall be constructed at the entrance to each and every tent if the decontamination unit is not attached to the tents.
- g. If a decontamination unit is not attached to each tent, located within each airlock there shall be extra clean and uncontaminated disposable protective suits (e.g., Tyveks), and one such clean suit shall be worn by each worker in the airlock, immediately after removal of the outer suit as per 15 RCNY § 1-106(k), before each worker exits any airlock.
- h. Any decontamination unit that is not attached to a tent (i.e., that is remote from a tent) shall be constructed as specified in Section 3.01 of this specification.
- i. Decontamination units that are attached to tents shall comprise at least a shower room and a clean room, with one curtained doorway separating them, and with a second curtained doorway separating the tent from the shower room. Any decontamination unit that is not attached to a tent (i.e., that is remote from a tent) shall be constructed as specified in Section 3.01 of this specification.

- j. Located within each airlock there shall be extra clean and uncontaminated disposable protective suits (e.g., Tyveks), and one such clean suit shall be worn by each worker in the airlock, immediately after removal of the outer suit, before each worker exits any airlock.
- k. Scrape asbestos containing materials completely from the substrate surfaces. No residue shall remain on substrate after the stripping work is completed.
- l. After the ACM removal and bagging, the bagged waste shall be HEPA-vacuumed then wet cleaned and transferred into the airlock or into the shower room for double bagging, and thereafter the double-bagged waste shall be transferred outside the airlock or outside the clean room for its final transfer for storage in an enclosed waste container.
- m. Upon completion of the abatement, the tent work area shall wet cleaned by using rags, mops or sponges and be lightly encapsulated with clear encapsulant to lockdown residual asbestos.
- n. For window frame removal, if tent is inside of the building, install two layers of polyethylene sheeting outside and around the window frame and caulking, sealing it to form an airtight barrier between the window and caulking and the exterior of the building. If tent is outside of the building, install two layers of polyethylene sheeting inside and around the window frame and caulking, sealing it to form an airtight barrier between the window and caulking and the interior of the building.
- o. An application for variance must be submitted to the NYCDEP if live electrical wires are to remain inside the work area.

Elevated Containment

A layer of reinforced 10-mil fire-retardant poly in addition to the two layers of 6-mil poly on the floor of the elevated containment.

Scaffolding erected for the demolition of the ceiling shall be signed off by a licensed PE and approved by the SCA Safety Unit. The contractor shall solely be responsible for any delays resulting from the rejection of his/her design by the Safety Unit.

All workers shall wear harnesses and lifelines at all times within the elevated containment.

Hard hats shall also be worn at all times within the elevated containment.

There shall be a licensed Asbestos Handler Supervisor within the elevated containment and one outside the containment at all times. They shall both have operational two-way radios.

All workers within the elevated containment shall be certified in the proper use of scaffold and harnesses as per new NYC local Law 52.

C. PROCEDURES FOR INSTALLATION OF ELECTRICAL CONDUITS, RISERS AND POWER SOURCE EQUIPMENT

Removal of Materials at Core Drill Locations: The Contractor shall use work methods and equipment that will keep the fiber count during abatement operations inside the work area to less than 0.1 fibers/cc of air when tested by NIOSH Method 7400.

Method One: Drilling completely through ceilings and floors - Tent Work.

1. All work shall be conducted by licensed asbestos handlers. An asbestos supervisor shall be present and oversee the work.
2. All work shall be conducted when school is not in session.
3. Locations where work is to be conducted are regulated areas which are to be restricted and posted in accordance with applicable regulations.

4. Respirators and disposable clothes (TYVEK Suits) are to be worn for the duration of the work.
5. A temporary Decontamination Unit shall be located on the premises in proximity to the work area.
6. Tents shall be installed on the floor below and the floor where the penetration is to be made. Each Tent shall be individually attached to its own negative air pressure equipment. Tents shall have a change room. Individuals working in the tent shall wear two disposable suits removing one upon exiting the tent. The worker shall then proceed directly to the shower and decontaminate.
7. Drilling to effect the installation of electrical conduit risers shall be conducted inside the tent enclosure. Air samples will be taken as prescribed by the United States Environmental Protection Agency regarding clearance of "mini-enclosures" pertaining to . New York City Department Environmental Protection "durings" air samples will also be employed as described below. At the conclusion of the drilling loose debris At the conclusion of the drilling loose debris shall be HEPA vacuumed and wet cleaned. Encapsulant shall be applied prior to air clearance of the tent. All openings and perimeters of openings shall be secured from delamination caused by subsequent work by other trades prior to air clearance testing. All equipment used for the drilling shall be wet wiped and HEPA vacuumed in the tent prior to removal.
8. Phase Contrast Microscopy (PCM) will be employed during abatement and to clear each tent. Two During Samples (Phase Contrast Microscopy) outside the tent will be taken at the start of the drilling and conclude at the completion of the drilling. For clearance, a minimum of two samples will be taken inside

and two samples will be taken outside of each tent. Each of the samples analyzed from inside the tent must be below the limit of detection of 0.01 f/cc. Analysis of PCM samples will be via NIOSH 7400 protocol. If PCM samples fail, TEM analysis via NIOSH 7402 protocol will be utilized. All air tests, except OSHA personals, will be provided by others.

9. In the event of a breach in the tent, Transmission Electron Microscopy will be used to establish the Authority's re-occupancy criteria.
10. Upon notification of successful clearance the tent shall be broken down and disposed of as ACM contaminated waste.
11. Work utilizing this method cannot be carried on simultaneously with work utilizing method two described below in the same work area.

Method Two: Drilling completely through walls. Drilling into any surface to effect the installation of conduit, hangers cabinets, fastening devices, carriers, supports, floor outlets, and/or other related equipment and devices.

1. All work shall be conducted by licensed asbestos handlers. An asbestos supervisor shall be present and oversee all work.
2. All work shall be conducted when school is not in session.
3. The work area for each phase of the project will be delineated by the Authority or its designated representative. In general this will be limited to one of the following:
 - a. An entire floor.
 - b. A group of rooms on one floor and the adjoining corridor.
 - c. A single room.

This shall be considered a regulated area which is required to have restricted access

and have signs posted in accordance with applicable rules and regulations.

4. All powered tools used to make the penetrations shall be equipped with a GS 81 vacuum system, as manufactured by NILFISK, or its equivalent. The system shall be connected to a portable HEPA vacuum.
5. Respirators and disposable clothes (TYVEK Suits) are to be worn for the duration of the work.
6. A temporary Decontamination Unit shall be located on the premises.
7. Plastic drop cloths shall be used under all ceiling and wall penetrations. Where feasible, these cloths shall extend at least five feet in any direction from the penetration or up to one foot up the wall. Plastic shall be fire retardant and at least 6 mils thick.
8. Portable hand held mist spray bottles shall be utilized with amended water to wet both localized areas impacted and general cleaning.
9. After completion of each penetration and the wet cleaning the areas on each side of the opening, the inside of the hole shall be encapsulated using a penetrating encapsulant. After each use tools shall be wet wiped. The cleaning medium shall be disposed of as ACM contaminated waste.
10. Phase Contrast Microscopy (PCM) "Durings" will be employed to verify cleanliness and project completion. A minimum of five (5) PCM samples will be taken inside each defined work area. Each of the samples analyzed from inside the work area must be below the limit of detection of 0.01 f/cc. Analysis of PCM samples will be via NIOSH 7400 protocol. If PCM samples fail, TEM analysis via NIOSH 7402 protocol will be utilized. All air tests, except OSHA personals, will be provided by Authority.

11. If the integrity of the local HEPA exhaust is breached, the OSHA (PEL) exceeded, or area samples are above 0.01 f/cc, all work shall stop and rules addressing such instances shall be complied with as per Rules of the City of New York, Title 15 New York City Department of Environmental Protection.
12. Upon completion of the work scheduled and verification, by the Authority's Project Monitor, that all air samples are acceptable, the contractor shall continue to the next area.
13. At the conclusion of each scheduled operation the workers shall proceed to the Decontamination Unit and shower out. Tools shall be wet wiped and HEPA vacuumed at the end of the scheduled work and left in a non-permeable container until their next use.
14. Work utilizing this method cannot be carried on simultaneously with work utilizing method one described above in the same work area.

D. Built-up Roof and Flashing Removal

These procedures apply only to the removal of asbestos-containing roofing material (ACRM) from exterior roof surfaces. With the exception of 1-41(c), 1-41(d), 1-81(m), 1-81(p), 1-91, 1-102(b), 1-112(d), and 1-112(e), all sections of Chapter 1 of Title 15 shall be followed in conjunction with procedure specified herein.

1. Preliminary examination shall be conducted and precautions shall be taken to prevent damage to the interior of the building and to ensure no adverse effect on the structural stability of the roof due to the abatement activity.
2. Abatement shall not be carried out during adverse weather conditions (e.g., precipitation, heavy winds, ambient temperature below 32 degrees Fahrenheit, etc.).

3. The work area on the roof shall be cordoned off, and only authorized persons shall have access to the "designated" work area.
4. Movable objects shall be removed from the work area, or kept in place and wrapped in one sheet of 6-mil plastic sheeting. Fixed objects including perimeter walls, bulkheads, cooling towers, ducts and other rooftop appurtenances shall be covered in one sheet of plastic (minimum height = 6 ft.).
5. The worker decontamination unit may be attached to each work area at an entry/exit from each work area in accordance with section 1-82 of Chapter 1 of Title 15, or may be remote, in which case it shall be equipped with an airlock at the entrance. In addition to the shower head(s), the shower room shall be equipped with a flexible hose for waste decontamination for removal of less than 1,000 square feet of ACRM.
6. For 1,000 square feet or more of ACRM removal, a separate waste decontamination facility as per section 1-83 of Chapter 1 of Title 15 shall be located at an entry/exit from each work area.
7. The remote holding area for the asbestos containing waste shall comply with Title 16, Chapter 8, Rules of the City of New York. (16 RCNY 8 et seq.).
8. Provisions shall be made to ensure a safe and adequate air supply to affected building(s). All vents, skylights, air intakes, windows and doors opening onto the roof, and all other openings are to be sealed with two layers of 6-mil plastic or fitted with HEPA-filters where appropriate. In lieu of sealing vents, air intakes, etc. can be vertically extended temporarily to a height of ten feet with two layers of plastic or HEPA-filters. Drains may be equipped with 5-micron filtering systems in lieu of being sealed.
9. Fixed objects including perimeter walls, bulkheads, cooling towers, ducts and other rooftop accessories must be covered in one sheet of fire retardant 6-mil plastic up to a height of at least six feet.

10. Prior to actual removal, the built-up roofing and flashing shall be blanketed and wetted with a minimum 1" coating of the acceptable foam or viscous liquid which shall be maintained for the duration of the removal until the material is bagged. The foam or viscous liquid shall be confined to the work area.
11. The foam or viscous liquid shall be non-toxic, shall not require special respiratory protection for handling, and shall not affect the handling and disposal of the waste.
12. Manual methods of removal are recommended; however, if hand-held power tools are used to drill, cut into, or otherwise disturb the asbestos-containing roofing material, the power tools shall be equipped with HEPA-filtered local exhaust ventilation and operated to prevent potential fiber release.
13. Portable HEPA-vacuum machines shall be available during abatement.
14. After the ACM removal and bagging, the bagged waste shall be HEPA-vacuumed then wet cleaned and transferred into the shower room for double bagging. The double-bagged waste shall be transferred outside the clean room for its final transfer for storage in an enclosed waste container.
15. Upon completion of the abatement in roof work area, clean-up procedures shall involve removal and bagging of:
 - a. the asbestos containing roofing material (ACRM)
 - b. visible accumulations of asbestos containing waste
 - c. all excess foam or similar viscous liquid
 - d. all debris, and shall be followed by a thorough wet cleaning.

- e. All tools shall be wet cleaned and HEPA-vacuumed, and then removed from the work area upon completion.
- 16. The work area shall be allowed to dry completely before the visual inspection is conducted. The inspection shall confirm the absence in the work area of:
 - a. ACM or ACW bags or debris
 - b. excess foam or other viscous liquid.
- 17. If the work area fails visual inspection, it shall undergo another wet cleaning and/or HEPA vacuuming until it passes the visual inspection.
- 18. When the visual inspection and clearance testing is successful, all plastic may be removed.
- 19. Remove all layers of roofing materials including concealed layers of membrane, vapor barriers, screed, plywood between roofing materials, etc., down to the structural slab, at no additional cost to the Authority, unless otherwise specified by the architect/engineer.

E. Additional Removal Requirements

- 1. The Authority's Environmental Consultant shall issue a stop work order if visible emissions are detected outside the work areas and/or should the fiber count in adjacent non-work areas exceed 0.01 f/cc of air or the background count (use the greater of these two values as the reference). Work shall not resume until the condition(s) causing the increase are corrected, surfaces outside of the work area are decontaminated using HEPA vacuums or wet cleaning techniques, and the Contractor receives written notice from the Authority's Environmental Consultant.

3.07 ACM WASTE PACKAGING AND LOAD OUT PROCEDURES

- A. Packaging of ACM shall conform to OSHA Standard 29 CFR 1926.1101, DOT 49 CFR 171,172, and 173, EPA Standard 40 CFR Part 61, New York City Department of Sanitation (in

relation to transport, storage, and disposal of ACM) and the requirement as heretofore specified. ACM waste shall be placed in a wet condition into properly labeled disposal bags or sealed in two layers of 6-mil plastic sheeting wrapped airtight and properly labeled. Materials to be transported through a non-work area building space shall be placed in hard wall shipping containers for handling. Specific requirements for decontamination of waste containers and load out through decontamination enclosure systems are outlined below.

- B. Decontamination of Impermeable Containers and Plastic Disposal Bags: For Sash Removal, Caulking Removal, Frame and Sash Removal, Built-up roofing and Flashing Removal, Plaster Removal, and Thermal System Insulation (Small Project Removal), the following procedure shall be used when removing ACM from the work area for load out through the personnel decontamination enclosure system (remote decon).
1. Waste removal shall not occur during worker shift changes or when workers are showering or changing.
 2. Place asbestos waste in disposal bags. Large items not able to fit into disposal bags shall be wrapped in two layers of 6-mil thick plastic sheeting. Clean outer covering of asbestos waste package by wet cleaning and/or HEPA vacuuming in the work area before transferring such items into the decontamination enclosure system.
 3. Sealed window sash shall be taken to the staging area and then completely plasticized with an additional layer of 6-mil plastic sealed with tape. Place materials in hard wall containers, if required.
 4. The clean containerized items or wrapped window sashes shall be moved into a lockable waste container.
- C. Waste Load-out Through Equipment Decontamination Enclosure (Full Decontamination Facility): For Plaster Removal (Large Project), Floor Tile and Mastic Removal, Fireproofing Material Removal, Thermal System Insulation Removal (Large Project), and Non-Structural Concrete Floor Fill Material Removal, the following waste

packaging and decontamination procedures shall be used when removing ACM from the work area by load out through the equipment decontamination enclosure system:

1. Place asbestos waste in disposal bags. Large items not able to fit into disposal bags shall be wrapped in one layer of 6-mil thick plastic sheeting. Clean outer covering of asbestos waste package by wet cleaning and/or HEPA vacuuming in a designated part of the work area. Move wrapped asbestos waste to the equipment washroom, wet clean each bag or object and place it inside a second disposal bag, or a second layer of 6-mil plastic sheeting, as the item's physical characteristics demand. Air volume shall be minimized, and the bags or sheeting shall be sealed airtight with tape.
2. The clean containerized items shall be moved to the equipment decontamination enclosure holding area pending load-out to storage or disposal facilities.
3. Load-out of containers from the decontamination enclosure holding area shall be performed by workers who have entered the equipment decontamination enclosure system from the uncontaminated non-work area. Dress workers moving asbestos waste to storage or disposal facilities in clean overalls of a color different than from that of coveralls used in the work area. Ensure that workers do not enter from uncontaminated areas into the equipment washroom or the work area. Ensure that contaminated workers do not exit the work area through the equipment decontamination enclosure system.
4. Thoroughly clean the equipment decontamination enclosure system immediately upon completion of the waste load-out activities, and at the completion of each work shift.
5. Labeled ACM waste containers or bags shall not be used for non-ACM debris or trash. Any materials placed in labeled containers or bags, whether turned inside out or not, shall be handled and disposed of as ACM waste.

- D. Asbestos containing Caulking Materials contaminated with PCB shall be disposed of as PCB material as specified in Sections S01900 and 02082. Store all materials at the job site in a suitable and designated area. Store materials away from wet or damp surfaces and under cover. Storage areas shall be kept clean and organized.
1. All PCB waste must be located at or near the point of generation in a locked area. Up to 55 gallons may be stored at the point of generation for an indefinite period, but any more than 55 gallons must be moved within 3 days to a Container storage area (CSA) as specified in 6 NYCRR Section 372.2 "Standards Applicable to Generators of Hazardous Waste", or off site. Waste may be stored at the CSA for 90 days, during which labeling, inspections, and other requirements must be met as described in 6 NYCRR Section 372.2, Section 373-3.1(d) and Subpart 373-3.
 2. While on-site, the container shall be labeled with PCB Warning Labels and DEC Hazardous Waste Labels. All waste containers shall be fully enclosed and lockable (i.e. enclosed dumpster, trailer, etc.)

3.08 CLEANUP, AND CLEARANCE TESTING OF WORK AREAS

- A. Area air samples will be collected during and after abatement according to established air clearance criteria per in compliance with New York State ICR 56 and New York City Chapter 1, Asbestos Control Program.
- B. Minimum Volume: PCM Samples - 1800 liters; TEM Samples- 1250 liters.
- C. Flow Rate; PCM Samples 5 to 15 liters/min.; TEM Samples 1 to 10 liters/min.
- D. Clearance procedure for areas completed utilizing full enclosures shall be following four steps:
- | | | |
|---------|--------------------|---|
| Step 1. | First Cleanup | Visual Inspection |
| Step 2. | Second Cleanup | Visual Inspection |
| Step 3. | Third Cleanup | Visual Inspection |
| Step 4. | Final Re-occupancy | Visual Insp., fiber count of <0.01 fiber/cc of air using NIOSH method |

7400 and <70 s/mm² of air using TEM analysis procedures.

1. Step 1. First Cleanup
 - a. Remove any visible accumulation of asbestos material and debris. All sealed drums, plastic bags, and equipment used in the work area shall be removed from the work area. The waste decontamination enclosure system shall be wet cleaned twice using wet cleaning methods upon completion of waste removal.
 - b. Upon request of the Contractor the IH will perform a visual inspection. Evidence of asbestos contamination identified during the inspection will necessitate further cleaning as heretofore specified.
 - c. A thin coat of lockdown encapsulant shall be applied to all surfaces in the work area that were not the subject of removal or abatement, including the cleaned layer of the surface barriers, but excepting sprinklers, standpipes, and other active elements of the fire suppression system.
2. Step 2: Second Cleanup
 - a. Twelve (12) hours after the First Cleanup, the cleaned and encapsulated layer of the surface barriers shall be removed from the walls and floors.
 - b. All objects and surfaces in the work area shall be HEPA vacuumed and wet cleaned a second time (second cleaning).
3. Step 3: Third Cleanup
 - a. Four hours after the second cleanup, the remaining plastic barriers shall be removed from the walls and floors. All objects and surfaces in the work shall be HEPA vacuumed and wet cleaned a third time (third cleaning).

- b. All containerized waste shall be removed from the work area through the decontamination enclosures and the holding area.
- c. All tools and equipment shall be removed from the work area and decontaminated in the waste decontamination enclosure system.
- d. A thorough visual inspection shall verify the absence of asbestos-containing waste material and dust.

4. Step 4: Final Re-occupancy

- a. Sampling shall not begin until at least one (1) hour after the area is dry from the third cleaning.
- b. Final visual inspection for re-occupancy will be done by the IH for the purpose of observing whether cleaned areas are free of dust, dirt, and debris. Evidence of asbestos contamination identified during the inspection will necessitate further cleaning as heretofore specified.
- c. When the work area passes the IH's visual re-occupancy inspection, the testing laboratory shall perform air monitoring. Aggressive air sampling procedures shall be used within the work area during clearance air monitoring. Re-occupancy will be approved by the IH if the specified fiber count in the work area is achieved according to the testing laboratory.
- d. When the work area passes the re-occupancy test, all controls and seals established shall be removed.

E. Clearance procedure for areas completed utilizing Interior Foam Procedures shall be following two steps:

Step 1.	First Cleanup	Visual Inspection
Step 2.	Second Cleanup	Visual Inspection
Step 3.	Final Re-occupancy	Visual Insp., fiber count of <0.01 fiber/cc of air using NIOSH

method 7400 and <70 s/mm² of air using TEM analysis procedures.

1. First Cleanup

- a. Remove any visible accumulation of asbestos material and debris. All sealed drums, plastic bags, and equipment used in the work area shall be removed from the work area.
- b. Following mastic removal with liquid soy-based mastic remover, the Contractor shall either clean the floor with a degreasing soap and water mixture to remove residue, or prepare the treated concrete floor through shot blasting or other approved methods, prior to applying self-leveling concrete or flash patch.
- c. Following the removal of all debris, the work area shall be thoroughly wet cleaned and HEPA vacuumed. The work area shall be allowed to dry completely. Upon request of the Contractor the IH will perform a visual inspection. Evidence of asbestos contamination identified during the inspection will necessitate further cleaning as heretofore specified.
- d. Remove layer of plastic sheathing inside the work area from baseboards and wall surfaces. Do not remove seals from doors, windows, critical barriers or disconnect the negative pressure equipment.

2. Step 2: Final Re-occupancy

- a. When the work area passes the IH's visual re-occupancy inspection, the testing laboratory shall perform air monitoring. Sampling shall not begin until the area is dry. Aggressive air sampling procedures shall be used within the work Re-occupancy will be approved by the IH if the specified fiber count in the work area is achieved according to the testing laboratory.

- b. When the work area passes the re-occupancy test, all controls and seals established shall be removed.
- F. Clearance procedure for areas completed utilizing Exterior Foam Procedures shall be following two steps [ACM Built-up Roofing and Flashing Materials, and Caulking Materials, Asphaltic Mastic or Tar, Cement Siding or Shingles, and Paints from the Parapet and Exterior Wall(s)]:
 - Step 1. First Cleanup Visual Inspection
 - Step 2. Re-occupancy Visual Inspection and fiber Clearance count of <0.01 fiber/cc of air using NIOSH Method 7400.
- G. Procedures for Installation of Electrical Conduits, Risers and Computer Power Source Equipment
 - Step 1. Clean-up Visual inspection
 - Step 2. Final Re-occupancy Visual Inspection and fiber Clearance count of <0.01 fiber/cc of air using NIOSH Method 7400.
- H. Post Abatement Sampling Requirements

The Authority's Environmental Consultant and the asbestos contractor shall comply with all pertinent NYC and NYS requirements in addition to SCA's IEH Protocols. The most stringent interpretation shall be followed when a discrepancy exists between NYS and NYC requirements. Furthermore, there shall be no deviation from SCA's Protocols.

3.09 PRE AND DURING ABATEMENT AIR MONITORING

- A. Pre-Abatement Air Sampling: The industrial hygiene company retained by the Authority will perform the pre, during and post abatement sampling. Prior to commencement of abatement activities, at a minimum, comply with NYS, NYC and SCA sampling Protocols. Where a discrepancy exists between NYC Title 15 and NYS ICR 56 requirements, the more stringent interpretation shall apply unless otherwise directed by the Field Industrial Hygienist.

- B. Area air samples will be collected prior to the abatement, during and after abatement according to established air clearance criteria per in compliance with New York State ICR, New York City Title 15 and SCA Protocols.

3.10 CONTINGENCY PLAN

- A. Contingency plan during abatement shall be implemented as described below. These are the minimum requirements that shall be enforced by the Contractor. These requirements shall not limit the Project Monitor from instituting additional requirements, if necessary, for the protection of the building occupants.
 - 1. If the pressure differential drops below 0.02 inches w.c., the following procedures shall be implemented:
 - a. The Contractor shall cease all abatement activity in the work area.
 - b. The Contractor shall investigate and evaluate the engineering controls and determine the source of the pressure loss.
 - c. The Contractor shall institute corrective action such as additional sealing, critical barrier maintenance and construction, changing of exhaust unit filters, adjustment of make-up air, operation of additional exhaust units or other necessary measures to reestablish an acceptable pressure differential.
 - 2. If the fiber levels outside the work area exceed 0.010 f/cc criterion, the following procedures shall be implemented:
 - a. The Contractor shall investigate and evaluate the engineering controls to determine the source of the high air level.
 - b. Cleaning shall be performed outside the work areas and shall include but not limited to: wet wiping, HEPA vacuum, and misting the air, etc. Cleaning the affected area shall be

continued outside of containment and PCM sampling shall also be continued until the result of fiber count in the area is either equal to or less than 0.010 f/cc by PCM or <70 s/mm² of air using TEM analysis.

- c. If a power outage occurs during active abatement work, all abatement work must be stopped and the entrances to the work areas must be sealed immediately.

3.11 DISPOSAL AND TRANSPORTATION OF ASBESTOS-CONTAMINATED WASTE

- A. Storage of Containerized ACM: As the work progresses, remove sealed and labeled bags of ACM from the work area and place in a lockable trailer, dumpster, or other container approved for storage or transport of asbestos waste. The waste container shall be lined with two layers of fire retardant plastic. Asbestos-containing waste shall remain under the positive control of the Contractor and must never be left unattended in an area or on a vehicle where unauthorized persons could gain access.
- B. Sealed and labeled disposal bags or waste wrapped in two layers of plastic sheeting sealed airtight shall be used to transport asbestos-contaminated waste to the landfill. Procedures for hauling and disposal shall comply with 40 CFR, Part 61, 49 CFR, Part 171 and 172, and other applicable state, regional, and local government regulations. Procedures for removal from the work area and disposal of waste are outlined below:
 - 1. A properly completed and original "Waste Shipment Record" form shall accompany asbestos waste which is transported to a disposal site. This form shall be signed and dated by each party who has control over the asbestos waste, and a copy retained by each party as responsibility for the waste is transferred to the next party. All original manifest forms and waste receipts shall be provided to the Authority's Environmental Consultant (see Paragraph "Submittal").
 - 2. Trucks hauling asbestos waste shall be totally enclosed to prevent loss or damage to waste containers enroute to approved landfill. The

interior of the vehicles shall be lined with two layers of 6-mil plastic.

3. Mark with a visible warning sign during the loading and unloading of asbestos-containing waste all vehicles used to transport the waste material. Danger sign legend, text size, style and arrangement shall conform to the requirements of EPA Standard 40 CFR Part 61.149 (d) (1).
4. Only sealed plastic bags or completely sealed window are permitted to be deposited in landfill. Damaged, broken sealed windows or leaking plastic bags shall resealed prior to being deposited in the landfill. Workers shall place asbestos waste in the landfill. Throwing or dumping of containers shall not be allowed. Workers unloading and handling the sealed bags/drums or sealed windows at the disposal site shall wear appropriate personnel protective equipment including respirators and protective clothing.
5. After the vehicle is unloaded at the landfill, the plastic sheeting that was taped to the floor, sides and top of the truck shall be carefully removed and placed in properly labeled bags for disposal with the rest of the waste.

3.12 ABATEMENT COMPLETION AND BUILDING DEPARTMENT PERMIT

- A. An Asbestos Completion or Conditional Completion (ACP 20/21) will be needed to obtain construction and alteration permit. Immediately following the abatement completion, the abatement contractor shall close the project with the NYCDEP. Upon receipt of project close-out information from the NYCDEP, the Project Monitoring firm will issue an ACP-15 with applicable documents to the NYCDEP, which is to be submitted within 21 days of abatement completion. Following the review and approval of ACP-15, NYCDEP will issue ACP 20/21.
- B. The General Contractor must provide MSDS information and a notarized certification for the re-placement products installed indicating that all products used for the project were asbestos free.

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PART 4 - SCHEDULES

SEE TABLE(S) BEGINNING ON NEXT PAGE

SUMMARY OF INSPECTION RESULTS FOR ASBESTOS Bard College HS M097 525 East Houston Street, New York, NY 10459						
Line #	PROPOSED WORK AS PER SCA RENO. PLANS	SUSPECT MATERIAL THAT WILL BE IMPACTED	SAMPLING AND INSPECTION RESULTS	QUANTITY ASBESTOS MATERIAL	SPECIFIC LOCATION	Notes
1.		Wall Brick Mortar	Non-ACM	N/A	Main Roof Bulkhead	
2.		Wall Stucco	Non-ACM	N/A	Main Roof Bulkhead	
3.		Gray paint on Stucco	Non-ACM	N/A	Main Roof Bulkhead	
4.		Waterproofing between Stucco and Brick	ACM	N/A	Main Roof Bulkhead	Should not be impacted Sow as only the rear (Façade Side) is being replaced
5.		Beige Window Caulking	Non-ACM	N/A	Main Roof Bulkhead	
6.		Black Tar Paper at Window Infill	Non-ACM	N/A	Main Roof Bulkhead	
7.		Light Gray Caulking to Window Infill	Non-ACM	N/A	Main Roof Bulkhead	
8.		Black Textured Paint to Window Lintel	Non-ACM	N/A	Main Roof Bulkhead	
9.		White Caulking to Metal Counter Flashing	Non-ACM	N/A	Main Roof Bulkhead	
10.		Gray Caulk at Bulkhead Metal Door Saddle/ Metal Cap Flashing / Door Frame	Non-ACM	N/A	Main Roof Bulkhead	
11.		Metal Door Saddle / Metal Cap Flashing	Non-ACM	N/A	Main Roof Bulkhead	
12.		Door Core Insulation	Not Present	N/A	Main Roof Bulkhead	

SUMMARY OF INSPECTION RESULTS FOR ASBESTOS Bard College HS M097 525 East Houston Street, New York, NY 10459						
Line #	PROPOSED WORK AS PER SCA RENO. PLANS	SUSPECT MATERIAL THAT WILL BE IMPACTED	SAMPLING AND INSPECTION RESULTS	QUANTITY ASBESTOS MATERIAL	SPECIFIC LOCATION	Notes
13.		Tar / Sealant Material Concealed Between Door Frame & Masonry Opening	Not Present	N/A	Main Roof Bulkhead Facade	The rear side of the bulkhead on the building facade and has no stucco.
14.		Spandrel Beam/ Lintel Flashing Mastic/ Coating	Not Present	N/A	Main Roof Bulkhead Exterior Facade Side	
15.		Waterproofing Layer/ Vapor Barrier Behind Facade Brick	Not Present	N/A	Main Roof Bulkhead Exterior Facade Side	
16.		Limestone Facade Mortar	Non-ACM	N/A	Main Roof Bulkhead Exterior Facade Side	
17.		Exterior Brick Mortar	Non-ACM	N/A	Main Roof Bulkhead Exterior Facade Side	
18.		Wall Plaster	Non-ACM	N/A	Interior Main Roof Bulkhead	
19.		Ceiling Plaster	Non-ACM	N/A	Interior Main Roof Bulkhead	
20.		Wall Brick Mortar	Non-ACM	N/A	Interior Main Roof Bulkhead	
21.		Wall Block Mortar	Non-ACM	N/A	Interior Main Roof Bulkhead	
22.		Interior Window Caulking	Non-ACM	N/A	Interior Main Roof Bulkhead	
23.		Asphalt Flooring	Non-ACM	N/A	Interior Main Roof Bulkhead	
24.		Roof Screed/ Roof Membrane Flashings	Assumed ACM	N/A	Main Roof	Should not be impacted SOW. Roof was recently replaced and is under warranty.

SUMMARY OF INSPECTION RESULTS FOR ASBESTOS Bard College HS M097 525 East Houston Street, New York, NY 10459						
Line #	PROPOSED WORK AS PER SCA RENO. PLANS	SUSPECT MATERIAL THAT WILL BE IMPACTED	SAMPLING AND INSPECTION RESULTS	QUANTITY ASBESTOS MATERIAL	SPECIFIC LOCATION	Notes
25.		Parapet Backup Brick Mortar	Non-ACM	N/A	Main Roof	
26.		Coping Stone Mortar	Non-ACM	N/A	Main Roof	
27.		Coping Stone Caulking	Non-ACM	N/A	Main Roof	
28.		Tar / Mastic / Flashing Concealed Below Coping Stone	Not Present	N/A	Main Roof	
29.		Roof Screed	Assumed ACM	30 Sq/ft	Main Entrance Vestibule Roof	
30.		Roof Membrane	Assumed ACM		Main Entrance Vestibule Roof	
31.		Roof Flashings	Assumed ACM		Main Entrance Vestibule Roof	
32.		Wall Plaster	Non-ACM	N/A	2 nd Floor	
33.		Ceiling Plaster	Non-ACM	N/A	2 nd Floor	
34.		Auxiliary Alarm Panel	Assumed ACM	N/A	Interior, 2nd Floor, Room 231, Custodians Office	Should only be impacted by Disconnect & Re-Connect
35.		Electrical Wire within Alarm Panel	Assumed ACM	N/A	Interior, 2nd Floor, Room 231, Custodians Office	Should only be impacted by Disconnect & Re-Connect

SUMMARY OF INSPECTION RESULTS FOR ASBESTOS
Bard College HS
M097
525 East Houston Street, New York, NY 10459

Line #	PROPOSED WORK AS PER SCA RENO. PLANS	SUSPECT MATERIAL THAT WILL BE IMPACTED	SAMPLING AND INSPECTION RESULTS	QUANTITY ASBESTOS MATERIAL	SPECIFIC LOCATION	Notes
36.		12x12 Floor Tiles & Mastic	Non-ACM	N/A	Interior, 2nd Floor, Room 231, Custodians Office	
37.		Felt paper below Wood Floors	Assumed ACM	2 Sq/ft	Interior, 2nd Floor, Room 231, Custodians Office	Quantity covers all penetrations/drilling required for this SOW regardless of the floor, location or penetration size. Furthermore, the exact location of penetration/drillings are to be field determined by the GC.
38.		Floor Tiles below Plywood Floor	ACM		Interior, 2nd Floor, Room 231, Custodians Office	
39.		Wall Plaster	Non-ACM	N/A	Interior Ground Floor	
40.		Ceiling Plaster	Non-ACM	N/A	Interior Ground Floor	
41.		Soffit Plaster	Non-ACM	N/A	Interior Ground Floor	
42.		Gypsum Board/ Joint Compound	Non-ACM	N/A	Interior Ground Floor	
43.		2x2 Ceiling Tiles	Non-ACM	N/A	Interior Ground Floor	
44.		12x12 Black Floor Tiles & Associated Mastic	Non-ACM	N/A	Interior Ground Floor Cafeteria	
45.		Asphalt Slab Substrate Below 12x12 Floor Tiles	Non-ACM	N/A	Interior Ground Floor Cafeteria	
46.		Asphalt Cinder Fill below Asphalt Slab	Non-ACM	N/A	Interior Ground Floor Cafeteria	

SUMMARY OF INSPECTION RESULTS FOR ASBESTOS Bard College HS M097 525 East Houston Street, New York, NY 10459						
Line #	PROPOSED WORK AS PER SCA RENO. PLANS	SUSPECT MATERIAL THAT WILL BE IMPACTED	SAMPLING AND INSPECTION RESULTS	QUANTITY ASBESTOS MATERIAL	SPECIFIC LOCATION	Notes
47.		Piping within Floor	Non-Suspect Material	N/A	Interior Ground Floor Cafeteria	
48.		Ceramic Wall Tile Grout	Non-ACM	N/A	Interior Ground Floor Cafeteria	
49.		Ceramic Wall Tile Mastic	Non-ACM	N/A	Interior Ground Floor Cafeteria	
50.		Magnesia Pipe/ Pipe Joint Insulation for Sanitary Lines	ACM	70 L/ft	Interior Ground Floor Cafeteria	
51.		Magnesia Pipe/ Pipe Joint Insulation for Sanitary Lines	ACM	80 L/ft	Interior Ground Floor Cafeteria Storage Room	
52.		Wall Brick Mortar	Non-ACM	N/A	Interior Ground Mechanical Room	
53.		Wall Block Mortar	Non-ACM	N/A	Interior Ground Mechanical Room	
54.		Light Blue Wall Coating/ Paint	Non-ACM	N/A	Interior Ground Mechanical Room	
55.		Magnesia Pipe/ Pipe Joint Insulation for Sanitary Lines	ACM	25 L/ft	Interior Ground Mechanical Room	
56.		Electrical Panel Board	Assumed ACM	N/A	Interior Ground Mechanical Room	Should only be impacted by Disconnect & Re-Connect
57.		Electrical Wiring within Panel	Assumed ACM	N/A	Interior Ground Mechanical Room	Should only be impacted by Disconnect & Re-Connect
58.		Concrete Pavement	Non-Suspect Material	N/A	Exterior North & South Egress Stairs	

SUMMARY OF INSPECTION RESULTS FOR ASBESTOS Bard College HS M097 525 East Houston Street, New York, NY 10459						
Line #	PROPOSED WORK AS PER SCA RENO. PLANS	SUSPECT MATERIAL THAT WILL BE IMPACTED	SAMPLING AND INSPECTION RESULTS	QUANTITY ASBESTOS MATERIAL	SPECIFIC LOCATION	Notes
59.		Cement below Stairs	Non-ACM	N/A	Exterior North & South Egress Stairs	
60.		Black Residual Tar to Steps	Non-ACM	N/A	Exterior North & South Egress Stairs	
61.		Railing / Fence Black Paint	Non-ACM	N/A	Exterior North & South Egress Stairs	
62.		Mortar/ Setting bed below Coping Stones	Non-ACM	N/A	Exterior North & South Egress Stairs	
63.		Stair/ Pavement Expansion Joint Caulk	Non-ACM	N/A	Exterior North & South Egress Stairs	
64.		Grade Level Tar Filler at Pavement Seams and Building Interface Non-ACM	Non-ACM	N/A	Exterior Facade	
65.		Spandrel Beam/ Lintel Flashing Mastic/ Coating	Non-ACM	N/A	Exterior Facade	
66.		Waterproofing Layer/ Vapor Barrier Behind Façade Brick	Non-ACM	N/A	Exterior Facade	
67.		Exterior Façade Brick Mortar	Non-ACM	N/A	Exterior Facade	
68.		Limestone Façade Mortar	Non-ACM	N/A	Exterior Façade	
		Total ACM to be Impacted		32 Sq/ft 175 L/ft		

The Re-Sampling of Pertinent Suspect Non-ACM materials (Plaster/ TSI) Complies with the Latest (05/06/16) ELAP Guidance Document and All the Noted Limitations of Current Analytical Protocols as Indicated by ELAP.

At the time of Inspection, No Mold was observed on the Non-ACM Materials that will be Impacted by this Survey.

Any Material not listed in the above tables shall be considered Assumed ACM.

Note 1: The contractor shall assume that ACM debris exists within the ceiling plenum and it is damaged. Thus, any materials associated with this debris shall be disposed of as ACM-contaminated waste at no additional cost to the Authority.

Note 2: All selective demolition into inaccessible spaces (including but not limited to pipe chases, ceiling plenums, soffits, etc.) must be conducted exclusively by the Abatement Contractor in modified tents or in full containments under controlled conditions in the presence of the Authority's environmental consultant.

Note 3: Any scaffolding erected shall be the responsibility of the General Contractor, will be constructed, maintained, and operated in accordance with the applicable federal, state, city & NYC/SCA rules, regulations and procedures and signed off by a licensed PE and approved by the SCA Safety Unit. The General contractor shall solely be responsible for any delays resulting from the rejection of his/her design by the Safety Unit.

Note 4: Any materials not listed or addressed in part 4 of spec 02081 must be assumed to be Asbestos-Containing Materials. The Contractor shall notify the Project Officer immediately if any materials that are not listed are encountered, who will then notify the Authority's Industrial Hygienist for directive.

Note 5: The General Contractor shall be responsible for providing the Authority's Environmental Consultant with access to all assumed ACM in order to facilitate sampling/ inspection of these materials at no additional cost to the Authority. The turn-around-time for bulk sampling and analysis shall not be deemed as a basis for a delay claim against the Authority.

Note 6: The contractor may opt to remove all fiberglass insulated pipes as asbestos contaminated material in order to expedite his/her schedule; however, the additional cost of re-insulation shall be borne solely by the General Contractor.

Note 7: The general contractor must provide all material, manpower and equipment to access all assumed ACM materials for sampling by the Authority, at no extra cost to the Authority.

Note 8: Unless otherwise noted, all caulks/sealants (including concealed/inaccessible) are presumed to be ACM and PCB-containing. The Contractor shall refer to SCA specification section 1.01 in section S01900 for additional handling and disposal requirements.

Note 9: The Asbestos Contractor shall be responsible for protecting all areas (floors and fixed items) underneath the elevated containment. At a minimum, a layer of 6-mil poly shall be draped over all immovable objects underneath the elevated containment.

Note 10: Asbestos Contractor shall be responsible for all repairs to finish surfaces which are damaged during the course of the abatement work which

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are not included in the proposed scope of work.

Note 12: All connections/ disconnections to existing electrical panels, fixtures, pull boxes, etc. shall be conducted by a licensed electrician with an asbestos handler license.

This Specification was completed based on the Design Drawings dated 02/07/2021

END OF SECTION

LIST OF SUBMITTAL

<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>
Pre-Project Submittal:	_____	_____
1. Insurance	_____	_____
2. Health and Safety Plan	_____	_____
3. Emergency Action Plan	_____	_____
4. Fall Protection Plan	_____	_____
5. Proof that all required permits and variances have been obtained.	_____	_____
6. Documentation of Required Qualifications of Workers	_____	_____
a. Worker certification and License requirements	_____	_____
b. Proof of medical Surveillance program	_____	_____
7. Proof of a respiratory protection program	_____	_____
8. Proof of historic airborne fiber data	_____	_____
9. Proof that a landfill site has been located.	_____	_____
10. Equipment and MSDS of chemicals to be used	_____	_____
11. Asbestos Removal and Disposal Work Plan	_____	_____
12. Sample of daily log	_____	_____
During Work Submittal:		
1. Schedule of Work Changes	_____	_____
2. Copy of each "Waste Shipment Record" form	_____	_____
Post Project Submittal:		
1. Copy of the bound log book	_____	_____
2. Personal air monitoring records pertaining to this project.	_____	_____
3. Compilation of all completed and signed Waste Shipment	_____	_____

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- Record forms.
4. Copies of notifications to applicable agencies.
5. Copies of the workers licenses (NYSDOL and NYCDEP

* * *

SECTION 02090**ENVIRONMENTAL MANAGEMENT OF EXCAVATED MATERIAL AND FILL/BACKFILL****PART 1 - GENERAL****1.01 DESCRIPTION OF WORK**

- A. Work of this Section includes, but is not limited to, the following:
1. Proper management of excavated material as part of the Work of this Contract.
 2. Collection and analysis of samples of excavated material for disposal/reuse.
 3. Disposal of all excavated material not approved for reuse in an environmentally acceptable manner.
 4. Management of material to be imported and/or reused on-site for fill and backfill.
- B. Execution of this Work may encounter asbestos contaminated soil or debris. Perform work in conjunction with Section 02081 as required.
- C. Perform Work in accordance with the requirements of Section 02100.

1.02 RELATED SECTIONS

- A. Existing Premises Work.....Section 01900
- B. Asbestos Abatement.....Section 02081
- C. Earthwork.....Section 02201

1.03 REFERENCES

- A. Local, State, and Federal Rules and Regulations
1. 6 NYCRR Parts 360-366 and 369, Solid Waste Management
 2. 6 NYCRR 370 - Hazardous Waste Management System: General

3. 6 NYCRR 371 - Identification and Listing of Hazardous Wastes
4. 6 NYCRR 375 - Environmental Remediation Programs
5. 29 CFR 1910.120 and 1926.65 - Hazardous Waste Operations and Emergency Response
6. 40 CFR 260 - Hazardous Waste Management System: General
7. 40 CFR 261 - Identification and Listing of Hazardous Waste
8. 49 CFR 100 to 177 - DOT Hazardous Materials Transport and Manifest System
9. NYSDEC STARS Memo #1, Petroleum-Contaminated Soil Guidance Policy (except Sections III and IV)
10. NYSDEC CP-51/Soil Cleanup Guidance

1.04 DEFINITIONS

A. Hazardous Waste

1. Material meeting the definition of a Resource Conservation and Recovery Act hazardous waste as defined in 40 CFR Part 261, New York State ECL Section 27-09 or 6 NYCRR Part 371.
2. Additional requirements related to handling and disposal of hazardous waste can be found in Section S01900 Existing Premises Work.

B. Petroleum-Contaminated Material

1. Material (soil, concrete, sediment, petroleum bulk storage tank contents, fill, debris, etc.) that meets the NYSDEC STARS Memo #1 definition of petroleum-contaminated material from known source areas.
2. The determination as to whether the excavated material is petroleum-contaminated will be made by the SCA IEH Division based on a review of the

qualitative and quantitative information provided by the Contractor.

a. Petroleum-contaminated material shall be evidenced by the following qualitative observations:

- 1) proximity to known releases from existing or historical petroleum sources
- 2) petroleum-like odor
- 3) visual impacts (e.g. staining or discoloration)

b. Petroleum-contaminated material shall be evidenced by the following quantitative observations:

- 1) producing higher than background responses on a portable vapor meter such as a photo ionization detector or flame ionization detector, and
- 2) exceeding the soil cleanup levels for gasoline and/or fuel oil contaminated soil provided in the NYSDEC CP-51: Soil Cleanup Guidance.

C. Non-Hazardous Excavated Material

1. Material that may include or contain mixtures of the following: soil (including, but not limited to, natural undisturbed material), Construction and Demolition debris (C&D Debris), concrete and concrete products (including steel or fiberglass reinforcing rods that are embedded in the concrete), asphalt pavement, scrap metal, brick, glass, rock, municipal solid waste, refuse, and incidental coal and ash.
2. This material will contain analytes that exceed 6 NYCRR 375-6 and NYSDEC CP-51 Soil Cleanup Objectives.

D. Construction and Demolition Debris (C&D debris)

C&D debris, as defined in 6 NYCRR Part 360.2, includes waste resulting from construction, remodeling, repair and demolition of structures, buildings and roads. C&D debris includes fill material, demolition wastes, and construction wastes.

E. Qualified Environmental Professional (QEP)

A QEP, as defined in 6 NYCRR Part 360.2, is a person who possesses sufficient specific education, training, and experience necessary to exercise professional judgment to develop opinions and conclusions regarding the presence of releases or threatened releases to the surface or subsurface of a property or off-site areas.

1.05 SUBMITTALS

A. Soil Sampling Plan

1. This plan shall provide a comprehensive description of the procedures to be used for collection and analysis of representative samples of the excavated material.
2. Submit the Soil Sampling Plan at least four weeks prior to the start of sampling.
3. The Soil Sampling Plan shall include, at a minimum:
 - a. A scaled drawing indicating
 - 1) Limits of excavation
 - 2) Quantities of excavated material
 - 3) Proposed locations of stockpiles
 - 4) Proposed locations where discrete soil samples are proposed to be collected with identification
 - b. Sampling methods to be used (e.g., direct push, drill rig, backhoe).
 - c. The number and type (e.g., grab, composite) of each sample to be collected and analyzed.

- d. The analytical parameters and analytical methods for analyzing all samples.
- e. Signed certifications from the Contractor indicating:
 - 1) Underground utilities will be located and contact will be made with appropriate organizations in accordance with applicable laws and regulations.
 - 2) Sample locations, where slabs or pavement is present, will be cleared of asbestos containing material.
 - 3) A site specific Safety Plan has been approved by the SCA Safety Division that includes all procedures required to complete the activities described in the Soil Sampling Plan.
 - 4) For sites where petroleum-contaminated material and/or hazardous waste is expected to be encountered, an appropriate site specific health and safety plan (HASP) will be developed and implemented as required by the Occupational Safety and Health Administration (OSHA).
 - 5) The SCA IEH Division shall be notified immediately if evidence of petroleum-contaminated material or hazardous waste is discovered at any time during sampling or excavation activities.
- f. Signed/sealed certifications from the QEP indicating:
 - 1) Sampling will be conducted in accordance with EPA Methods 5035 and 5035A collection methods, in conformance with NYSDEC DER-10, SW-846, the New Jersey Field Sampling Procedures Manual, and in conformance with the disposal facility requirements.

- 2) Samples will be analyzed by a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) certified laboratory using approved methods and in accordance with requirements of other jurisdictions where material will be disposed.
 - 3) Laboratory reporting limits will be at or below comparison criteria.
 - 4) The SCA IEH Division shall be notified immediately if evidence of petroleum-contaminated material or hazardous waste is discovered at any time during sampling or excavation activities.
4. The Sampling Plan shall adhere to the format of the template available on the Authority's website (under Environmental & Regulatory Compliance, Industrial and Environmental Hygiene).

B. Excavated Material Disposal Plan

1. This plan shall describe the procedures to be followed for the excavation, management, transportation and disposal of material to an off-site disposal facility(ies).
2. Submit the Excavated Material Disposal Plan at least four weeks prior to the start of excavation.
3. The Excavated Material Disposal Plan shall include, at a minimum:
 - a. The quantity of excavated material to be:
 - 1) Disposed of off-site
 - 2) Reused on-site
 - b. A copy of the Soil Sampling Plan as executed.
 - c. A copy of the laboratory report containing the waste characterization analytical data.

- d. A listing, including company name, name of owner, and address, of each proposed off-site disposal facility.
- e. For each proposed disposal facility:
 - 1) Current Disposal Facility Permits and Supporting Documentation (including but not limited to permits, waste acceptance criteria, material management plans, etc.)
 - 2) Quantity of material to be disposed.
 - 3) A completed waste profile form, to be signed by a representative of the SCA IEH Division.
 - 4) A letter on Contractor letterhead certifying that all available waste characterization data has been provided to each of the disposal facilities. The letter shall reference the laboratory report number and sample IDs for all data submitted to the facility.
 - 5) A pre-acceptance letter from the disposal facility that references the laboratory report number and sample IDs for the waste characterization samples stating that it can accept the material.
- f. Signed certifications from the Contractor indicating:
 - 1) Each identified waste classification conforms to the material definition in the contract documents and the disposal facility requirements.
 - 2) Waste transporters will have all necessary permits, licenses, authorizations, etc. required to transport the specific material being shipped to the approved destination facility.

- 3) A site specific Safety Plan has been approved by the SCA Safety Division that includes all procedures required to complete the activities described in the EMDP.
 - 4) For sites where petroleum-contaminated material and/or hazardous waste is expected to be encountered, an appropriate site specific health and safety plan (HASP) will be developed and implemented as required by the Occupational Safety and Health Administration (OSHA).
 - 5) The SCA IEH Division shall be notified immediately if evidence of petroleum-contaminated material or hazardous waste is discovered at any time during sampling or excavation activities.
- g. Signed/sealed certifications from the QEP indicating:
- 1) All samples were collected in accordance with the attached Soil Sampling Plan.
 - 2) Sampling was conducted in accordance with EPA Methods 5035 and 5035A collection methods, in conformance with NYSDEC DER-10, SW-846, the New Jersey Field Sampling Procedures Manual and in conformance with the disposal facility requirements.
 - 3) Samples were analyzed by a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) certified laboratory using approved methods and in accordance with requirements of other jurisdictions where material will be disposed of.
 - 4) Laboratory reporting limits were at or below comparison criteria.

- 5) The SCA IEH Division shall be notified immediately if evidence of petroleum-contaminated material or hazardous waste is discovered at any time during sampling or excavation activities.
- h. The location and quantities of any Asbestos-Containing soil that is to be removed as part the Contract.
4. The Excavated Material Disposal Plan shall adhere to the format of the template available on the Authority's website (under Environmental & Regulatory Compliance, Industrial and Environmental Hygiene).

C. Backfill and Reuse Plan

1. This plan shall describe the quantities, testing requirements and management procedures for imported and reused materials to be used as fill or backfill.
2. The Backfill and Reuse Plan shall include, at a minimum:
 - a. The quantity of each type of fill to be imported to or reused on the site, including but not limited to:
 - 1) Fill and Backfill
 - 2) Aggregate Base
 - 3) Crushed Stone
 - 4) Broken Stone Ballast
 - 5) Recycled Concrete Aggregate
 - 6) Gas Permeable Aggregate
 - 7) Top Soil (Per Section 02900 Landscaping)
 - 8) CU-Structural Soil® (Per Section 02900 Landscaping)
 - b. A listing, including company name, name of owner, and address, of each proposed fill source. For each proposed fill source, provide a certification letter which:
 - 1) Includes the street address; section, block and lot numbers; and, a description

of the current and former uses of each borrow area site.

- 2) States the fill/aggregate meets the definition of environmentally clean as defined in Article 2.01 of this section of the specifications.
 - 3) States that the test data provided is representative of the source. If stone is being imported from a virgin quarry as fill, a certification letter stating that the stone is virgin quarried material must be provided.
- c. If material is not being directly shipped to the site from the proposed fill sources, provide a listing of all suppliers including company name and address. For each proposed fill supplier, provide a certification letter which:
- 1) States the fill/aggregate meets the definition of environmentally clean as defined in Article 2.01 of this section of the specifications.
- d. Analytical Testing Data
- 1) Sample analytical results shall be provided which verify that the material meets the definition of environmentally clean fill defined in Article 2.01 of this section of the specifications. Stone from a virgin quarry is not required to be sampled.
- e. Signed certifications indicating:
- 1) All samples for reuse were collected in accordance with the attached Soil Sampling Plan.
 - 2) A site specific Safety Plan has been approved by the SCA Safety Division that includes all procedures required to

complete backfill import/placement activities.

3. The Backfill and Reuse Plan shall adhere to the format of the template available on the Authority's website (under Environmental & Regulatory Compliance, Industrial and Environmental Hygiene).

D. Documentation of Proper Disposal

1. Documentation that all excavated materials removed from the site have been disposed of at a facility approved by the Authority (e.g. completed manifests, weigh scale tickets, disposal facility receipts).
2. Documentation of proper disposal of petroleum-contaminated material and hazardous waste will be subject to review and approval by the SCA IEH Division.

E. Gas Permeable Aggregate Gradation and Los Angeles wear test Analysis. Refer to Section 02201 for requirements.

F. Qualified Environmental Professional (QEP) credentials

The SCA IEH Division will determine if the proposed QEP is acceptable. Documentation demonstrating the qualifications of a certifying QEP shall be made available upon request.

1.06 QUALITY ASSURANCE

A. Qualifications

1. Company specializing in analytical sampling methods and protocols, management, handling and disposal of soils shall have a minimum of 3 years of experience and shall have worked on 3 projects of similar size.
2. Non-hazardous excavated material under this Contact shall be beneficially re-used or disposed of only at sites that are regulated by a state agency, have a material acceptance protocol for soil, and a permit approved by that state agency. Mine reclamation disposal or recycling facilities in New York State are not acceptable. Sites approved by

a New Jersey Licensed Site Remediation Professional (LSRP) as part of the New Jersey Department of Environmental Protection (NJDEP) Site Remediation Program are not acceptable.

3. Any additional information related to contractors/vendors involved in transportation and disposal of material shall be made available to the Authority upon request.

B. Regulatory Requirements

1. Work of this Section shall conform to all applicable requirements of the NYSDEC, NYCDEP and USEPA and all applicable regulations and guidelines of all governmental authorities having jurisdiction, including, but not limited to, safety, health, and anti-pollution regulations. All operations necessary for removal, disposal and reuse of excavated material shall comply with the applicable Federal, State and local laws and regulations, and Authority policies referenced herein.
2. The Contractor shall be responsible for the safe and proper management of all wastes addressed herein in accordance with all local, State and Federal regulatory requirements
3. Work outside the street line shall conform to the applicable requirements of the governmental authorities or utilities having jurisdiction (DOT, DEP, etc.). Where more stringent requirements are given in this Section than those provided by the applicable governmental authority, the requirements of this Section shall govern.
4. Conform to the requirements of -OSHA, 29 CFR 1926 Subpart P - Excavations.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Imported fill and aggregate materials to be used for project shall be stockpiled separately at the producer's facility and shall be accessible to inspection and quality control testing by the Authority.

- B. Material intended for reuse shall be stockpiled separately on site and shall be accessible to inspection and quality control testing by the Authority.
- C. Stockpiled material shall be managed to prevent erosion, dust and comingling with other materials.
- D. Testing and certification of all imported environmentally clean fill and aggregate are the responsibilities of the Contractor.

1.08 SEQUENCING AND SCHEDULING

- A. Perform work in such a manner to ensure a minimum interference with roads, walkways, adjacent properties, and facilities that are to remain open. Do not close or obstruct these items without obtaining permits from the agencies having jurisdiction or the permission of the adjacent owners.
- B. There shall be no petroleum-contaminated material and/or hazardous waste excavation and handling activities performed when the existing building is in use by the Department of Education or others during occupied hours, except when permitted in writing by the Authority.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Environmentally Clean Fill and Backfill
 - 1. All material imported to or reused on site shall be Environmentally Clean. This includes all materials listed in Section 02201, Earthwork, and Section 02900, Landscaping, including but not limited to:
 - a. Clean Fill and Backfill
 - b. Aggregate Base
 - c. Crushed Stone
 - d. Broken Stone Ballast
 - e. Gas Permeable Aggregate
 - f. Recycled Concrete Aggregate
 - g. Top Soil

2. Environmentally Clean fill and backfill is defined as:
 - a. Excavated from undisturbed geologic formations (except for Recycled Concrete Aggregate);
 - b. Not located on or impacted by other contaminant sources;
 - c. Not comingled with any other material;
 - d. Not known or suspected of being contaminated;
 - e. Not adversely impacted by discharges of hazardous materials or chemical application;
 - f. Not affected by conditions or processes that would result in the introduction of contaminants into the material in concentrations above regulatory concern;
 - g. and is either:
 - 1) Virgin material obtained from a licensed quarry/mine OR
 - 2) Contains no analytes at concentrations above the lower of the Protection of Groundwater and Protection of Public Health - Residential Land Use set forth in NYSDEC 6 NYCRR Part 375-6.8(b).

B. Gas Permeable Aggregate

1. Gas Permeable Aggregate when used for sub-slab depressurization systems shall be in accordance with specifications 02201 Earthwork and 02221 Sub-Slab Depressurization System.
2. Gas Permeable Aggregate gradation shall conform to ASTM C33 No. 5 stone. Material selected for use as gas permeable aggregate shall be composed of particles that will not be reduced in size due to forces exerted on the material during placement and construction as by the Los Angeles wear test (ASTM C131).

2.02 SOURCE QUALITY CONTROL

A. Importing of Fill/Backfill Material

1. The Contractor shall import only soil, fill, or other material that meets the definition of Environmentally Clean as per Article 2.01 unless

otherwise approved by the Authority. Additionally, imported material will comply with the provisions of Section 02201 and 02900, as applicable.

2. The Contractor shall provide documentation in the Backfill and Reuse Plan for all proposed imported fill/backfill materials, including the origin of material, address and Block/Lot identification, ownership and a brief history of the source site.
3. All samples collected for analytical testing must be representative and must meet the following requirements:
 - a. Samples shall be collected and analyzed at a frequency of no less than one sample per 500 cubic yards.
 - b. Samples shall be analyzed within the last 6 months.
 - c. Samples shall be analyzed utilizing methods which yield laboratory reporting limits that are below the regulatory comparison criteria
 - d. Samples to be analyzed for VOCs shall be discrete grab samples.
 - e. Samples to be analyzed for all other parameters shall be minimum 5-point composite samples.
4. The Contractor must comply with all applicable Federal, State and local rules and regulations (e.g. additional Part 360 requirements for material generated within NYC)

B. Inspection

1. The Authority may engage an approved Analytical Testing Laboratory to perform laboratory tests on the fill/backfill materials.
2. Inspections and testing performed by the Authority shall not relieve the Contractor of responsibility for performing all other testing and inspection specified herein or otherwise necessary to meet the

quality control and quality assurance requirements of this Section.

3. Time for conducting the tests and/or inspections defined in these specifications shall be considered as part of the Work of this Project and neither extension of time nor additional costs shall be accepted as a result.

C. Responsibility

All required testing and/or analysis not specifically defined as being provided by the Authority shall be provided by the Contractor as part of the included Work and costs of this Project.

PART 3 - EXECUTION

3.01 PREPARATION AND PROTECTION

A. Excavated Material Sampling

Soil Sampling Plan (as described in Article 1.06) shall have been submitted for review and approval prior to sampling for waste characterization.

B. Community Air Monitoring Program (CAMP)

1. Community Air Monitoring Program shall be in effect during petroleum-contaminated material and/or hazardous waste excavation work.
2. The Contractor shall notify the SCA IEH Division a minimum of two business days prior to excavation of petroleum-contaminated material and/or hazardous waste.
3. The CAMP monitoring and reporting will be implemented by a representative of the SCA IEH Division.
4. The Contractor shall implement dust, vapor, and/or odor suppression measures as directed by the Authority's Construction Management personnel based on the recommendation of the SCA IEH Division's on-site representative.

5. No claims of delay will be permitted for work stoppages due to the Contractor's failure to properly address exceedances of the CAMP action levels.
6. The CAMP will comply with New York State Department of Health (NYSDOH) Generic CAMP, Appendix 1A of NYSDEC DER-10.
7. The Contractor shall provide notice to the SCA IEH Division a minimum of 24 hours before cancelling excavation of petroleum-contaminated material and/or hazardous waste. Any costs incurred due to cancellation made less than 24 hours in advance will be back charged to Contractor.

3.02 EXCAVATION - GENERAL

- A. Excavate all materials of every kind to the Contract elevations and dimensions required by the Drawings and Specifications and any additional material required for safe slope of excavation, regardless of the character of materials and obstructions encountered.
- B. All excavated materials shall be properly segregated and stored on-site as per the approved Soil Sampling Plan and Excavated Material Disposal Plan.
- C. The Contractor shall complete the work in accordance with the site specific Safety Plan approved by the SCA Safety Division.
- D. For sites where petroleum-contaminated material and/or hazardous waste is expected to be encountered, the Contractor shall complete the work in accordance with the site specific health and safety plan (HASP) as required by the Occupational Safety and Health Administration (OSHA).
- E. Comply with all other requirements of the contract documents for excavation, including but not limited to Section 02201 support of excavation.
- F. The Contractor must control dust, vapor, and/or odors and implement appropriate suppression measures during the performance of this work.

3.03 MATERIAL HANDLING

- A. All segregated construction and demolition debris and related wastes shall be managed in accordance with the contract documents and disposed in accordance with applicable Federal, State and local regulations, including but not limited to 6 NYCRR Part 360 and Part 364.
- B. If non-hazardous excavated material is temporarily stockpiled on-site, the stockpile shall be covered with heavy-duty tarps, secured with sand bags, and silt curbs shall be installed around the stockpile. If there is no room on the site for stockpiling, Contractor shall provide containers for stockpiling or other means (e.g. roll-offs).
- C. Unless authorized in writing by the SCA IEH Division, all petroleum-contaminated material and/or hazardous waste shall be loaded directly into trucks for transportation to the disposal facility.
- D. All trucks and disposal containers for all petroleum-contaminated material and/or hazardous waste shall comply with 49 CFR Part 173 and with all other applicable Federal, State, and local regulations.

3.04 TRANSPORTATION AND DISPOSAL OF EXCAVATED MATERIAL

- A. Excavated Material Disposal Plan (as described in Article 1.06) shall have been submitted for review and approval before disposing of any material.
- B. Remove all excavated material from the site and legally dispose of away from the premises in accordance with the requirements specified in this section and the approved EMDP.
- C. All material shall be transported under bills of lading or shipping manifests approved by the Authority. If encountered, all hazardous waste and petroleum-contaminated material shall be transported under a manifest consistent with the requirements of 6 NYCRR Part 372.
- D. Waste transporters shall have all necessary permits, licenses, authorizations, etc. required by Federal,

State and local regulations to transport the specific material being shipped to the approved destination facility.

- E. All trucks and containers shall be shall be maintained in clean, sanitary condition by the Contractor at all times and inspected prior to entering or leaving the site to ensure that no material adheres to the wheels, undercarriage, tailgates, covers or other areas.
- F. Each truck or container shall be covered whenever material is not being added. Covers shall be secured in an approved manner and shall remain in place until the container has reached the disposal facility.
- G. Any material spills/leaks during transport shall be responded to immediately by the Contractor and remediated at no additional cost to the Authority.

3.05 REUSE OF EXCAVATED SOIL

- A. Backfill and Reuse Plan (as specified in Article 1.05) shall have been submitted for review and approval before reusing material as backfill.
- B. Excavated material may not be reused on-site unless approved by the SCA IEH Division and additional approvals specified in Section 02201 are received.
- C. If material is reused without proper approvals, the Contractor shall be responsible for removing and disposing of all material off-site at an approved disposal facility.
- D. The Authority shall be credited for any quantities of excavated material approved for reuse on-site.

3.06 FILLING AND GRADING

- A. Backfill and Reuse Plan (as described specified in Article 1.05) shall have been submitted for review and approval before proceeding with filling and backfilling operations.
- B. Only Environmentally Clean Fill and Backfill (as defined in Paragraph 2.01A) shall be used as fill and backfill.

- C. Fill may not be imported unless approved by the SCA IEH Division and additional approvals specified in Section 02201 are received.
- D. If fill or backfill is placed without proper approvals, the Contractor shall be responsible for removing and disposing of all material off-site at an approved disposal facility.

3.07 FIELD QUALITY CONTROL

- A. The Contractor shall notify the SCA IEH Division of the Authority a minimum of two business days prior to delivery of every load of environmentally clean fill to the site.
- B. The Authority, as a quality assurance measure, may inspect fill/backfill material or perform applicable analysis of samples to verify that the material meets the environmentally clean fill requirements.
- C. Responsibility
 - 1. All required testing and/or analysis not specifically defined as being provided by the Authority shall be provided by the Contractor as part of the included Work and costs of this Project.
 - 2. No testing and/or analysis by the Authority shall relieve the Contractor of the responsibility of conforming to the requirements of these specifications.
 - 3. Time for conducting the tests and/or inspections defined in these specifications shall be considered part of the Work of this Project and neither extension of time nor additional costs shall be accepted as a result.

3.08 PAYMENT

- A. For the purpose of the base bid, the Contractor shall assume that all material excavated from the site meets the definition of non-hazardous excavated material as defined in Paragraph 1.05C, except for quantities of petroleum-contaminated material and hazardous waste

specified in Article 1.01 of this Section (if applicable).

- B. All labor, materials, equipment, and incidentals to perform all work under this Section shall be included in the base bid. No separate payment will be made for any Work associated with the disposal of non-hazardous excavated material, as the cost of said work shall be deemed included in the Contract.
- C. Reimbursement of payment for transportation and disposal of any petroleum-contaminated material and hazardous waste encountered beyond the quantities listed in this section, and approved by the Authority, will be paid as a change order. The Contractor shall submit a proposal in accordance with Article 7 of this Contract. All broker fees are part of the Contractor mark up as detailed in Article 7.
- D. Payment for the transportation and disposal of petroleum-contaminated material and hazardous waste encountered that are not part of the base bid will be contingent upon the Authority's receipt of original shipping documents (e.g., manifests), weigh tickets, and original invoices.
- E. The Contractor shall credit the Authority for any quantities of excavated material that the Authority approves for reuse on-site.

END OF SECTION

LIST OF SUBMITTALS

Item No.	Paragraph No.	SUBMITTAL	Due Date
1	1.05A	Soil Sampling Plan	4 weeks before sampling
2	1.05B	Excavated Material Disposal Plan	4 weeks before excavation
3	1.05C	Backfill and Reuse Plan	4 weeks before backfilling
4	1.05D	Documentation of Proper Disposal	Within 4 weeks of disposal
5	1.05E	Gas Permeable Aggregate Gradation Analysis	4 weeks before use
5	1.05F	QEP Credentials	Upon Request

TEMPLATES

The following templates are available on the Authority's website at <http://www.nycsca.org/Vendor/Environment-Regulatory-Compliance#Industrial-Environmental-Hygiene-15>

SOIL SAMPLING PLAN**EXCAVATED MATERIALS DISPOSAL PLAN****BACKFILL AND REUSE PLAN**

SECTION 02201
EARTHWORK

PART 1 - GENERAL**1.01 DESCRIPTION OF WORK**

- A. Remove all items designated to be removed and excavate for new construction, fill and backfill as required, prepare subgrades and place aggregate bases for slabs, walks, and pavements. Protect existing vegetation and all adjoining properties and existing structures from damage. Perform Work in conjunction with Section 02090 and other related sections.
- B. Execution of this work will encounter asbestos contaminated soil or debris. Perform work in conjunction with Section 02081.

1.02 RELATED SECTIONS

- A. Environmental Management of Excavated Material and Fill/Backfill.....Section 02090

1.03 REFERENCES

References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by governing codes or regulations, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

- A. ASTM International (ASTM), latest editions
- B. New York Code of Rules and Regulations (NYCRR):
6 NYCRR Part 364, Waste Transporter Permits
- C. United States Department of Transportation (USDOT):
49 CFR 173, General Requirements for Shipments and Packagings
49 CFR 177, Carriage by Public Highway
- D. United States Department of Labor (USDOL), Occupational Safety and Health Administration (OSHA):
29 CFR 1910, Occupational Safety and Health Standards
- E. All Applicable New York City Department of Environmental Protection (NYCDEP) and New York State

Department of Environmental Conservation (NYSDEC) Rules and Regulations

- F. All applicable New York City Department of Transportation (NYCDOT), Department of Sanitation (NYCDOS), Department of Buildings (NYCDOB), and Transit Authority (NYCTA) Rules and Regulations

1.04 DEFINITIONS

- A. Excavation

Excavation is considered unclassified and consists of removal of material encountered to contract level, stockpiling, testing, loading, handling, transporting and subsequent legal disposal of such.

- B. Improvements

Man-produced items such as concrete, brick, asphalt, piping, etc. Those items not naturally occurring.

1.05 SUBMITTALS

- A. Product Data

Provide manufacturer's information on the compaction equipment to be used on each type of material for review.

- B. Shop Drawings

Submit shop drawings and associated calculations for sheeting, shoring, and bracing. Shop drawings and calculations shall be signed and sealed by a New York State licensed professional

- C. Samples

Provide a 15-pound bag of each material used for fill, backfill, aggregate base, and crushed stone to the Authority's testing laboratory.

- D. Quality Control Submittals

1. Design Data:

Provide the following information:

- a. Gradation analysis for fill materials.
- b. Gradation analysis for aggregate bases.
- c. Gradation analysis for crushed stone.

- d. Material composition analysis of recycled concrete material.
2. Existing Conditions Survey - Not used.
3. Certificates
 - a. Provide certificate guaranteeing fill and backfill material used for construction conforms to the samples supplied and the requirements of this section.
 - b. Provide certificate guaranteeing aggregate materials used for construction conform to the gradation supplied and the requirements of this section.
 - c. If dewatering requires a permit from DEP, submit copy of Notice of Termination sent to DEP to close the dewatering permit.
4. Contractor Qualifications

Provide proof of Contractor and Professional Engineer qualifications specified under "Quality Assurance".

1.06 QUALITY ASSURANCE

A. Qualifications

1. Company specializing in performing the Work of this Section shall have a minimum of 3 years experience and shall have worked on 3 projects of similar size.

B. Regulatory Requirements

1. Work of this Section shall conform to all requirements of the NYC Building Code and all applicable regulations and guidelines of all governmental authorities having jurisdiction, including, but not limited to, safety, health, and anti-pollution regulations. Where more stringent requirements than those contained in the Building Code or other applicable regulations are given in this Section, the requirements of this Section shall govern.
2. Work outside the street line shall conform to the requirements of the governmental authorities or utilities having jurisdiction (i.e. DOT, DEP, etc.). Where more stringent requirements than those provided by the applicable governmental

authority are given in this Section, the requirements of this Section shall govern.

3. Conform to requirements of "Safety and Health Standards, Subpart P - Excavations, Trenching and Shoring" - OSHA.
4. All fill and backfill must be environmentally clean meeting the requirements of Section 02090.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Imported fill and aggregate materials to be used for project are to be stockpiled separately at the producer's facility and shall be accessible to inspection and quality control (QC) testing by the Authority.
- B. Stockpile material brought to the site prior to placing in order to allow for testing by the Authority's testing laboratory. Stockpile material in such a manner as to prevent erosion and dust. Provide silt curbs if necessary.

1.08 PROJECT/SITE CONDITIONS

- A. Obtain all Building Department data available on the lot and those adjacent lots affecting or being affected by the project construction.
- B. Prior to clearing and removal or abandonment of improvements, ascertain the exact locations of all existing underground utilities. Protect these during subsequent operations.
 1. Demolish and remove underground utilities designated to be removed. Coordinate with utility companies for shut-off of services if lines are active.
 2. Consult immediately with the utility owner for directions should uncharted or incorrectly charted piping or other utilities be encountered during excavation. Cooperate with the utility owner, the Board of Education, and owners of lots serviced by the utilities in keeping their respective services and facilities in operation. Repair damaged utilities to the satisfaction of the Utility Owner.
 3. Do not interrupt existing utilities serving facilities occupied and used by the Board of Education or others during occupied hours, except when permitted in writing by the Department of Education and the affected lot owners, and only after acceptable temporary utility service has been

provided. Do not proceed with interruption of services without providing a minimum of 48 -hours notice to the affected parties and receiving their written approval.

C. Coordination

Examine drawings to determine sequence of operations, and relation to work of other trades. Start of work will signify acceptance of field conditions and will acknowledge coordination with other trades.

1.09 SEQUENCING AND SCHEDULING

- A. Perform work in such a manner to ensure a minimum interference with roads, walks, adjacent properties, and facilities to remain open. Do not close or obstruct these items without obtaining permits from the agencies having jurisdiction or the permission of the adjacent owners.
- B. There shall be no petroleum-contaminated material and/or hazardous waste excavation and handling activities performed when the existing building is in use by the Department of Education or others during occupied hours, except when permitted in writing by the Authority. Comply with Section 02090.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Restricted Excavated Material

Remove all debris not explicitly designated to be salvaged (to remain) from improvements and soil excavated during construction from premises and legally dispose of away from premises as part of the base bid. Any environmentally clean fill (as defined in Section 02090 and tested to meet such requirement) meeting the gradation requirements of Paragraph B below may be reused on the site pending credit to the Authority.

B. Fill and Backfill

Comply with the environmental requirements of Section 02090 for reused and imported material. Only environmentally clean fill (as defined in Section 02090) shall be used as fill and backfill. All fill and backfill shall be material classified as controlled fill by the New York City Building Code. Composition shall consist of a mixture of angular sands and gravels. Flat structured material such as mica (the main component of "mole" rock) falling into the acceptable gradation or other material affecting the permeability and structural characteristics of the sand material shall be no more

than .4% of the total material. Material shall not contain salts or foreign materials of any kind and the material shall show a percentage of wear by the Los Angeles wear test (ASTM C131) of not more than 35%. These fill materials shall contain no particles exceeding 3" in the largest dimension. No more than 30% of the material by weight shall be retained on a 3/4" sieve. No more than 10% shall pass the No. 200 sieve by weight. The Contractor shall provide the Authority with laboratory data on material proposed for use as fill/backfill. Samples shall be collected from imported material and material proposed for reuse on-site.

C. Aggregate Base

1. Aggregate base course, to be used under pavements, driveways, and slabs, shall be composed of crushed ledge rock (blue stone) or talus, roughly cubical or pyramidal in shape, and sand meeting the gradation and soundness requirements of New York State DOT, Item 3.04.02, Type 2. Material shall be uniform in quality and free of wood, loam, clay, dirt, roots, bark, and any other extraneous material. Comply with the environmental requirements of Section 02090 for the imported material. Material shall not contain salts or foreign materials of any kind. The aggregate shall be produced from material showing a percentage of wear by the Los Angeles wear test (ASTM C131) of not more than 35%.

2. Stone shall have the following gradation:

Sieve	Percent Passing by Weight
2"	100
1/4"	25-60
No. 40	5-40
No. 200	0-10

D. Crushed Stone

1. Crushed stone, to be used under interior slabs on grade and backfill at narrow excavations (less than 3'-0" wide), shall be composed of crushed ledge rock (blue stone) or talus, roughly cubical or pyramidal in shape, with a gradation conforming to ASTM C33 No. 57 stone. Material shall be uniform in quality and free of wood, loam, clay, dirt, roots, bark, and any other extraneous material. Comply with the environmental requirements of Section 02090 for the imported material. Material shall not contain salts or foreign materials of any kind. The aggregate shall be produced from material showing a

percentage of wear by the Los Angeles wear test (ASTM C131) of not more than 35%.

2. Stone shall have the following gradation:

Sieve	Percent Passing by Weight
1 ¹ / ₂ "	100
1"	95-100
1/2"	25-60
No. 4	0-15
No. 8	0-5

E. Recycled Concrete Aggregate

1. As an option, recycled concrete aggregate may be used instead of ledge rock for aggregate base, crushed stone, and broken stone ballast (meeting the indicated gradations for each and complying with the environmental requirements of Section 02090 for the imported material), depending on the soundness of aggregates, which are at the Engineer of Record's option. The material must be clean, with no deleterious material visible (wood, brick, metal, or other friable material) and meet the following criteria:
 - a. Material shall consist of at least 99.5% by weight of Portland cement concrete or ledge rock.
 - b. Material making up the remaining 1% shall be as follows:
 - 1) Wood - 0.1% maximum
 - 2) Brick, mica schist, metal, or other friable stone material - 0.4% maximum
 - 3) Asphaltic Concrete - 0% maximum

2.02 EQUIPMENT

- A. Provide proper compaction equipment to properly compact subgrade, fill and backfill, aggregate base, crushed stone and broken stone base. Subgrade compaction requirements are indicated in those sections. Employ a Licensed Professional Engineer to determine soil type and which equipment will give the proper compaction.

2.03 SOURCE QUALITY CONTROL**A. Tests**

The Authority's Testing Laboratory will perform the following laboratory tests:

1. Sieve Analysis: Performed in accordance with ASTM D422 on submitted fill samples to verify material meets gradation requirements.
2. Moisture Density Curve: Optimum moisture content obtained from submitted fill samples, tested in accordance with ASTM D1557.

B. Inspection**1. Testing Laboratory**

- a. The Authority will engage an approved Testing Laboratory or Special Inspection Agency to perform laboratory tests and field compaction testing on the fill/backfill materials and subgrade.
- b. The Laboratory will be responsible to and under the supervision of a Special Inspector.

2. Special Inspection

The Authority will assign, under the requirements as defined in Chapter 1 Title 28 of the NYC Administrative Code and Section BC 1704.7 of the 2014 NYC Building Code, a Special Inspector to supervise the testing of the controlled filling operations and approval of the subgrade bearing capacity, as well as and inspection of shoring operations as per Section BC 1704.20.2.

3. Contractor's Responsibility

Inspections and testing performed by the Authority's agent(s) shall not relieve the Contractor of responsibility for performing all other testing and inspection specified herein or otherwise necessary to meet the quality control and quality assurance requirements of this Section.

PART 3 - EXECUTION**3.01 EXAMINATION****A. Verification of Conditions**

Verify existing site conditions match those of the Drawings and pre-bid inspections. Notify the Authority in writing prior to commencement of Work of any discrepancies.

B. Preparation

1. Before starting any excavation work for new construction, ascertain the exact locations of all existing underground drain lines, piping, and conduits. Consult with the Mechanical Trades.
2. At location where any of the above services interfere with the excavation work, notify the Authority and Mechanical Trade under whose jurisdiction such work falls before continuing with any more excavation.

3.02 PREPARATION AND PROTECTION**A. General**

1. Provide adequate protection measures to protect workmen and pedestrians at the site.
2. Prevent damage to existing improvements designated to remain. If they are damaged during construction, restore improvements to their original condition.
3. Prevent damage to improvements on adjoining properties. Restore damaged improvements to their original condition to the satisfaction of their owner. Restore grades and vegetation to their original condition or better.
4. Hire a qualified horticulturist or arborist to supervise the protection of and the repair or replacement of damaged trees or other vegetation, including those of adjacent properties. Vegetation damaged during construction shall be replaced with same size and type.
5. Salvable Improvements
 - a. Carefully remove and protect all items to be saved and reused. Replace any items that are damaged by removal at own cost.

- b. Notify the Authority in writing of any item that is damaged prior to removal so that they may ascertain the item's condition.

B. Condition Survey

1. General: The Contractor shall perform a condition survey of the adjoining properties and existing school building prior to beginning excavation. Note damage to existing structures.
2. Photographs: Take photographs of the building walls of the adjoining properties and existing school so that the surfaces may be examined during construction and compared with the pre-work condition. If any cracks or other stress signs are exhibited by the buildings, halt operations until corrective action has been provided and is acceptable to the Authority. Take photographs of existing vegetation to record condition, size, and type.
3. Monitoring - Not used.
4. Should benchmark readings indicate displacement, halt operations until corrective action has been provided and is acceptable to the Authority.

C. Shoring, Sheeting, and Bracing

1. General
 - a. Inspect site, examine existing conditions and make all necessary preparations for the safe and proper sequence of work.
 - b. Properly guard and protect excavations so as to prevent them from becoming dangerous to person or property.
 - c. Properly slope sides of excavation or provide shoring, sheeting and bracing to prevent caving, erosion, or gullyng of sides of excavations. The sides of all excavations that are 5 feet or greater in depth measured from adjacent ground surface to the deepest point, shall be protected to prevent the sides from caving in. Alternatively, excavation sides may be sloped not steeper than 45 degrees.
 - d. Brace, shore, and protect existing structures when excavations are made adjacent to the existing structures or within a distance that they will be affected by the excavation.

- e. Maintain sides and slope of excavation in safe condition until backfilling or other work is complete. Maintain shoring and bracing in place till completion of work. Ensure that after all rainstorms all sides or slopes of excavations are inspected as per Section BC 3304.5.1 and safe conditions restored.
- f. Provide materials for work in good serviceable order.
- g. All shoring, bracing, sheet piling, etc. is to be removed upon completion of the work where they are installed, including any portion thereof, outside of street and lot lines. Within the lot, remove all wood and cut steel elements at a minimum to 4 feet below grade. Where they interfere with new work and utilities, remove elements in their entirety.

2. Inspection and Code Requirements

- a. Sheeting, shoring, and bracing for protection of excavations and protection of adjacent structures and the public is the responsibility of the Contractor and shall comply with the requirements of Section BC 3309, Protection of Adjoining Property.
- b. The most stringent requirements of the Building Code, Contract Drawings, Specifications, or any authorities having jurisdiction shall govern this Work.
- c. Coordinate Work of this Section with Work of all other Divisions so as to properly, and completely, install all Work as drawn or specified.
- d. The Contractor shall engage the services of a third party Registered Professional Engineer (not a direct employee) to prepare details of bracing, sheeting, shoring, party wall stabilization, and other construction required for protection of excavations and support of adjacent properties or buildings as per Sections BC 1704.20.7, BC 3309.6 and BC 3309.4.4. These drawings shall be submitted to the Engineer of Record for general review, which does not relieve the Contractor's Engineer of responsibility for the adequacy of the design.
- e. The Contractor's Engineer shall file Form PW-1 with the Building Department, thereby becoming

the Engineer of Record for such protection work and is responsible for stability of all slopes and bracing and for preparation of all design and shop drawings and their approval by the Building Department prior to obtaining a permit. The Contractor's Engineer is to inspect the installation of his/her design in the presence of the Authority's Safety Unit to verify that the systems have been installed as per the Engineer's Drawings.

- f.** The SCA will engage a Special Inspection Agency to perform the Special Inspections described in Sections BC 1704.20.2 and BC 3304.4.1.
- g.** As per Section BC 3304.3.1, no earthwork within the property line shall commence unless Contractor or permit holder notifies the Department of Building via phone or electronically within 24 to 48 hours prior to the commencement of such work. The Contractor shall preserve and protect from damage any adjoining structures.
- h.** When an excavation to a depth of 5 to 10 feet is to be made within 10 feet of an adjacent building or over 10 feet anywhere on the site, the Contractor shall provide written notice to the owner of the adjacent building not less than 10 days prior to the starting of excavation as per Section BC 3304.3.2. The written notice shall describe the work, timeframe and schedule and contact information of the contractor and of the department. No excavation shall commence until the Contractor has documented the existing conditions of all adjacent buildings in a pre-construction survey.

D. Water Control - Dewatering

- 1. Provide for the pumping and removal of all water that is encountered on the Site at any location, at any and all times, during the course of construction of the project and until the acceptance of the Work.
- 2. Prevent surface water from flowing into excavations, backfilled areas and from flooding the project site and surrounding area in order to keep the site and foundation subgrades dry. Ensure grades are pitched away from buildings and provide berms to prevent surface water from storm events

from flooding the site until permanent pavements and final landscaping is complete.

3. Provide and maintain pumps and other dewatering system components necessary to convey water out of excavations and demolitions, as well as removing away all surface water. Remove all water from the area of Work.
4. The Contractor shall utilize methods that minimize drawdown and pumping rates, and comply with dewatering permit.
5. The Contractor shall be responsible for all remedial action due to problems arising from improper/illegal dewatering. The Contractor shall obtain all permits from governing regulatory agencies, including but not limited to New York City Department of Environmental Protection (DEP) and New York State Department of Environmental Conservation (DEC), for dewatering and the off-site disposal of water. Ensure that when dewatering operations are complete that a Notice of Termination is submitted to NYCDEP.
6. Dispose of water from site in such manner as will not cause injury to the public health, nor to public or private property, nor to the work completed or in progress, nor to the surface of the streets, nor cause any interference with the use of the same by the public. Contaminated water generated from dewatering activities shall not be disposed of on site. At a minimum, a fractionation tank, oil/water separator, and granular activated carbon adsorption system shall be provided for treatment of contaminated water. Prevent silting of storm sewers by using settling tanks or other devices approved by the DEP. Clean sewer lines that are to be used for disposal of water and waste during construction. The Contractor is responsible for obtaining all necessary permits for disposal of liquids generated during dewatering operations and for the pretreatment of all liquids as required for disposal in accordance with all applicable rules and regulations.
7. Place all dewatering and discharge pipes and hoses that cross traveled roadways in such a manner so as to eliminate any disruption of traffic flow. If so ordered by the Authority, place the pipe and hoses in shallow trenches that will then be plated over. Firmly secure all plates so as to eliminate any possible shift or movement.

E. Frost Protection

1. Furnish all facilities and materials needed to prevent the earth and/or rock at bottom of excavation from becoming frozen or unsuitable to receive footings, etc.
2. When excavations for footings, etc. have been brought to the bottom elevations indicated on the Drawings and the bottoms of these excavations become frozen or otherwise unsuitable in the opinion of the Special Inspector because of inadequate protection by the Contractor, these excavations shall be carried to lower depths sufficient to provide stable bearings as determined by the Special Inspector and subject to approval by the Engineer of Record and without additional cost to the Authority.

F. Use of Explosives

The use of explosives is prohibited.

G. Workability of Excavation Subgrade

1. Take all steps necessary to prepare or improve existing conditions for proposed foundation work, including general excavation throughout the project site.
2. Properly grade site and perform operations to avoid disturbing the existing subgrade and any intermediate subgrade.
3. If subgrade conditions are disturbed that prevent earthwork operations or safe operation of foundation installation equipment, the Contractor shall take steps to improve subgrade conditions at own expense. Many types of soils are sensitive to disturbances such as water saturation or construction traffic and become unworkable.

3.03 EXCAVATION - GENERAL

- A. Excavate all earth, rock, and materials of every kind to the Contract elevations and dimensions required by the Drawings and Specifications and any additional required for safe slope of excavation, regardless of the character of materials and obstructions encountered. Prior to excavation, perform GPR survey of area of excavation to determine location of any unknown buried utilities.
- B. No additional compensation will be allowed for excavation or foundation work carried below the levels shown on Drawings unless same has been authorized in

writing by the Authority. Contractor is responsible for all remedial work due to unauthorized excavation.

- D. Level off and grade bottoms of excavations to receive footings, slabs, pavements, etc.
- E. For footings and foundations, machine excavation is allowed to within one foot of final subgrade. Excavate balance by hand. Excavate to a tolerance of plus or minus 0.10' and extend a sufficient distance from the structures to permit placing and removal of formwork, installation of services, other construction, and for inspection.
- F. For pavements and slabs on grade, excavate to depths required for installation of aggregate base or pavement as specified herein or shown on Drawings.
- G. All excavations for foundations and footings must be completed and the underlying soil or rock material approved by the Special Inspector before concrete foundation work is started. The Contractor may, with the written approval of the Authority, proceed with concrete foundation work before the entire building excavation has been completed. In addition, excavation for foundations and footings shall conform to Section BC 3304 unless more severe requirements are given in this Section.
- H. Remove all excavated material from the site and legally dispose of away from the premises, in accordance with the requirements specified in the Contract Documents. Burning of material on the site is not permitted.
- I. Trenching for pipes and conduits is described under "Excavation of Trenches."

3.04 EXCAVATION - ROCK

- A. Excavate rock where encountered by means other than blasting.

3.05 EXCAVATION OF TRENCHES

- A. Trenching shall be accomplished with an appropriate trenching machine, except hand trenching shall be used where machine may damage existing underground pipe, conduit, or other objects to remain.
- B. Excavate trenches to elevations required to install pipes and conduits at required inverts, as required by governing regulatory agencies, as shown on Drawings, as specified herein, and to allow encasement in concrete when indicated on Drawings. All items shall have full bearing when placed.

- C. Remove loose material and proofroll trench subgrade with a vibratory plate or jumping compactor (a minimum of 6 passes, 3 in each direction, if material is fill) in the presence of the Special Inspector. Remove any soft spots and replace with controlled fill, compacting material in 4" lifts to 92% (95% in vehicular areas) of maximum dry density by ASTM D1557 at optimum moisture content.
- D. Excavate trenches of sufficient width to allow for proper installation of the require item.
- E. Prevent trench bottoms from freezing until items are placed and the trench backfilled.
- F. Fill trench with concrete to a depth even with the bottom of footings when excavations pass within 18" of the footings at a depth below the footing. Continue concrete 2'-0" each side of the footing.
- G. Work outside the street line in governed by the regulatory authority having jurisdiction for such.
- H. Trenches shall be dry when trench bottom is prepared and, where applicable, when bedding concrete is placed.
- I. At water pipe, line trenches with non-woven geotextile filter fabric immediately before pipe laying to prevent soil contamination in the pipe.

3.06 DISPOSAL OF EXCAVATED MATERIAL

- A. All material disposal shall be in accordance with the requirements of Section 02090.
- B. Material Suitability and Construction Methods:
 - 1. All material excavated from the site shall be transported by the Contractor to an approved off-site designated facility. Environmentally clean material as defined in Section 02090 meeting controlled fill gradation may be reused pending credit to the Authority. When the Authority orders the Contractor to excavate during other than normal construction hours, the material shall be stockpiled on the site until the material can be delivered to the facility that is approved and complies with Section 02090. Stockpiled excavated soil shall be covered with heavy-duty tarps, secured with sand bags. If there is no room on the site for stockpiling, provide containers for stockpiling or other means.
 - 2. The Contractor is responsible for implementing all appropriate dust and/or odor control measures, including, but not limited to, water suppression.

3. Prior to departure from the site, transport vehicles shipping excavated material shall be inspected and cleaned to prevent tracking material off-site. Contractor shall properly collect and properly dispose, at an Authority-approved facility, all waste generated from cleaning.
4. The Contractor shall provide all required notifications to federal, state and local agencies prior to transporting material off site. Copies of all notifications issued shall be transmitted to the Authority at the time of issuance.
5. The Contractor shall screen drivers of transport vehicles prior to engagement and prior to departure from the site. Vehicle drivers shall be fully-licensed and possess appropriate training.
6. Vehicles used to transport excavated material shall be designed, equipped, operated and maintained to prevent leakage, spillage and airborne emissions during transport. Only safe, suitable and well-maintained vehicles, which are properly labeled/placarded, manned, permitted and registered to perform the required transportation services, shall be used.

3.07 FILLING AND GRADING

A. General

1. Do not commence filling and backfilling operations until proposed fill and backfill have been approved by the IEH Hazmat Division as per Section 02090 (in addition to gradation approvals), construction below finish grade has been approved, underground utilities and mechanical items inspected and tested, forms removed, waterproofing/membranes/coatings and other improvements installed, trash and debris removed, and temporary and permanent bracing installed.
2. Do not commence backfilling, filling and grading until existing subgrades have been compacted.
3. Backfilling of trenches is described under "Backfilling of Trenches".
4. Fill all excavations, backfill against all walls, and do all filling and grading necessary to bring the surfaces to the level required.
5. Do not backfill against concrete elements until the concrete has obtained its specified compressive strength.

6. Take particular care when rolling over areas where trenches or other excavations have been made and backfilled.
7. Fill voids caused by the removal of below grade improvements.
8. Grade bottoms of pavements toward sediment pits or catch basins to maintain uniform thickness of the slabs.
9. A minimum of 24" of environmentally clean fill (as defined in Section 02090) that has been tested utilizing laboratory reporting limits that are acceptable to the Authority (i.e., below the regulatory comparison criteria) shall be used on all exposed ground surfaces, including landscaped areas (grass, sod, groundcover, shrub areas, tree areas, including tree pits, etc.). Provide environmentally clean fill to bring soil to depth below the required amount of top soil required for each type of planting as described in Section 02900.

B. Compaction of existing subgrade

1. Surface Preparation: Existing subgrade shall be free from stumps, bushes, roots, sod, topsoil, rubbish, garbage, and any other material that may decay.
2. Grading
 - a. Prior to placing fill or backfill in any area, grading is to be performed as required to provide for drainage. Ditching or filling around the area shall be performed to intercept or divert all surface water.
 - b. On completion of grading as specified above, closely examine to determine whether excessive wetness, springs, or other seepage of water can be observed at any point. If such conditions exist, positive drainage in suitable form, such as french drains or tilling, must be provided before placement of fill is undertaken.
 - c. When the fill area has been prepared as specified above, compact the natural ground surface by methods indicated in 3 below.
3. Method of Compaction
 - a. Natural undisturbed material shall be graded and compacted to attain a uniform surface.

These areas shall be determined by the Special Inspector.

- b. Existing subgrade shall be proofrolled in the presence of the Special Inspector for the following conditions:

- 1) Subgrade consists of uncontrolled fills.
- 2) Identification of shallow loose zones of material or identification of soft/spongy material at surface.

- c. Proofrolling shall be accomplished with a minimum of four passes using a compactor of minimum static weight of 19,000 lbs, a minimum dynamic force of 40,000 lbs, and a total applied force of not less than 7,500 per foot of drum width. In areas inaccessible to the heavy equipment, provide a minimum of six passes with a vibratory plate or jumping compactor. Fill shall not be placed until the subgrade is approved by the Special Inspector.

- 4. Soft Areas During Compaction: If any areas show pumping, noticeable weaving, or that are otherwise unsatisfactory, undercut material within the limits and extent ordered by the Special Inspector. These areas shall be replaced with controlled fill, compacted to 92% of maximum dry density by ASTM D1557 at optimum moisture content (95% for vehicular areas), unless otherwise directed by the Engineer of Record.

C. Placement and Compaction of Fill and Backfill

1. Placement

- a. General: Begin fill and backfilling in the lowest section of the area. Spread material evenly by mechanical equipment or by manual means above the approved compacted subgrade in lifts not exceeding 6" to 8". Build layers as horizontally as practical to prevent thickness of lift from exceeding that specified but provide with sufficient longitudinal and transverse slope to provide for runoff of surface water from every point.
- b. Moisture Control: The moisture-density curve for the fill use shall be supplied to the Contractor as a guide in controlling moisture to achieve the required degree of compaction. If, in the opinion of the Special Inspector, fill material becomes too wet for the required compaction, the fill shall be dried by a

method approved by the Special Inspector prior to commencing or continuing compaction operations. Likewise, if, in the opinion of the Special Inspector, the fill material becomes too dry for the required compaction, the fill shall be moistened by a method approved by the Special Inspector prior to commencing or continuing compaction operations.

2. **Compaction:** Compact each lift to the degree of compaction indicated below. The degree of compaction shall be checked by the Special Inspector and each successive lift shall not be placed or compacted until the previous lift is inspected and approved by the Special Inspector. Compact the fill and backfill to elevations and limits shown on Drawings and is subject to final inspection and approval by the Special Inspector. Extend the compacted fill beyond the berm lines on a slope downward at a maximum slope of two horizontal to one vertical to intersect the approved stripped subgrade. Maintain the fill slopes at all times.
 - a. **Areas to receive heavy vehicular traffic or footings:** 95% of the maximum dry laboratory density by D1557 at optimum moisture content.
 - b. **All other areas:** 92% of the maximum dry laboratory density by D1557.
3. **Drainage During Fill Operation:** At all times, maintain and operate proper and adequate surface and subsurface drainage to the satisfaction of the Special Inspector in order to keep the construction site dry and in such condition that placement and compaction of fill may proceed unhindered by saturation of the area. Submit method of dewatering to the Authority for prior approval. Such approval shall not relieve the Contractor of his responsibility to maintain the site dry during the compaction operation. See Article 3.02.
4. **Frost:** Do not place fill materials when either the fill materials or the previous lift (or subgrade) on which it is placed is frozen. In the event that any fill that has already been placed on the surface shall become frozen, it shall be scarified and recompact, or removed, to the approval of the Special Inspector before the next lift is placed. Remove or recompact any soft spots resulting from frost to the satisfaction of the Special Inspector before new fill is placed.

- D. Placement and Compaction of Aggregate Bases and Crushed Stone
1. Provide aggregate base under all exterior pavements and wherever else indicated on the Drawings or specified herein. Provide crushed stone under all interior slabs. Provide 6" minimum unless specified otherwise elsewhere.
 2. Verify finished subgrade is at proper level.
 3. Prior to placement of material, reroll subgrade with a two-ton roller or hand tamper.
 4. Place aggregate base and crushed stone in layers of uniform thickness, but not exceeding 6". Compact material to either 80% of relative density or 92% (95% for heavy vehicular traffic) of maximum dry density at optimum moisture in accordance with ASTM D1557. Maintain optimum moisture content for compacting the material. Place material in single layer for aggregate courses 6" or less. Alternate blading and rolling to obtain a smooth, even, and uniformly compacted course.
 5. Where crushed stone is used to backfill narrow excavations, the final 4-0" shall be backfilled with compacted controlled fill, with a geotextile separating the crushed stone from the controlled fill.

3.08 BACKFILLING OF TRENCHES

- A. Do not backfill trenches until tests and inspections have been made and the backfilling authorized by the Authority. Use care to avoid damage or displacement of pipe or conduit.
- B. Backfill with controlled fill and compact each layer to 92% (95% for vehicular areas) of its maximum density as per ASTM D1557 using a vibratory plates, jumping compactors, or other approved means.

3.09 FIELD QUALITY CONTROL

- A. Tests
1. Sieve Analysis: The Authority's Laboratory will perform sieve analysis in accordance with ASTM D422 on fill and aggregate materials at the site prior to placement in order to verify conformance with the submitted samples. The laboratory will take one sample at a minimum for every 100 CY placed (or portion thereof) each day. If material appears to vary from approved material, more frequent testing will be done and if results indicate material

varies from that approved, costs of such testing will be paid by the Contractor.

2. Field density tests: The Authority's Laboratory will perform in-place field density tests in accordance with either of the three following procedures; ASTM D1556, ASTM D2167, or ASTM D2922.
 - a. Existing subgrade. One field density test for each 2000 ft², but in no case less than three tests.
 - b. Fill areas - For each lift, one field density test for each 2000 ft², but in no case less than three tests.
 - c. Backfill areas - For each area, two field density tests per lift at locations determined by Special Inspector and one test per lift for every 50 linear feet of trench.
3. Environmentally Clean Fill/Backfill Tests
 - a. The Authority, as a quality assurance measure, may perform applicable analysis of fill/backfill material samples to verify that the material meets the definition of environmentally clean fill as per Section 02090.

B. Inspection

1. Fill and Backfill Compaction: The Special Inspector will give approval for each lift in accordance with Sections BC 1704.7.2 and BC 1704.7.3. In the event that the compaction requirements are not satisfied, the lift shall be rerolled or removed and again tested until the required compaction is obtained.
2. Footing Subgrade: Not used.
3. Excavation - Sheet piling, Shoring, and Bracing: Not used.
4. Contractor's Responsibility: The Contractor shall notify the Authority at least 48 hours prior to filling operations, pouring of footings, and installation of excavation support to allow for the Authority to have the appropriate personnel at the site.
5. Contractor's Inspections: Inspections and testing performed by the Authority shall not relieve the Contractor of responsibility for performing all other testing and inspection specified herein or

otherwise necessary to meet the quality control and quality assurance requirements of this Section.

C. Responsibility

1. All required testing and/or analysis not specifically defined as being provided by the Authority shall be provided by the Contractor as part of the included Work and costs of this Project.
2. No testing and/or analysis by the Authority shall relieve the Contractor of the responsibility of conforming to the requirements of these specifications.
3. Time for conducting the tests and/or inspections defined in these specifications shall be considered as part of the Work of this Project and neither extension of time nor additional costs shall be accepted as a result.

3.10 PROTECTION

- A. Protect graded and compacted areas from traffic and erosion. Keep free of trash and debris.
- B. When completed compacted areas are disturbed by subsequent construction or weather, scarify surface, re-shape, and compact to required density prior to further construction.
- C. Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.
- D. A guardrail or solid enclosure at least 3'-6" high shall be provided along the open sides of excavations, except if the side slopes are one vertical to three horizontal or flatter.

END OF SECTION

LIST OF SUBMITTALS

<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>
Product Data:	_____	_____
1. Compaction equipment		
Samples:	_____	_____
1. Fill and backfill		
2. Aggregate base		
3. Crushed stone		
Design Data:	_____	_____
1. Fill and backfill		
2. Aggregate base		
3. Crushed stone		
4. Recycled concrete material composition		
Existing Condition Survey:	_____	_____
1. Project photographs		
Certificates:	_____	_____
1. Fill and backfill		
2. Aggregate base		
3. Crushed Stone		
4. Recycled concrete material composition		
5. Facility permits		
Qualifications:	_____	_____
1. Contractor		
2. Professional Engineer		

* * *

NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY
SPECIFICATIONS FOR
PLANYC CLIMATE CONTROL & BOILER CONVERSION
AT BARD COLLEGE HIGH SCHOOL - MANHATTAN

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05/09/2023

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A001.00	GENERAL NOTES - ARCHITECTURAL	05/09/2023
A002.00	2ND FLOOR EGRESS PLAN & ROOF ACCESS PLAN	05/09/2023
A061.00	SELECTIVE REMOVALS PLAN - 1ST FLOOR	05/09/2023
A062.00	SELECTIVE REMOVALS PLAN - 2ND FLOOR	05/09/2023
A063.00	SELECTIVE REMOVALS PLAN - 3RD FLOOR	05/09/2023
A064.00	SELECTIVE REMOVALS PLAN - ROOF	05/09/2023
A081.00	NORTH REAR EGRESS STAIR SELECTIVE DEMOLITION	05/09/2023
A082.00	SOUTH REAR EGRESS STAIR SELECTIVE DEMOLITION	05/09/2023

A083.00	MAIN ENTRANCE BALCONY SELECTIVE DEMOLITION	05/09/2023
A084.00	1ST FLOOR CAFETERIA SLAB SELECTIVE DEMOLITION	05/09/2023
A085.00	NORTH BULKHEAD SELECTIVE DEMOLITION	05/09/2023
A101.00	CONSTRUCTION PLAN - 1ST FLOOR	05/09/2023
A102.00	CONSTRUCTION PLAN - 2ND FLOOR	05/09/2023
A103.00	CONSTRUCTION PLAN - 3RD FLOOR	05/09/2023
A104.00	CONSTRUCTION PLAN - ROOF	05/09/2023
A401.00	NORTH REAR EGRESS STAIR REPAIR WORK	05/09/2023
A402.00	SOUTH REAR EGRESS STAIR REPAIR WORK	05/09/2023
A403.00	MAIN ENTRANCE BALCONY REPAIR WORK	05/09/2023
A404.00	1ST FLOOR CAFETERIA SLAB REPLACEMENT	05/09/2023
A405.00	NORTH BULKHEAD MASONRY REPAIR	05/09/2023
A406.00	ROOF PARAPET BARRIER FENCE	05/09/2023
A407.00	ACCESS STAIR AT ROOFTOP AND DETAILS	05/09/2023
A408.00	MASONRY DETAILS	05/09/2023

STRUCTURAL

<u>DWG. NO.</u>	<u>TITLE</u>	<u>DATE</u>
S102.00	ROOF PLAN	05/09/2023
S201.00	SECTIONS AND DETAILS-1	05/09/2023

PLUMBING

<u>DWG. NO.</u>	<u>TITLE</u>	<u>DATE</u>
P001.00	KEY OF SYMBOLS, ABBREVIATIONS AND GENERAL NOTES	05/09/2023
P002.00	PLUMBING SCHEDULES	05/09/2023
P061.00	FIRST FLOOR PLUMBING REMOVALS PLAN WEST	05/09/2023

P062.00	FIRST FLOOR PLUMBING REMOVALS PLAN EAST AND SECTIONS	05/09/2023
P201.00	FIRST FLOOR PLUMBING NEW WORK PLAN WEST, PART PLAN AND SECTION	05/09/2023
P202.00	FIRST FLOOR PLUMBING NEW WORK PART PLAN EAST AND SECTIONS	05/09/2023
P301.00	SANITARY AND STORM DRAINAGE RISER DIAGRAMS	05/09/2023
P401.00	PLUMBING DETAILS	05/09/2023

ELECTRICAL

<u>DWG. NO.</u>	<u>TITLE</u>	<u>DATE</u>
E001.00	FIRST FLOOR ELECTRICAL NOTES AND SYMBOL LIST	05/09/2023
E201.00	FIRST FLOOR ELECTRICAL NEW WORK PLAN, KEY PLAN, AND DETAIL	05/09/2023

END OF LIST OF DRAWINGS

SECTION 03005
CONCRETE WORK

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. Furnish material, equipment, labor, services required to provide for miscellaneous concrete equipment pads, slabs, and foundations as shown. Work includes the installation of formwork, reinforcement, expansion joints, and other items listed herein. Provide special formwork or formliners for concrete with smooth finishes. Allow ample time and facility for the Work of other Divisions to be installed.

1.02 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

Products to be installed include, but are not limited to, the following:

- A. Anchor bolts and other anchors
cast into concrete.....Section 05121

1.03 SUSTAINABILITY REQUIREMENTS

- A. Sustainability requirements included in the Section are as follows:

1. Meet established minimum recycled content for concrete and documentation of recycled materials.

1.04 REFERENCES

References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by governing codes or regulations, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

- A. American Society of Testing and Materials (ASTM) standards, latest editions.
- B. American Concrete Institute (ACI) standards, latest editions.
- C. "Placing Reinforcing Bars - CRSI-WCRSI Recommended Practices", latest edition. Concrete Reinforcing Steel Institute.

1.05 DEFINITIONS

- A. Normal weight concrete: Concrete for which density is not a controlling attribute, made with aggregates of the types covered by ASTM C33 and usually having unit weights in the range of 135 to 160 lb/ft³.

1.06 DESIGN REQUIREMENTS

- A. Performance Characteristics:
1. The minimum compressive strength of concrete shall be 4000 psi.
 2. For normal weight concrete, the maximum water to cementitious ratio shall be 0.45.
 3. Exterior concrete (concrete exposed to the elements) and shall be air-entrained.

1.07 SUBMITTALS

- A. Product Data

Submit manufacturers' information for the following:

1. Admixtures
2. Curing compounds
3. Bonding Agent
4. Vapor barrier
5. Vapor retarder
6. Welded Wire Fabric

- B. Samples

1. Vapor Barrier
2. Vapor retarder

- C. Shop Drawings

1. Immediately after award of Contract, prepare shop drawings showing all fabrication dimensions and locations for placing of the reinforcing steel and accessories. Follow detailing recommendations of ACI 315. Shop Drawings are to be prepared by a rebar detailer.
2. Shop drawings will be checked for size of material and spacing by the Engineer of Record, which shall

not render the Engineer responsible for any errors in construction dimensions, quantities, bends, etc. that have been made in preparation of the shop drawings. The Contractor shall assume full responsibility for the correctness of quantities, dimensions and fit.

3. Do not order or deliver reinforcement to job site prior to approval of drawings.

D. Quality Control Submittals

1. Design Data: Submit design mixes for concrete, including list of admixtures to be used to the Engineer of Record. After approval and prior to placement, send the approved mix to the Authority's laboratory.

2. Certificates

1. Concrete laboratory license number and certification of meeting ASTM E329 standards.
2. Concrete producer's Computer Batch Ticket in accordance with Section BC 1905.8.2.3.1 of the 2014 NYC Building Code must be presented at site to the Authority's testing laboratory before concrete is placed for every load of concrete delivered.

3. Contractor Qualifications

Provide proof of Installer, Producer, and Rebar Detailer qualifications specified under "Quality Assurance".

E. Sustainability Submittals

Submit documentation of recycled content of concrete materials; product data, mix design information, or manufacturer's statement as applicable.

1.08 QUALITY ASSURANCE

A. Qualifications

1. Concrete Installer: Company specializing in performing the Work of this Section shall have three years minimum experience on successful projects of similar size.
2. Concrete Producer: Company specializing in the production of concrete shall be certified by the National Ready Mixed Concrete Association (NRMCA) and shall have certification by either a New York

City Agency or the NYS Department of Transportation and complies with ASTM C94 requirements for production facilities and equipment. The plant shall use NYSDOT approved trucks and drivers shall be certified by the NRMCA.

3. Rebar Detailer: Company shall be specialized in the detailing of reinforcing bar shop drawings with a minimum of three years experience.
4. Concrete Laboratory: Concrete laboratory providing design mixes shall be New York City licensed and shall meet the requirements of ASTM C1077 for testing indicated, as documented according to ASTM E329.

B. Regulatory Requirements

1. Building Code: Work of this Section shall conform to all requirements of the NYC Building Code and all applicable regulations of other governmental authorities. Where more severe requirements than those contained in the Building Code are given in this Section, the requirements of this Section shall govern.
2. Industry Standards: The ACI Standards contained in the ACI Manual of Concrete Practice apply to Work of this Section. Where more severe requirements than those contained in the Standards are given in this Section or the Building Code, requirements of this Section or the Building Code shall govern. The Contractor shall keep a copy of ACI SP-15 - "Field Reference Manual" at the site.

C. Certifications

Cement and aggregate shall be acquired from the same source for all work. If a change in suppliers is required, a new mix submittal must be produced with the new material and submitted for approval.

D. Coordination

Coordinate this work with the work of other Divisions so that items to be installed are done so correctly and in proper sequence.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Protect material from the elements and from other damage on the site before, during, and after installation. Store reinforcement in location to prevent rusting, etc.

- B. Insure proper identification of reinforcement after bundles are broken.
- C. Replace and pay for material and work damaged to the satisfaction of the Authority.

1.10 ENVIRONMENTAL REQUIREMENTS

- A. Adequately protect concrete placed during rain, sleet, or snow, or when the mean daily temperature falls below 40°F or rises above 90°F as provided in "Mixing and Placing Concrete".

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Rough Formwork: Commercial Douglas Fir, DFPA: 5/8" thick minimum.
- B. Release Agent: VOC compliant material such as those of the Cresset Chemical Company for coating forms.
- C. Form Ties: Wire ties not permitted. Form ties for exposed concrete shall be adjustable, leave no metal closer than 1¹/₂" to the surface, and free of devices that leave holes or depressions larger than 7/8" back of exposed surface.
- D. Reinforcing Bars: All reinforcing bars shall be of deformed type of new billet steel conforming to current requirements of ASTM A615 Grade 60. No rail or re-rolled steel will be permitted. For concrete exposed to the elements, reinforcing bars are to be epoxy coated in accordance with ASTM A775.
- E. Welded Steel Wire Fabric: Wire Fabric shall conform to the requirements of ASTM A185. For concrete exposed to the elements, wire mesh shall be epoxy coated in accordance with ASTM A884.
- F. Supports for Reinforcement: Metal bolsters and chairs of adequate strength, size, and number. Provide CRSI Class C supports (plastic tipped) for formed concrete surfaces and Class A (bright basic) for other conditions. Plastic supports may be used if submitted for approval. Wire bar supports shall be coated with dielectric material for a minimum distance of 2" from the point of contact with the epoxy-coated reinforcing bars.
- G. Cementitious Materials:
 - 1. Portland cement: Shall conform to ASTM C150 Type I or II unless otherwise permitted by the Engineer of

Record and shall be of the non air-entrained type.
Provide Type II for exterior pavements.

2. Ground Granulated Blast-Furnace Slag (Slag cement):
Shall conform to ASTM C989, Grade 100 or 120.
3. No other alternate cementitious materials may be utilized.

H. Admixtures

1. The use of admixtures shall comply with the requirements of Section BC 1903.6. The final soluble chloride content in concrete, percent by weight of cement, due to the addition of admixtures and other ingredients shall not exceed .05 at 28 days.
2. Air-entraining admixtures shall conform to ASTM C260.
3. Chemical admixtures shall conform to ASTM C494.

I. Water: Clean potable water free of injurious foreign matter conforming to the requirements of Section BC 1903.4.

J. Aggregate: Maximum size of coarse aggregate shall conform to paragraph 3.3.2 of ACI 318-11.

1. Aggregates for normal weight concrete shall conform to ASTM C33 and be of Size No.57, No.67 and/or No.8.

K. Curing Compounds

1. Non-strippable

- a. Clear Curing and Sealing Compound (A.I.M. Regulations - VOC Compliant, 350 g/l): Liquid type membrane-forming curing compound, clear styrene acrylate type, complying with ASTM C1315, Type I, Class A, 25% solids content minimum. Moisture loss shall be not more than 0.40 Kg/m² when applied at 300 sq. ft./gal. Manufacturer's certification is required.

- b. Curing Compounds shall be "Super Diamond Clear VOX" by The Euclid Chemical Company or "Masterkure 100W" by Master Builders.

2. Strippable

- a. Clear Curing Compound: Liquid type membrane-forming curing compound, complying with ASTM C309.
- b. Curing Compounds shall be "Kurez DR Vox, Kurez W Vox by The Euclid Chemical Company or "Masterkure N-Seal VOC" by Master Builders.

L. Bonding Agent

1. Epoxy/acrylic resin that will not form a vapor barrier with the concrete with the following properties:
 - a. Bond strength of 1800 psi in 2 hours when tested in accordance with ASTM C882.
 - b. Flexural strength of 2000 psi in 28 days when tested in accordance with ASTM C78.
 - c. Tensile strength of 600 psi in 28 days when tested in accordance with ASTM C496.
2. Bonding agent shall be "CR246 Sto Bonding and Anti-corrosion Agent" by Sto Concrete Restoration Division, Armatec 110 by Sika Corp, or Corr-bond by Euclid Chemical Company.

2.02 MIXES

- A. General: Concrete for all parts of the Work shall be of the specified quality capable of being placed without excessive segregation and, when hardened, of developing all characteristics required by the Specifications and Drawings.
- B. Strength: Strength requirements given in Part 1 of this Specification are based on 28-day compressive strength, unless high early strength is specified, in which case required strengths are based on 7-day compressive strength. Mixes with slag will have a slower initial set time, which must be taken into account when finishing.
- C. Method of Proportioning
 1. Proportion concrete mix of strength listed in B above in accordance with the requirements of Section BC 1905.4. The Engineer of Record will review the design mix.
 2. Mix designs are specific to material used, concrete producer, and method of placement. Each mix design must be reviewed and accepted by the Engineer of Record.

3. The recycled content in the concrete mix shall be 40% of the cementitious content or a minimum of 6% of the dry weight.

D. Normal Weight Concrete

1. Unless otherwise specified, proportion and produce normal weight concrete to have a maximum slump of 4" or less. A tolerance of up to 1" above the indicated maximum shall be allowed for individual batches provided the average for all batches or the most recent 10 batches tested, whichever is fewer, does not exceed the maximum limit. The slump shall be determined by ASTM C143. Concrete containing High Range Water Reducer shall have a slump not exceeding 9", unless other wise approved by the Engineer of Record. The concrete shall arrive at the job site with a water slump of 2" to 3", be verified by the Authority's representative, and the HRWR admixture added to increase the slump to the approved level.
2. The concrete producer shall provide a redosage chart onsite to maintain proper slump or slump-flow. The chart must indicate dosage per remaining concrete and expected slump or slump flow increase.
3. Where normal weight concrete is indicated to be air-entrained, provide the following air content for the grading size of coarse aggregate as follows:
 - a. No.8.....7¹/₂%
 - b. No.57 or 67.....6%

Tolerance on air content as delivered shall be +1.5%.

E. Mortar Screed and Protection Coats

Mortar screed coats shall be one part cement, three parts sand, water as required.

2.03 SOURCE QUALITY CONTROL

A. Tests

1. The Engineer of Record will review the proposed materials for compliance with the Specifications prior to construction.
2. The Testing Laboratory will perform field tests as work progresses as listed in "Field Quality Control".

B. Inspection

1. Testing Laboratory

- a. Concrete work is subject to Quality Control Inspection
- b. The Authority will assign a licensed concrete testing laboratory to perform the required field testing. The Testing Laboratory will perform field testing and inspect the work as it progresses. The listing of services to be performed by the testing Laboratory are given in Section 1.6 of ACI 301.
- c. The Testing Laboratory must be present when the concrete is being placed. The Authority may elect to have the laboratory present at the plant to witness the batching and mixing of the concrete.

2. Notification

- a. Notify the Authority in writing at least forty-eight hours in advance of each concrete placement. The Authority will notify the Testing Laboratory immediately to order out the necessary concrete technicians to cover the work. Keep records of such notification.
- b. Once the concrete technicians are ordered out and a cancellation follows, the Contractor will be charged Four Hundred Fifty Dollars for each technician so ordered to appear, unless a cancellation order is issued to the Laboratory by 3 PM the day before the concrete placement.
- c. During the placement of the concrete, notify the Authority immediately of any delay at the concrete plant or at the job site. Where the Authority decides to provide a technician at the plant, do not mix concrete or add admixtures unless the Technician is present. Do not add admixtures to be added at the site unless the Technician is present.

3. Contractors Responsibility for Quality Control

- a. The Authority and the Authority's Testing Laboratory shall receive the producer's Computer Batch Ticket for each truck.
- b. The tests and inspections, as provided in the Code, do not in any way relieve the Contractor of responsibility to construct the Work in accordance with the Drawings and

Specifications and to use safe, standard methods of construction at all times, safeguarding the public, workmen, and structure. The Contractor shall be solely responsible for the physical control of the materials and concrete mixes, and shall see that such mix designs, tests, and controls are in accordance with the Code and Specifications. The Contractor's superintendent shall attest that the work was installed in accordance with the documents.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Prior to placement of concrete, verify that the concrete cover over the reinforcement is that specified on Drawings and that reinforcement and all other embedded items are provided and held securely, positioned accurately, and will not be a detriment to concrete placement.
- B. Examine all adjoining work on which this Work is in anyway dependent for proper installation and workmanship. Report to the Authority any condition that prevents the performance of this Work.

3.02 PROTECTION

- A. Protect adjacent finish materials and previously poured concrete against spatter during concrete placement.
- B. Provide and maintain barricades and safeguards around openings, etc. to protect workmen from injury and to comply with all Building Code, OSHA, and other authorities having jurisdiction regulations.

3.03 NOT USED

3.04 REINFORCEMENT

- A. Place reinforcement in accordance with CRSI "Placing Reinforcement Bars", Section 3 of ACI 301, and Section BC 1907.5.
- B. Unless otherwise permitted, welding of crossing bars (tack welding) for assembly of reinforcement is prohibited.
- C. Support and fasten together all reinforcement to prevent displacement by construction loads or placing of concrete.
- D. Lifting of bars and welded wire fabric into position during placement of concrete is not permitted.

- E. Where the concrete surface will be exposed to the weather in the finished structure, the portions of all accessories within 1/2" of the concrete surface shall be non-corrosive or protected against corrosion.
- F. Provide minimum protective cover given in Section BC 1907.7.1 if not indicated on Drawings.
- G. All splices not shown on the Project Drawings shall be shown on the shop drawings and approved by the Engineer of Record.
- H. All embedment lengths not shown on the Project Drawings shall be shown on the shop drawings and approved by the Engineer of Record.

3.05 PREPARATION

- A. Remove hardened concrete from inner surfaces of conveying equipment and all formwork, reinforcement, and dowels.
- B. Prepare previously placed concrete to be in contact with new concrete in the manner described under "Construction Joints".
- C. Prepare existing concrete to be in contact with new concrete by roughening and cleaning the surface and applying a bonding agent. Surface must be free of laitance. Concrete must be placed after agent cures and within 20 hours of applying bonding agent. If time elapses, apply a new application in accordance with the directions of the manufacturer.

3.06 JOINTS AND EMBEDDED ITEMS

- A. Construction Joints
 - 1. Make joints not shown on Drawings at locations that will least impair the strength of the structure and comply with requirements of Section BC 1906.4. Such location is subject to the approval of the Engineer of Record.
 - 2. Continue reinforcement across joints. Provide longitudinal keys at least 1½" deep in walls and provide other keys as required. Drawings indicate keys or roughened surface at interface of walls and footings.
 - 3. Thoroughly clean concrete surface of oil, grease, and other contaminants and remove all laitance prior to placement of adjoining concrete. Roughen surface of the concrete in an approved manner that will expose the aggregate uniformly to a 1/4"

amplitude and will not leave laitance, loosened particles of aggregate, or damaged concrete at the surface. Dampen surface immediately prior to placement.

3.07 MIXING AND PLACING CONCRETE

A. General

1. Notify Authority at least 48 hours in advance of each concrete placement. Do not place concrete without approval of the Authority.
2. Do not allow rainwater to increase mixing water nor damage surface finish.
3. When placing concrete in cold weather (air temperature below 40°F), concrete shall contain either an accelerating admixture or use Type III cement.
4. Production of concrete, including batching and mixing, shall be done in accordance with the requirements of Section 4 of ACI 301 and Section BC 1905.8.
5. Placement of concrete shall be done in accordance with the requirements of Section 5 of ACI 301 and Sections BC 1905.9 through 1905.13. All consolidation shall be done by vibration.

B. Mixing

1. Batch, mix, and transport ready-mixed concrete in accordance with the appropriate sections of ASTM C94 and Section BC 1905.8.2. Truck mixers and agitators shall meet the requirements of the Truck Mixers Manufacturer's Bureau or shall comply with Section 11 of ASTM C94 and shall be NYSDOT approved. All trucks shall have working revolution counters and site gages.
2. Batch and mix other concrete in accordance with subsection 4.3.1 of ACI 301.
3. Use of chemical admixtures must be approved by the Engineer of Record.
4. Unless otherwise approved by the Engineer of Record, concrete shall be deposited within 1½ hours or 300 revolutions of the mixing drum, whichever comes first, after introduction of water to the cement or cement to the aggregate. When the

ambient temperature rises above 90°F, the time shall be decreased to 1 hour.

5. Batch lightweight concrete using the saturated weight of aggregate, which shall take into account the internal and surface moisture content.
6. Tempering and control of mixing water
 - a. Mix concrete only in quantities for immediate use. Concrete which has started to set shall not be rettempered, but shall be discarded. Water shall not be added at the site.
 - b. For concrete containing HRWR (Superplasticizer), if loss of slump occurs, HRWR may be redosed at the site as long as a "flash set" has not occurred. Redosage chart and procedures must be discussed and approved by the Engineer of Record and the admixture manufacturer.

C. Placing: Place concrete in accordance with ACI 304R, ACI 318-11, and Sections BC 1905.9 and BC 1905.10.

1. Consolidate all concrete by vibration so that the concrete is thoroughly worked around the reinforcement, around embedded items and into corners of forms, eliminating all air or stone pocket or weakness. Internal vibrators shall be the largest size and most powerful that can be used in the Work, as described in **Section 5.1** of ACI 309R, with a minimum frequency of 7000 revolutions per minute and shall be operated by competent workmen. Over-vibrating and use of vibrators to transport concrete within forms is not permitted. Insert and withdraw vibrators at many points, from 18" to 30" apart. At each insertion, the duration shall be sufficient to consolidate the concrete but not sufficient to cause segregation, generally from 5 to 15 sec duration. Keep a spare vibrator on the job site during all concrete placing operations.

2. Cold Weather Concrete Protection

When the mean daily temperature of the atmosphere is less than 40°F during concreting, or within 24 hours thereafter, follow the procedures outlined in ACI 306R to protect the concrete. Temperature of the plastic concrete shall be no lower than 55°F. Heat all forms, reinforcing steel, and surfaces to receive concrete above the freezing point and keep them completely free of frost, snow, and ice.

3. Hot Weather Protection: When the mean daily temperature of the atmosphere is over 90°F during concreting, follow the procedures outlined in ACI 305R to protect the concrete.
4. As per Section BC 3303.15, all concrete washout water, if washed out on site, shall be collected in water tight containers placed on the site for holding prior to legal disposal off site. Wash water is not permitted to be disposed of in storm, sanitary, or combined sewers.

3.08 FINISHING OF FORMED SURFACES AND REPAIR OF SURFACE DEFECTS

A. General

1. Remove forms as soon as practicable.
2. Repair surface defects, including tie holes and cracks, immediately after form removal. Patches shall be of quality to match the specified finish.
3. Remove oil, grease, compounds, and other contaminants from surfaces and areas to be repaired.
4. Provide finishes specified below immediately after form removal.
5. Provide curing and protection.

B. Repair of Surface Defects

Repair surface defects in accordance with subsection 5.3.7 of ACI 301. At the Authority's discretion, repair mortars and coatings shall be employed to rectify defects. Materials shall be as selected by the Authority.

C. Acceptance of Concrete Finish

If the finish produced is not acceptable to the Authority, the Contractor shall be responsible for all costs incurred to produce an acceptable finish by whatever means determined by the Authority. Remove stains, rust, efflorescence, and other surface deposits to the satisfaction of the Authority.

3.09 SLABS

A. Placement

1. Mixing and placing shall be carefully coordinated with finishing. Do not place concrete on the subgrade or forms more rapidly than it can be spread, straightedged, and darbied or bull floated.

Provide leveling, floating, troweling, etc. at the correct time interval after pouring to prevent dusting and provide a durable surface as specified in ACI 302.1R. These operations must be performed before bleeding water has an opportunity to collect on the surface.

2. To obtain good surfaces and avoid cold joints, the size of finishing crews shall be planned with due regard for the effects of concrete temperature and atmospheric conditions on the rate of hardening of the concrete.

B. Leveling and Finishing

1. General

- a. Unless otherwise indicated on the Drawings or specified herein, make all slabs even and uniform in appearance and, where no slope is required, level.

1) Floor Levelness:

- a) Slabs on grade and formed slabs shall be placed level to an $F_L=35$.

2) Floor Flatness

- a) Slabs on grade and formed slabs shall be finished flat to an $F_F=50$ based on 3/16".

- 3) Floor flatness and levelness shall be measured in accordance with ASTM E1155 within 72 hours of placement.

- b. Follow detailed recommendations for finishing given in ACI 301, Section 5, and ACI 302.1R.
- c. Protect finishes from contamination from time of placing until time of acceptance, placement of topping, etc.
- d. Remove defects of sufficient magnitude to show through floor coverings or that do not meet tolerances by grinding.

2. Finishes

- a. Surfaces which receive bonded applied cementitious applications such as full-set terrazzo and vitreous ceramic tile, self-leveling underlayment, concrete fills and toppings, crystalline waterproofing, screed

coats: Strike off and level to the proper elevation. After the concrete has stiffened sufficiently to permit the operation, float the surface to a uniform sandy texture. The surface shall then be broomed to a texture as approved by the Architect.

- b. Surfaces to receive floor coverings such as resilient flooring, thin-set terrazzo and vitreous ceramic tile, carpeting, wood floors or surfaces that are exposed or painted, unless specified otherwise: Steel trowel surface to a smooth dense finish, free of trowel marks, grooves, depressions and ripples with a tolerance no greater than $\pm 3/16$ " in ten feet ($1/8$ " at wood floors). Exposed or painted slabs are to have a "hard trowel" finish. Apply densifier/sealer to slabs exposed or painted, except for those specified below to have no finish. Apply two coats in accordance with the manufacturer's instructions at the proper time.
- c. Surfaces intended to receive roofing, waterproofing membranes; mechanical pads: Level and float surface. Leave surface free from depressions, bulges, rough spots, and other defects.
- d. Pavements: Finish surface to a true smooth plane and texture with a toothed roller or float with a wood float. Score concrete pavement in squares of approximately 5'-0" and/or as shown on Drawings. Each rectangular slab shall have all edges neatly rounded with proper tools and be bounded on all sides by a troweled border about 1" in width.
- e. Ramps, Driveways, Exterior Concrete Steps: Level and float surface. Follow with a broom finish perpendicular to direction of traffic.

3.10 MISCELLANEOUS CONCRETE WORK AND TRIMMINGS

- A. Provide curbs, walls, and other miscellaneous concrete trimmings.
- B. Provide motor, blower, and other mechanical bases. Coordinate with the work of Division 15 and 16. Provide concrete bases as shown on the Drawing.

3.11 PATCHING AND BONDING TO EXISTING CONCRETE

- A. Provide bonding agent whenever new concrete is to be poured against existing concrete, whenever the time between concrete pours is longer than that allowed for proper bond, and wherever bonding agent is indicated on the Drawings to be applied.
- B. Remove loose concrete from surface to be bonded with new concrete and clean. Remove rust from reinforcement and structural steel by power chipping and power driven brushes.
- C. Apply bonding agent in accordance with manufacturer's specifications. Pour concrete as soon as bonding agent has cured and within 20 hours after application. If the 20-hour period has elapsed, then the bonding agent must be reapplied.

3.12 CURING AND PROTECTION

A. General

- 1. Begin curing concrete immediately after placement and finishing. Protect all freshly deposited concrete from premature drying and excessively hot or cold temperatures and maintain it with minimal moisture loss at a relatively constant temperature for the period of time necessary for the hydration of the cement and proper hardening of the concrete. Detailed procedures are given in ACI 308.
- 2. Provide 7-day moist curing or provide strippable curing compounds to surfaces receiving waterproofing, adhesives, membranes or additional concrete. The compound shall be removed in an approved manner prior to subsequent installation of the material.

B. Procedure

- 1. Concrete surfaces not in contact with forms:
 - a. Ponding or continuous non-manual sprinkling.
 - b. Absorptive mat or fabric, sand, or other covering kept continuously wet.
 - c. Curing compounds conforming to ASTM C1315 or strippable curing compound conforming to ASTM C309.
- 2. Continue curing until a total of 7 days has elapsed during which the temperature of the air in contact with concrete has remained above 50°F. Prevent rapid drying during and at the end of the curing period.

3. Remove all curing compounds completely with cleaners recommended by curing compound manufacturer.

C. Cold Weather Curing

Concrete must be protected from water loss. This shall be accomplished by the application as soon as possible without harm to the concrete surfaces of either (a) exhaust steam, or vapor-resistant paper or polyethylene film, or (b) curing compounds. In all other respects, curing shall conform to applicable provisions of this Section. Concrete temperature shall be maintained between 50°F and 70°F.

D. Hot Weather Curing

1. During the period June 1 to October 1 or when hot weather conditions require it, maintain continuous water curing for a minimum period of twenty-four hours. Provide for wind breaks, shading, and other necessary provisions.
2. After 24 hours, curing shall be by one of the methods specified under B above. In all other respects, curing shall conform to applicable provisions of this Specification. Upon termination of the specified moist curing, every effort should be made to reduce the rate of drying by avoiding air circulation.

- E. Protection from mechanical injury: Protect concrete from mechanical disturbances during curing period as described under "Protection and Cleaning".

3.13 TOLERANCES

- A. Establish and maintain in an undisturbed condition and until final completion and acceptance of the project sufficient control points and bench marks to be used for reference purposes to check tolerances.
- B. Place reinforcing bars in accordance with the tolerances given in Section BC 1907.5.2.
- C. Move bars as necessary to avoid interference with other reinforcement, conduits, or imbedded items. If bars are moved more than one bar diameter, or enough to exceed the above tolerances, the resulting arrangements are subject to approval by the Engineer of Record.
- D. Place concrete to meet tolerances specified in ACI 117, unless specified otherwise herein.

3.14 FIELD QUALITY CONTROL**A. Tests**

Tests to be performed by the Authority's Testing Laboratory during construction are as follows:

1. Compliance of materials to Specifications tested from production samples.
2. Determination of the slump of the concrete for each sample taken.
3. Determination of water content of freshly mixed normal weight concrete utilizing the procedure of AASHTO T318. Concrete that does not meet the maximum water to cement ratio or the proportions given in the approved design mix will be immediately rejected regardless of slump.
4. Strength tests: The frequency of conducting strength tests of concrete shall be in accordance with Section BC 1905.6.2, with additional cylinders taken for an additional strength test and one cylinder for a 7-day break. Strength tests shall be performed for each 50 cubic yards, or portions thereof, of concrete placed in any one day's concreting. Specimens will be stored at the site in the insulated curing box provided by the Contractor. Each group of specimens is considered one strength test. One cylinder will be broken at 7 days for information. Strength test shall be at 28 days for acceptance. The cylinders for the additional strength test will be utilized for either a strength test or other types of testing only if the 28-day breaks are low or durability of the concrete is in question. If one specimen in a test manifests evidence of improper sampling, molding, or testing, it shall be discarded and the average strength of the remaining cylinders shall be considered the test result. Should all specimens in a test show any of the above defects, the entire test shall be discarded.
5. Determination of air content and unit weight of sample.
6. Determination of temperature of concrete sample for each strength test.

B. Inspection

1. Refer to "Source Quality Control" for responsibility and procedure.

2. The lab will inspect placement of reinforcement and thickness of members prior to placement.
3. Keep a record of all inspections, the name of the persons making them, and the name of the foreman in charge of formwork at the site. Submit to the Authority's representative on the site a copy of the inspection records prior to each concrete placement.
4. The Contractor shall cooperate in the making of all tests by the Laboratory Technician by:
 - a. Providing the field storage curing facility as defined in ASTM C31 as per Section BC 1905.6.3.3.1 of sufficient size and strength to contain all specimens made in any two consecutive working days.
 - b. Providing a buggy for transporting the concrete taken from the mixer (and/or point of placement) to the location of the curing box for testing and the preparation of specimens.
 - c. Protecting the property of the Laboratory and keeping test specimens free from vibration and other disturbances.
 - d. Providing a microwave of the size specified in AASHTO T318 and a portable generator.

C. Evaluation and Acceptance of Concrete

1. Strength tests on concrete will be evaluated according to Section BC 1905.6.3.4 by the Engineer of Record. If the tests fail, the adequacy of the concrete will be checked according to the requirements of Section BC 1905.6.5. Concrete exposed to the elements with indications of poor durability will be rejected regardless of strength and will be subject to petrographic examination.
2. Pay for additional costs of labor and materials required at the job for all damages resulting from testing. Remove and replace concrete work that is not of adequate strength or weather resistance and cannot be made to work by remedial methods acceptable to the Authority at own cost. The Contractor shall be held responsible for all delays and damages to the work of other Divisions that occur as a result of non-conformance.
3. Pay for all expenses borne by the Authority resulting from low strength test procedures or evidence of poor durability (such as high slump) specified above.

3.15 PROTECTION AND CLEANING

- A. During the curing period, and thereafter as conditions may require, protect the concrete from damaging mechanical disturbances, particularly excessive load stresses, heavy shock, and excess vibration. Protect all finished concrete surfaces from damage caused by construction equipment, materials or methods, and by rain or running water.

3.16 ACCEPTANCE OF CONCRETE WORK

- A. The provisions of Subchapter check of ACI 301 apply to the acceptance of the concrete work.
- B. Concrete work judged inadequate by structural analysis, core test, results of load test or deemed unacceptable due to appearance or durability concerns shall be repaired, reinforced with additional construction if so directed by the Engineer of Record, or be replaced if so directed by the Engineer at the Contractor's expense.

END OF SECTION

LIST OF SUBMITTALS

<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>
Product Data:	_____	_____
1. Admixtures		
2. Curing compounds		
3. Bonding agent		
4. Vapor Barrier		
5. Vapor Retarder		
6. Welded Wire Fabric		
7. Overlaid plyform formwork or formliners		
Samples:	_____	_____
1. Vapor barrier		
2. Vapor retarder		
3. Overlaid plyform formwork or formliners		
Shop Drawings:	_____	_____
1. Reinforcement layout		
Design Data:	_____	_____
1. Normal weight concrete mix		
2. Lightweight concrete mix		
Certificates:	_____	_____
1. Concrete laboratories certificate		
2. Concrete producer's Batch Ticket to Authority's lab.		
Qualifications	_____	_____
1. Concrete Installer		
2. Concrete producer		
3. Rebar Detailer		
4. Concrete laboratory		
Sustainability:	_____	_____
1. Mfr's mix design or statement on recycled material content		

* * *

SECTION 03610
GROUTING

PART 1 - GENERAL**1.01 DESCRIPTION OF WORK**

- A. Furnish material, equipment, labor, services required to provide non-shrink grout. Work includes, but is not limited to grouting under steel and mechanical equipment base plates, filling of fence and rail posts sleeves, grouting of piping, and wherever else shown on Drawings.

1.02 RELATED SECTIONS

- A. Structural Steel..... Section 05121

1.03 REFERENCES

References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by governing codes or regulations, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

- A. American Society of Testing and Materials (ASTM) Standards, latest editions.

ASTM C109 Test Method for Compressive Strength of Hydraulic Cement Mortars.

ASTM C191 Standard Test Methods for Time of Setting of Hydraulic Cement by Vicat Needle

ASTM C1090 Standard Test Method for Measuring Changes in Height of Cylindrical Specimens of Hydraulic-Cement Grout

ASTM C1107 Specification for Packaged Dry, Hydraulic-Cement Grout (Non-shrink).

- B. Army Corp of Engineers

CRD C-621 Specification for Non-Shrink Grout.

1.04 SUBMITTALS

- A. Product Data

Submit manufacturer's information on the non-shrink grout, including mixing and installation instructions for each type of application.

B. Quality Control Submittals

1. Qualifications

Provide proof of Manufacturer and Installer qualifications specified under "Quality Assurance".

1.05 QUALITY ASSURANCE

A. Qualifications

1. Manufacturer: Company specializing in the production of grout shall have a minimum of five years experience.
2. Installer: Company specializing in performing the work of this section shall have three years minimum experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Materials shall be delivered in manufacturer's sealed and undamaged packaging. Each package shall contain clear and legible labels that meet requirements of local, state and federal regulations identifying manufacturer's name, product name, quantity of material, and batch number.
- B. Protect material from the elements and from other damage at site.
- C. Replace and pay for material and work damaged to the satisfaction of the Authority.

1.07 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply grout at temperatures below 40°F or higher than 90°F. Follow manufacturer's recommendations for placement temperatures, which is typically at an optimum range of 50°F to 80°F. Provide hot and cold weather procedures at other temperatures as per ACI 305R and ACI 306R respectively.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Grout

1. Sika Corp., Lyndhurst, NJ 07071

2. Euclid Chemical Company, Cleveland, OH 44110
3. Five Star Products, Inc., Fairfield, CT 06824
4. HiltiInc., Tulsa, OK 74146
5. Mapei, Deerfield Beach, FL 33442
6. **Kaufman Products Inc. Baltimore, MD 21226**

2.02 MATERIALS

A. Grout

1. Grout shall be non-shrink, non-metallic, cement based material meeting ASTM 1107 and CRD C-621 with the following characteristics:
 - a. Minimum compressive strength of 6000 psi @ 28 days when testing in accordance with ASTM C109 or CRD C-621.
 - b. Slight positive expansion when tested in accordance with CRD C-621 or ASTM C1090.
2. Products:
 - a. SikaGrout 212 by Sika Corp.
 - b. Dry Pack Grout and NS Grout by Euclid Chemical Company
 - c. "Five Star Grout" by U.S. Grout Corp.
 - d. Multipurpose Grout by Hilti, Inc.
 - e. Precision Grout by Hilti, Inc.
 - f. Planigrout 712 by Mapei
 - g. SureGrout and Suregrout 106 by Kaufman Products Inc.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine all adjoining work on which this Work is in anyway dependent for proper installation and workmanship. Report to the Authority any condition that prevents the performance of this Work.

- B. Repair surfaces to receive grout as approved by the Engineer of Record to ensure that the maximum allowed thickness of material is not exceeded.

3.02 SURFACE PREPARATION

- A. Concrete surface shall be free of all loose material.
- B. All metal components shall be clean and free of corrosion.
- C. Surfaces and metal components shall be free of oil, grease, loose paint, corrosive deposits, dust, laitance and other contaminants.
- D. Sleeves and holes shall be clean of water, dust and debris.

3.03 APPLICATION

- A. Perform all grouting in accordance with the recommendations of ACI, CSI, and the grout manufacturer's published specifications for site preparation, product mixing, and placing. For grouting in weather below 50°F, contact manufacturer for cold weather instructions.
- B. Arrange with the manufacturer of the grout for the services of a qualified field representative to instruct the work crews in the mixing of components, preparation of surfaces, technique of installation, and inspection procedures.
- C. Place grout at a no more than "flowable" consistency as required by the application, carefully using the manufacturer's recommended water content for Dry Pack, Plastic or Flowable consistencies.
- D. Locations
 - 1. Provide grout 1" thick minimum, 2" thick maximum, unless otherwise specified, under column base plates and beam bearing plates. Work grout under plates to provide full and even bearing. Grouting is to be done prior to placement of any concrete on the structure.
 - 2. Provide grout wherever else it is indicated on Drawings or Specifications.
- D. Follow manufacturer's instructions for curing.

3.04 PROTECTION AND CLEANING

- A. Clean all adjacent area of excess material and clean all floors and walls of powder and droppings.

3.05 FIELD QUALITY CONTROL

- A. The Authority's Testing Laboratory will inspect the grouting procedure and take cube specimens to test compressive strength.
- B. The Authority will inspect and reject any that are of inadequate strength or contains cracks or other defects. These areas shall be fixed at contractor's expense.
- C. Engage the services of the material manufacturer's representative to instruct in the proper mixing and usage of the material to ensure the grout is placed at the correct consistency and manner.

END OF SECTION

GR:gr

LIST OF SUBMITTALS

<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>
Product Data:	_____	_____
1. Grout		
Qualifications	_____	_____
1. Manufacturer		
2. Installer		

* * *

SECTION 04520
MASONRY RESTORATION

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK:

- A. Provide all masonry restoration Work as indicated on the Drawings and as specified herein.

1.02 RELATED SECTIONS

- A. Joint Sealers..... Section 07900

1.03 REFERENCES

References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by governing codes or regulations, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

- A. ASTM International (ASTM)

A240 Standard Specification for Heat-Resisting Chromium and Chromium Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels.

A580 Standard Specification for Stainless and Heat-Resisting Steel Wire.

C67 Standard Methods of Sampling and Testing Brick and Structural Clay Tile.

C109 Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-inch or 50 MM Cube Specimens).

C126 Standard Specification for Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units.

C144 Standard Specification for Aggregate for Masonry Mortar.

C150 Standard Specification for Portland Cement.

C207 Standard Specification for Hydrated Lime for Masonry Purposes.

C270 Standard Specification for Mortar for Unit Masonry.

C404 Standard Specification for Aggregates for Masonry Grout.

C476 Standard Specification for Grout for *Reinforced* and Nonreinforced Masonry.

C780 Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.

C979 Standard Specification for Pigments for Integrally Colored Concrete.

B. Brick Industry of America (BIA): BIA Technical Notes

1.04 **SUBMITTALS**

A. Product Data

1. Portland Cement: Brand and manufacturer's name.
2. Lime: Brand and manufacturer's name.
3. Mortar Pigments: Brand and manufacturer's name.
4. Packaged Products: Manufacturer's specifications and application instructions.
5. Sand: Location of pit, name of owner, and previous test data.
6. Masonry reinforcement, anchors and helical masonry ties.

B. Shop Drawings

If bracing/shoring of the masonry is required, submit stability drawings and calculations prepared, signed and sealed by a New York State Professional Engineer or Registered Architect.

C. Samples

Deliver to the Site for comparison with existing masonry.

1. Mortar for Exposed Joints and Cracks: Each required type, minimum 12" long by full thickness, showing finish and color.
2. Masonry Units: Each required type, full size, showing finish and full color range. Remove one unit of each existing type in order to allow for full size comparison.
3. Masonry reinforcement, anchors and helical masonry ties.

D. Quality Control Submittals

1. Schedule of Uses: By mortar type.
2. Certificates
 - a. Furnish notarized Building Department affidavit from masonry manufacturer (Form 10H) stating materials delivered to project comply with the Specification requirements.
 - b. Furnish notarized Building Department affidavit from masonry supplier (Form 10J) stating materials delivered to project comply with the Specification requirements.
 - c. Provide a letter signed and sealed by a New York State Professional Engineer or Registered Architect describing the Contractor's "Method of Operation" for removal and installation of masonry, and stating whether bracing/shoring for structural stability is required or not required. Provide calculations, if requested.
3. Tests
 - a. Provide test reports on masonry units utilized showing conformance to specification requirements. Reports shall be dated within two years of project.
 - b. Provide test results prepared by the helical masonry tie manufacturer's Company Field

Representative (CFR) for the helical masonry tie pull out tests with recommendations.

4. Qualifications
 - a. Masonry installer
 - b. Masonry foreman
 - c. Masonry technician
 - d. Adhesive anchor installer
5. Mock-up: Provide mock-ups as indicated under Quality Assurance, including technician workmanship.

1.05 QUALITY ASSURANCE

A. Qualifications

1. Company specializing in the Work of this Section shall have a minimum of three years experience and at least three successful projects with similar quantity of materials.
2. Masonry foreman shall have the following minimum experience:
 - a. Five years of practical experience as determined by Authority's Representative via a letter from the Contractor listing the projects and experience of the foreman.
 - b. Certificate of journeyman brick layer or PCC.
 - c. The construction of five masonry related projects of the same type of construction (e.g. brick, stone, terra cotta, etc.) where the individual served as a field foreman. List project in qualification submittal.
 - d. Must be able to read and communicate in English and be able to read construction drawings and specifications.
3. Technicians performing the work must pass the mock-up test indicated in Paragraph D.3 below.

4. Adhesive Anchor Installer: Installer for adhesive anchors installed in a horizontal or upwardly inclined position supporting sustained tension loads shall be certified per ACI Appendix D9.2.2 as per Section BC 1912 of the 2014 NYC Building Code.

B. Regulatory Requirements

Building Code: Work of this Section shall conform to all requirements of the NYC Building Code and all applicable regulations of governmental authorities having jurisdiction, including safety, health, noise, and anti-pollution regulations. Where more severe requirements than those contained in the Building Code are given in this Section, the requirements of this Section shall govern.

C. Certification

Masonry construction shall conform to the material acceptance, certification and inspection requirements of Section BC 1701 of the 2014 NYC Building Code.

D. Mock-ups

1. Prior to performing the Work of this Section, prepare at the job site sample panels of not less than 12 sq ft for each type of masonry restoration Work required, including cutting of joints prior to and after pointing. Sample panels shall be at locations indicated on the Drawings or where directed by the Authority's Representative. Inconspicuous locations will be chosen, except where it is necessary to choose other locations to be representative of brick color, joint size, mortar color, and other aspects of masonry appearance.
2. Clean masonry and mortar of the mock-up area and surrounding area to expose the true color of the masonry prior to preparing sample panels. Cleaning materials shall not damage masonry surface. Do not proceed further with the Work until the sample panel has been approved by the Authority's Representative. Approved samples will be used as quality standards for the Work. Maintain approved samples at the Site until the Work is completed. Once the panel is approved, do not change materials or proportions of mortar mixes unless approved by the Architect or Engineer of Record. Sample panels

may be a portion of existing masonry that is to be restored, at a location directed by the Authority's Representative.

3. All technicians performing masonry removal and joint cutting must successfully complete five linear feet of cutting and raking of mortar joints in the presence of the Authority's Representative. Unsuccessful performance of this test is grounds for the rejection of the technician for this project.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Packaged Products

1. Deliver materials to the site in manufacturer's original, sealed containers. Do not deliver materials that have exceeded shelf life limitation set forth by the manufacturer. Material containers shall bear the manufacturer's label indicating manufacturer's name, trade name of product, lot number, shelf life of product, and mix ratio (if applicable). This includes individual bags of pre-bagged mortar mixes.
2. Comply with manufacturer's printed instructions for storing and protecting materials.

B. Bulk Aggregate

Store in a manner which will keep aggregate clean and protected from the weather elements.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Cold Weather Construction Requirements

1. Per Section BC 2104.3, cold weather construction provisions of TMS 602/ACI 530.1/ASCE 6 Article 1.8C shall be implemented when either the ambient temperature falls below 40°F or the temperature of masonry units is below 40°F.
2. Salt or other chemicals for lowering the freezing temperature of the mortar shall not be used.

C. Hot Weather Construction Requirements

Per the requirements of Section BC 2104.4, hot weather construction provisions of TMS 602/ACI 530.1/ASCE 6 Article 1.8D shall be implemented when temperatures exceed 100°F, or 90°F with a wind velocity greater than 8 mph.

C. Wetting of Clay Masonry Units

Provide prewetting of masonry for units with initial rates of absorption that require their wetting before laying (21.42 grams per 30 square inches or 0.025 ounce psi).

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Reinforcement and Ties

1. Hohmann & Barnard, Inc., Hauppauge, NY.
2. Dur-O-Wal by Dayton Superior, Dayton, OH.
3. Leviaat, A CRH Company (Helifix), Windcrest, TX.
4. Blok-Lok Ltd., Woodbridge, ON.

B. Mortar Coloring

1. "SGS" Mortar Colors, Solomon Grind-Chem Services, Inc.
2. "True Tone Mortar Colors", Davis Colors, Rockwood Industries, Inc.

C. Masonry Cleaner

1. ProSoCo, Inc., South Plainfield, N.J.
2. Sure-Kleen

D. Restoration Mortar

1. Cathedral Stone Products
2. Conproco
3. Edison Coatings, Inc.

2.02 FACE BRICK MANUFACTURERS/DISTRIBUTORS

- A. Belden Tri-State/Extech Building Materials; 43-87
Vernon Blvd., Long Island City, NY 11101
- B. Glen-Gery/Glen-Gery Reading Masonry Supply Center, 200
Hartman Road, Muhlenberg, PA 19605
- C. Stone Art Inc., 295B California Ave. Church Hill, TN
37642

2.03 MATERIALS

- A. Base Materials
1. Portland Cement: Type I ASTM C150
 2. Sand for Mortar Mix ASTM C144
Sand shall be natural sand matching the gradation and color of the existing mortar aggregate.
 3. Hydrated Lime ASTM C207
Type "S"
 4. Water: Shall be clean potable water free of injurious foreign matter conforming to the requirements of Section BC 1903.4.
 5. Mortar Coloring: Provide pure mineral pigments, natural and synthetic iron oxides, and chromium oxides compounded for use in mortar mixes. Material shall conform to ASTM C979. Coloring shall not contain alkalyde salts. No liquid colorants shall be permitted.
 6. Premixed sand and lime for mortar mixes is not permitted. The use of batched material by Spec-Mix and factory-packaged cement-lime-pigment by major mortar manufacturers is permitted. Each individual bag of material shall have the manufacturer's label identifying the mortar type.
 7. No air-entraining admixtures or material containing such shall be permitted in the mortar. Also, no anti-freeze compounds, calcium chloride, or other compounds, unless expressly permitted otherwise, shall be permitted in the mortar.

B. Masonry Units

1. Match existing units in type, grade, size, appearance, texture, and color unless otherwise indicated. Provide multiple types, sizes, and colors of brick to match existing brick patterns.
2. In addition to 1. above, brick shall be clay or shale, ASTM C216, grade SW, solid. Brick shall be tested for efflorescence in accordance with ASTM Test Methods C67 and the rating shall be "Not Effloresced".
- 3.
4. Use 100% solid brick over exterior relieving angles/lintels or other brick projections on exterior face of building. (Use of solid brick with cores is acceptable if cores are filled solid with mortar and the cores are not visible to view.)

C. Accessories:

1. Material

a. Reinforcement and anchors

- 1) Stainless Steel: 18-8, type 304
- 2) Sheet Steel: (No. 2B finish), cold-rolled, annealed, ASTM A240.
- 3) Wire Steel: ASTM A580

b. Manufactured Units: All manufactured units shall be as follows:

- 1) Veneer Anchor: DW-10HS Manufacturers Hohmann & Barnard or approved equal. Stainless steel Type 304, ASTM A580.
- 2) Vee Tie: Stainless steel, masonry wire ties. Manufacturer - Hohmann & Barnard or approved equal.
- 3) Anchors: Manufacturers - Rawlplug; RKL. 1/4" diameter, 2" long flat head stainless steel Zamac Nailing Fastener by Rawlplug Company Inc. or approved equal.

- 4) Wire: Stainless steel continuous wire by Hohmann & Barnard or approved equal.
 - 5) If the actual space between wythes of solid masonry limits the use of a particular anchor, notify the Engineer of Record for an acceptable alternate anchor.
 - 6) Seismicclips: #187 by Hohmann & Barnard or approved equal.
- c. Electrode for Welding to Stainless Steel to carbon steel: E309-16. Keep electrode dry. Oven dry electrode after exposing it for more than 6 hours.

D. Helical Masonry Ties for Stabilization of Existing Masonry Walls:

1. Ties shall be fabricated from round stock stainless steel, Type 304, subject to the requirements specified herein. Tie diameters available: 8mm, 10mm. Sizes, type and length of ties shall be as recommended by the helical tie manufacturer's Company Field Representative (CFR) based on pull out load tests performed at the site and field conditions. A minimum 10mm diameter ties shall be used for cinder block.
2. Where necessary, as in ties installed through mortar joints into concrete backup, provide asymmetric helical ties.

E. Masonry Repair Mortar:

1. Material shall be capable of filling the holes created due to the installation of the helical masonry ties in bricks. Material shall match properties of the existing natural material, be freeze-thaw resistant and shall be color to match the existing bricks.
2. Masonry repair mortar for bricks shall be Jahn Repair Mortar M100 as manufactured by Cathedral Stone Products, Matrix by Conprocco, or Custom Series 45 as manufactured by Edison Coatings, Inc.

2.04 MIXES**A. Mortar Types****1. All Mortar:**

- a. Comply with ASTM C270 and BIA-M1-88.
- b. Provide Type I Portland cement. Masonry cement shall not be used as a substitute.
- c. Preconstruction testing with the proportions carefully monitored is to be used to establish the upper end of the strength range of the mortar, which should generally be near the minimum strength of the next higher strength mortar.
- d. The maximum strength of each mortar shall generally not exceed the minimum strength of the next higher strength mortar type. The preconstruction testing will determine the general range of strengths to be found and may end up higher than the threshold above.
- e. Air content of mortar shall be less than 12%.

2. Rebuilding/Setting Mortar; Type N: 1 part Portland cement, 1 part lime, 6 parts dry sand. Minimum compressive strength shall be 750 psi.

B. Mortar Color

For exposed mortar, select materials (complying with the requirements) and proportion pigments with other ingredients as necessary to match the color and texture of existing corresponding materials. White Portland cement and colored aggregates similar to the existing may be used as required to accomplish the matching of mortar color desired.

2.05 SOURCE QUALITY CONTROL

- A. The Authority will assign a Special Inspector who will inspect the masonry construction under the requirements of Section BC 1704.5.

B. Preconstruction Testing

1. Preconstruction testing of mortar properties will be done in accordance with ASTM C780. The Contractor shall assist the Authority's laboratory by any means necessary and shall provide the mock-up prior to beginning the installation work to allow for adjustments of the mix if necessary. Do not proceed with masonry work until the preconstruction testing is completed. Contractor shall mix mortar as it intends for the actual construction.
2. Compressive strength tests of field mixed mortar and factory batched/prepackaged mortar are to be done during construction of the mock-up, or earlier if desired by the Contractor, to provide a benchmark for the strength based on actual field conditions and proportioning of the mortar. If mortar strengths are too high or too low, proportions and material source may be required to be modified if directed by the Architect or Engineer of Record.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine all adjoining Work on which this Work is in anyway dependent for proper installation and workmanship. Report to the Authority any conditions that prevent the performance of this Work.

3.02 PREPARATION AND PROTECTION

A. Protection

1. Protect adjacent surfaces not being restored. Protect sills, ledges, and projections from material droppings. Also protect any painted surfaces that are not included in the Work from impact or damage.
2. Cover top of masonry wall with waterproof plastic membrane at the end of the work period and at other times when Work needs to be protected from rain and other precipitation. Extend cover down sides as needed to thoroughly protect the Work.

3. During cold weather, do not use wet masonry units and frozen masonry units.
4. Do not use frozen materials or lay masonry on frozen materials; remove frozen materials from wall. Refer to Part 1 of this Section, "Environmental Requirements" for temperature restrictions.
5. Remove excess mortar from walls as soon after laying units as practicable to prevent staining and to facilitate cleaning of wall.
6. Brace walls as needed until sufficiently set, or until intersecting walls provide lateral support.
7. Scaffolding shall not be supported from a parapet wall on which work is being performed.
8. Work on the exterior face of a parapet wall shall not be done concurrently with work on the interior face of the parapet wall.

B. Surface Preparation

1. Prepare surfaces to be restored in compliance with product manufacturer's printed instructions and as specified.
2. Remove dirt, dust, and foreign material from surfaces to be restored.
3. Clean areas to be restored with compressed air or water flushing, except as otherwise recommended by the mortar manufacturer.

C. Material Preparation

1. Do not further wet concrete masonry units and stone that are already wet.
2. Wet bricks that have a high initial absorption rate (greater than 20 g/min). Wet bricks until water runs off. Install bricks when surface is slightly damp.
3. Prepare exposed mortar to match the color and appearance of existing adjoining mortar.

3.03 MIXING PROCEDURE FOR MORTAR

- A. Measure material by volume or equivalent weight. In measuring by volume, use a container to measure ingredients. Do not measure by shovel.
- B. Rebuilding/Setting Mortar
 - 1. Mix ingredients in a clean mechanical mixer for a minimum of 3 minutes, maximum of 5, with the minimum amount of water to produce a workable consistency.
 - 2. Mortar that has stiffened because of evaporation of water from the mortar may be retempered only once, and only during the first hour of placement to restore the required consistency. Use mortar within 2¹/₂ hours of its initial mixing; tempering is permitted only once and during the first hour only. Limit amount of mortar batched at one time to stay within these requirements.
- C. Pointing Mortar
 - 1. Add sufficient water to dry mix to produce a damp mix that will retain its shape when pressed into a ball by hand. Mix from 3 to 7 min. in a mechanical mixer.
 - 2. Let mortar stand for not less than 1 hour nor more than 1¹/₂ hours for prehydration. Add sufficient water to bring mortar to proper consistency for tuck-pointing, somewhat drier than mortar used for laying units.
 - 3. Use mortar within 2¹/₂ hours of its initial mixing; tempering is permitted only once after bringing mortar to proper consistency. Limit amount of mortar batched at one time to stay within these requirements.
- D. For prepackaged masonry repair mortar, mix with water or manufacturer's polymer in proportions defined by manufacturer to provide the required consistency.

3.04 REPOINTING JOINTS

- A. The Contractor shall take all precautions required to ensure the original appearance of the building is maintained (not changed) and the existing brick is not

damaged. The new mortar shall match the original in color & texture and the new joint shall match the existing joint tooling, size and profile. For joints that are set back from the brick face (raked joints), provide a sloping joint starting at the original depth at the top and sloping to the brick face at the bottom that will prevent water sitting on the brick while maintaining the intended shadow line.

- B. Rake or cut out joints to a minimum uniform depth of 3/4" and until sound surface is reached. Do not spall edges of masonry units or widen joints. Replace all brick damaged by such operations with new to match color, size, and texture.

- 1. Mortar Removal

Where cutting is required to remove existing mortar and joint filler, use a rotary power masonry saw wherever possible without damaging masonry. Masonry saw shall have a vacuum attachment to reduce dust. Use non-power tools for vertical brick joints or where rotary power masonry saw will damage joint.

- 2. Cut the mortar and joint filler cleanly from the sides of the joints, leaving square corners. Flush joints clean with water or compressed air.

- C. Dampen joints slightly before application of mortar, making sure there is no free water. Pack pointing mortar tightly in joints in thin layers (1/4" max.), with each layer "thumbprint hard" before applying the next layer. Tool joints to match existing adjoining joints.

- 1. Where joint sealant is required, backpack the joints tightly out to a uniform depth of 1/4", or as indicated on Drawings. Refer to Section 07900 for sealants. Apply bondbreaker tape prior to installing sealants.

- D. Cure mortar by maintaining in a damp condition for at least 72 hours.

3.05 REPLACING MASONRY UNITS

- A. The Contractor is responsible for performing Work in a safe manner. Provide temporary shoring or other supports as required to prevent displacement of existing masonry that is to remain. Perform the removal Work with such

care as may be required to prevent failure of the masonry or damage to adjoining masonry that is to remain. Follow method of operation and/or bracing scheme required to be provided in Article 1.04 titled "Submittals".

- B. Remove the deteriorated and damaged masonry units to their full depth, including the surrounding joint mortar. Wet masonry to reduce dust. Install helical masonry ties at perimeter of replacement prior to removal as indicated in details on the Drawings. Wherever possible without damaging masonry, use a rotary power masonry saw for cutting Work. Masonry saw shall have a vacuum attachment to reduce dust. For SHPO designated/landmark buildings, removal of perimeter brick in the area designated for removal shall be done by first cutting the joint utilizing methods specified in Art. 3.04,B.,2. Leave square corners at adjoining masonry that is to remain. Clean joints and cavities by flushing with water or compressed air.
- C. Dampen contact surfaces slightly before application of mortar, making sure there is no free water. Install matching masonry units with Type N mortar. Install units to match and align with existing masonry. Maintain bonding and coursing pattern of existing masonry. Use presoaked wood wedges where necessary to properly set the units and maintain uniform matching joints. Backpack and fill joints full of mortar. Finish joints to match existing adjoining joints as described in Art. 3.04-Repointing Joints. Fill open joints in backup. In solid masonry construction, ensure that entire collar joint is filled between the backup and the face masonry. Collar joint is likely to vary substantially, up to 3" in locations.
- D. Install accessories as indicated on Drawings. In cavity wall construction provide mortar mesh directly on flashing, such as at base of wall, and at relieving angles and lintels, with flashing extending at least 6" above top of mortar mesh.
- E. Area Face Brick Replacement
 - 1. Single wythes of brick shall be replaced in 4 foot lengths maximum unless indicated otherwise by the "methods of operation" submitted by the Contractor's Engineer as required to be submitted in the Article 1.04 titled "Submittals".

2. Install reinforcement every 16" each way and secure it to backup masonry as indicated on Drawings.

F. Replacement by Brick Stitching

Remove and replace existing brick to their full depth with new face brick, one brick each on both sides of crack in masonry. Also, remove and replace all existing pushed-out, missing, split or otherwise defective face bricks to match the adjoining existing good sound masonry. If the existing masonry work has a solid masonry common-bond pattern, existing sound header bricks shall remain. However, any cracked, defective or loose header brick shall be replaced. All new brick work shall be toothed into existing good work. At horizontal and diagonal cracks, the replacement of bricks shall be done in 4-foot lengths maximum unless indicated otherwise by the "methods of operation" submitted by the Contractor's Engineer as required to be submitted in Article 1.04 titled "Submittals". Existing mortar bed for replaced brick shall be thoroughly removed and the back parged with a coat of new mortar to fill the collar joint.

3.06 STABILIZATION OF EXISTING MASONRY WALLS

- A. The existing face masonry shall be stabilized to the backup material by means of helical masonry ties. The installation and procedure shall be inspected by the Authority's Representative and the Company Field Representative to verify proper installation of the helical ties.
- B. Prior to start of the Work, the existing conditions shall be examined by a Company Field Representative (CFR) authorized in writing by the manufacturer of the helical ties (see Art. 2.01, Par. F.) The CFR shall instruct the Contractor in the installation of the ties. The CFR shall recommend the diameter, length, type, and spacing of ties and drill bits to be used at each location and masonry condition, based on tests described in paragraph C., below. The CFR shall submit this information in written or graphic form, through the Contractor, to the Authority for review and approval by the Architect or Engineer of Record.
- C. The design spacing of the ties shall typically be 16" vertically and 16" horizontally. Spacing shall be closer where required because of existing conditions, and where pull-out load tests show it to be necessary. Pull-out tests shall be performed at each masonry condition by the

CFR prior to the start of the Work, and the results of the tests shall be submitted to the Authority. Separate pull-out tests shall be performed on the face masonry, mortar joints and on the backup material. For tie spacing of 16" x 16" a load of 300 lbs. shall be achieved for the face masonry and for the backup material separately, without failure by loss of resistance or slippage. Where a 500 lbs. test load is achieved for each material separately, it will be permissible to increase spacing of ties to 16" x 24".

- D. A pilot hole shall be drilled through the face masonry and into the backup material using a high-speed rotary percussion drill (Bosch model 1194VSR, or equivalent), 3-jaw chuck type. If acceptable pullout results are achieved through the mortar joints, this shall be the preferred method of installation of the ties rather than through the face masonry, particularly for SHPO eligible buildings. At certain conditions, as recommended by the CFR, the drill bit used for the face masonry shall be of different diameter than the bit used in the backup material. The helical tie shall be driven into position using an electric hammer drill with SDS type chuck and specialized insertion tool. The electric hammer drill with SDS type chuck shall not be used for drilling pilot holes in face masonry. The electric hammer drill with SDS type chuck shall only be used for drilling pilot holes in backup material when recommended by the manufacturer such as in concrete.
- E. Each wall condition shall be examined by the Architect or Engineer of Record and the CFR to determine specific installation requirements. The following is presented as an example of a 10mm diameter tie in face brick with concrete block backup. The installation shall be performed in the following manner, subject to actual project conditions and modification by the CFR:
1. For use of 10 mm helical ties, drill an 8mm-entry\ hole through face brick using high speed rotary percussion drill. (Where location is a mortar joint, drill a 6.5mm hole near the approximate center point of the brick, not at T-joints or ends).
 2. Change bits and drill a 6.5mm entry hole through the concrete block backup to a minimum of 3 inches, using high-speed rotary percussion drill.

3. Drive helical tie into place, recessed for final patching, using a setting tool mounted on an electric hammer drill with an SDS type chuck.

3.07 FIELD QUALITY CONTROL

- A. The Authority will assign under the requirements of Section BC 1704.5 a Special Inspector who will inspect the masonry construction. Post installed anchors are subject to Special Inspection as per Section BC 1704.32. If the masonry work is not designated for Special Inspection, the masonry work will be subject to Quality Control Inspection, with testing and inspection similar to that listed below for Special Inspection. Inspections performed by the Authority do not relieve the Contractor of its obligation to conform to all requirements specified in this Section.
- B. The Special Inspector will make inspections and any testing deemed necessary. Mortar suspected or tested to be too strong or too weak will be subject to petrographic analysis or other methods deemed necessary by the Engineer of Record and Special Inspector. The Contractor shall pay for all tests if they verify improper work. Inspections will include, but not be limited to, the following:
 1. Proper installation of reinforcement of brick on angles.
 2. Proper depth of mortar cutting for pointing.
 3. Proper installation of mortar, including proportioning and mixing. Those mortar properties listed in the Appendix of ASTM C780 are to be tested at the discretion of the Special Inspector or the Architect/Engineer of Record. Mortar strengths, when tested, will be determined in accordance with ASTM C780 using cylinders.
 4. Proper installation of weeps, flashing, drip edges, mortar mesh, cleaning of cavity (if cavity wall construction), etc.
 5. At solid masonry construction, all bed, head, and collar joints are filled completely. For cavity wall construction, all bed and head joints are filled completely.

- C. The Architect or Engineer of Record will analyze any results not found to be in conformance with the applicable ASTM, industry practice, and the Specifications and determine if the masonry in question is to be removed and redone.
- D. Cooperate with the Special Inspector and the Testing Laboratory performing Special Inspection testing.
- E. The Contractor's engineer shall monitor the restoration procedure to ensure compliance with the "methods of operation" and to ensure safety of the structure.

3.08 PROTECTION AND CLEANING

- A. Protect face of adjacent walls and surfaces from water, mortar, and grout used for terra cotta installation.
- B. Remove excess mortar and mortar smears as work progresses.
- C. After mortar has cured (a minimum of 30 days), clean soiled surfaces with detergent and clean water. Use fiber brushes and cloths. Do not use metallic tools or acids. Perform a mock-up of the cleaning procedure.

END OF SECTION

LIST OF SUBMITTALS

<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>
Product Data:	_____	_____
1. Portland Cement Mfr & Brand		
2. Lime Mfr & brand		
3. Mortar Pigments Mfr & Brand		
4. Packaged Products: Mfr's specs & application instructions		
5. Sand: Location of pit, Owner's name, & previous test data		
6. Masonry reinforcement, anchors, helical masonry ties		
Shop Drawings:	_____	_____
1. Bracing/Structural Stability		
Samples:	_____	_____
1. Exposed joint mortar		
2. Masonry Units: each type, full size		
3. Masonry reinforcement, anchors, helical masonry ties		
Schedule of Uses:	_____	_____
1. Mortar type		
Certificates	_____	_____
1. Notarized Bldg Dept. affidavit re: Mas. Producer, Materials comply		
2. Notarized Bldg Dept. affidavit re: Mas. Supplier, Materials comply		
3. Letter from Contractor's Engineer		

Tests:

-
1. Helical tie pullout test
for each condition
and separately for
face masonry, mortar
joints & back up material.

Qualifications

-
1. Masonry installer
 2. Masonry foreman
 3. Masonry technician
 4. Adhesive anchor installer

Mock Up:

-
1. Cutting of Joints
 2. Pointing of Joints
 3. Face brick replacement
 4. Each technician joint cutting

* * *

SECTION 05121
STRUCTURAL STEEL

PART 1 - GENERAL**1.01 DESCRIPTION OF WORK**

- A. Furnish and erect all structural steel as shown on Drawings.
- B. Repair existing steel members and replace lintels by welding and bolting miscellaneous steel shapes to the existing steel.
- C. Provide shop painting and galvanizing as specified.

1.02 RELATED SECTIONS

- A. Grouting.....Section 03610
- B. Metal Fabrications.....Section 05500
- C. Painting.....Section 09900

1.03 SUSTAINABILITY REQUIREMENTS

- A. Sustainability requirements included in the Section are as follows:
 - 1. Meet established minimum recycled content for structural steel and documentation of Recycled materials.

1.04 REFERENCES

References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by governing codes or regulations, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

- A. American Society of Testing and Materials (ASTM) standards, latest editions.
- B. "Specification for Structural Steel Buildings" - American Institute of Steel Constructors (AISC 360-05).
- C. American Welding Society (AWS) standards for procedures and materials.

- D. "Code of Standard Practice for Steel Buildings and Bridges" (AISC 303)
- E. Steel Structures Painting Council (SSPC) standards.

1.05 DEFINITIONS

A. Structural Steel

Structural Steel consists of the steel elements of the structural steel frame essential to support the design loads. These elements consist of material as shown on the structural steel plan and listed in Article 2.1 of the AISC "Code of Standard Practice for Steel Buildings and Bridges." Structural steel also includes structural lintels framing over masonry openings bearing on masonry.

1.06 SUBMITTALS

A. Product Data

Submit manufacturers' specifications for the following products:

1. Primer paint, galvanizing repair paint
2. Expansion/adhesive anchors

B. Shop Drawings

1. Failure to submit legible shop drawings will be cause for return without review.
2. Provide a set of shop drawings showing all connections, bolting, welding, and size of material. Shop drawing shall show intended method of reinforcing existing members and making connections to existing steel as developed by the detailer based on conditions and actual dimensions. Shop Drawings for MEP equipment dunnage and access platforms shall not be submitted until after approval of the submitted MEP units. Ensure shop drawings submitted for MEP equipment dunnage and access platforms are coordinated and based on unit approved, which may vary substantially from the Basis of Design. The Contractor shall take into account in their schedule the potential time impact in the sequencing of the steel drawings.
3. Do not order steel in advance of approval of shop drawings, except at own risk.

4. Shop drawings shall be prepared under supervision of and bear the seal of a Professional Engineer licensed in the State of New York. Connections not designed on the Drawings shall be done by the detailer's licensed Engineer. Do not submit unchecked shop drawings. After final approval of all shop drawings, submit a final set sealed and signed by the Professional Engineer.
5. Shop drawings will be checked for size of material and strength of connection by the Engineer of Record, which shall not render the Engineer of Record responsible for any errors in construction dimensions, etc. that have been made in preparation of shop drawings. The Contractor shall assume full responsibility for the correctness of dimensions and fit.
6. Calculations shall be submitted upon request.
7. After shop drawings are 100% complete and approved and all field changes have been made, submit a set of as-built drawings to the Authority.

C. Quality Control Submittals

1. Certificates and Affidavits

- a. Furnish bolt manufacturer's test reports, covering physical and chemical tests, for each lot of high strength bolts submitted.
- b. Furnish steel manufacturer's certificate certifying welders employed on the work are current with their AWS qualifications (including having their required maintenance forms from their employer) and for work performed in the field are NYC licensed welders as per §28-407.1 of the Administrative Code.
- c. Furnish complete listing of ASTM's of materials listed in Part 2 of this Section and certification that materials supplied meet those listed.
- d. For mechanical and adhesive anchors installed in concrete, submit ICC certification for use in cracked concrete.

2. Contractor Qualifications

Provide proof of Fabricator, Erector, Adhesive Anchor Installer and Zinc Metallizer qualifications specified under "Quality Assurance".

a. Provide proof of Zinc Metallizer's qualifications specified under "Quality Assurance"; certification of qualifications meeting Military Standard by one of the following:

- 1) A branch of the U.S. Dept. of Defense (DoD), or
- 2) A company certified by U.S. Dept. of Defense; submit DoD certification for this company.
- 3) The Society for Protective Coatings (SSPC).

D. Test Reports

Submit test reports for zinc metallizing and epoxy coating system as specified herein, paragraph titled "Galvanizing by the Zinc Metallizing Process".

E. Sustainability Submittals

1. Recycled Content

a. Submit documentation of recycled content of structural steel; product data or manufacturer's statement as applicable.

1.07 QUALITY ASSURANCE

A. Qualifications

1. Fabricator: Company specializing in the fabrication of steel products to be used in this Contract shall have a minimum of five years experience.
2. Erector: Company specializing in performing the Work of this Section shall have a minimum of three years experience and have done at least three projects with similar quantity of material.
3. Adhesive Anchor Installer: Installer for adhesive anchors installed in a horizontal or upwardly inclined position supporting sustained tension loads shall be certified per ACI Appendix D9.2.2 as per Section BC 1912 of the 2014 NYC Building Code.

B. Regulatory Requirements

1. Building Code: Work of this Section shall conform to all requirements of the NYC Building Code and all applicable regulations of governmental authorities having jurisdiction, including safety, health, noise, and anti-pollution regulations. Where more severe requirements than those contained in the Building Code are given in this Section, the requirements of this Section shall govern.
2. New York City Board of Standards and Appeals (BSA): Rules for Arc and Gas Welding and Oxygen Cutting and Steel Covering the Specifications for Design, Fabrication, and Inspection of Arc and Gas Welded Steel Structures and Qualification of Welders and Supervisors.
3. Industry Standards: Standards specified in Article 1.04 apply to Work of this Section. Where more severe requirements than those contained in the Standards are given in this Section or the Building Code, requirements of this Section or the Building Code shall govern.
4. Recommendations or suggestions in the codes and references listed in this Article and under "References" shall be deemed to be mandatory unless they are in violation of the Building Code.

C. Certifications

1. Structural steel shall conform to the material acceptance, certification, and inspection requirements of Section BC 1701.
2. Qualify welding processes and welding operators in accordance with AWS B2.1.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the site at such intervals as to insure uninterrupted progress of Work.
- B. Deliver anchor bolts and other anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time so as not to delay Work.
- C. Store materials to permit easy access for inspection and identification. Store material off the ground and protect from the weather and contamination.

1.09 FIELD MEASUREMENTS

- A. Take field measurements as required by Drawings. Where possible, take field measurements of existing conditions prior to fabrication. Verify that field measurements are the same as those shown on Drawings and shop drawings. Report all deviations to the Authority in writing.

PART 2 - PRODUCTS**2.01 MANUFACTURERS**

- A. Paint
 - 1. Tnemec Co.
 - 2. Carboline
 - 3. Sherwin Williams
 - 4. ZRC
- B. Expansion/Screw/Adhesive Anchors, Fasteners
 - 1. Hilti, Inc.
 - 2. ITW Buildex/Red Head/Ramset
 - 3. Simpson Strong-Tie Anchor System, Columbus, OH
 - 4. Powers Fasteners

2.02 MATERIAL

- A. Structural Steel Shapes, Shims, Plates, and Bars
 - 1. Structural steel shall conform to the provisions of ASTM A36 or ASTM A992, pipe steel to the provisions of ASTM A53, Grade B, and tube steel to the provisions of ASTM A500, Grade B, unless otherwise noted.
 - 2. Structural steel shall contain a minimum of 30% post-consumer content and 15% pre-consumer content.
- B. Bolts
 - 1. Anchor Bolts: Shall conform to the provisions of ASTM F1554, Grade 36, unless different grade is specified elsewhere. Size and detailing indicated on Drawings.

2. Unfinished Bolts: Shall conform to the provision of ASTM A307.
3. High-Strength Bolts: Shall conform to the requirements of ASTM F3125-Grade A325/F1852.
4. Expansion/Screw/Adhesive Anchors, Fasteners
Provide types as indicated on Drawings. The anchor specified shall be considered the basis of design. As a minimum, all anchors exposed to weather or embedded in masonry are to be Type 316 stainless steel. Anchors installed in concrete shall be ICC certified for cracked concrete as per BC 1913.
 - a. Wedge Expansion and Undercut Anchors/
expansion bolts shall have an ICC-ES Evaluation Service Report (ESR) issued in accordance with ACI 355.2 or ICC-ES AC 193 for use in cracked concrete, and including seismic applicability loading, and pursuant to the Office of Technical Certification and Research (OTCR) Building Bulletin 2014-018. Anchors installed in grouted masonry shall have a report issued in accordance with AC 01.
 - b. Adhesive anchors shall have an ICC-ES Evaluation Service report (ESR) issued in accordance with ACI 355.4 or ICC-ES AC 308 and for use in cracked concrete, and seismic loading and pursuant to the Office of Technical Certification and Research (OTCR) Building Bulletin 2014-018. Anchors installed in grouted masonry shall have a report issued in accordance with AC 58.
 - c. Concrete Screw Anchors shall have an ICC-ES Evaluation Service report (ESR) issued in accordance with ICC-ES AC 193 and for use in cracked concrete, and seismic loading and pursuant to the Office of Technical Certification and Research (OTCR) Building Bulletin 2014-019. Anchors installed in grouted masonry shall have a report issued in accordance with AC 106.

D. Hardware

1. Nuts for anchor bolts and unfinished bolts shall conform to the requirements of ASTM A563.
2. Nuts for high-strength bolts shall conform to the provisions of ASTM A194 or ASTM A563.

3. Washers shall conform to the provisions of ASTM F436.

E. Filler Metal for Welding

1. Welding electrode shall conform to E70XX classification of AWS A5.1 for welding of new steel to new steel.
2. Welding electrode shall be compatible with existing steel where connections are made to steel of existing building. Electrode shall be E7018 unless determined otherwise. E7018 are low hydrogen electrodes that must be kept extremely dry.

F. Structural Steel Primer Paint

Provide type of primer indicated on steel under the following application conditions.

1. General application shop primer:
 - a. Shop Primer Paint: Modified alkyd rust-inhibitive type containing no lead equal to Tnemec 10-99 or Carboline Carbocoat 115-SG.
 - b. Field Touch-up Paint: Acrylic rust-inhibitive type containing no lead equal to Tnemec 115 Unibond or Carboline Carbocrylic 3358. Paint must meet SCAQMD standards for VOC emissions.
2. Steel embedded in exterior masonry wall and exterior application: High adhesion high-solids epoxy coating equal to Tnemec Co. Series 135 Chembuild or Carboline Carboguard 890. This paint shall also be used on the existing steel exposed by masonry removals and wherever else existing steel is to be painted. Top coats for exposed to view steel is to be the epoxy coat system given in Section 09900.

G. Galvanizing by the Hot-dip Method - No Finish Coating

1. Galvanize structural shapes in accordance with ASTM A123.
2. Galvanize hardware in accordance with ASTM A153.
3. Galvanizing repair paint for regalvanizing welds and damaged areas shall conform to ASTM A780 and comply with Military Specification MIL-P-21035, such as ZRC Cold Galvanizing Compound.

H. Galvanizing by the Zinc Metallizing Process or Hot-Dip Galvanizing; and Finish Coating

1. Zinc/aluminum metallizing (referred to herein as zinc metallizing) is the process of thermally applying an 85/15 zinc-aluminum wire over the surface of steel.
2. Zinc metallizing, or hot dip galvanizing, and finish coating system shall have the following performance characteristics and results of tests performed on representative samples. Finish coating for metallizing shall have an epoxy coating system or powder coating. Finish coating for hot dip galvanizing shall be powder coating (See paragraph 3 below for acceptable system):

- a. Adhesion: Test zinc metallizing/hot dip galvanizing with complete finish coating (epoxy coating system or powder coating system) in accordance with ASTM D4541, Test Method E. Pull-off strength throughout the system shall be not less than 750 psi before and after environmental cycling.

Environmental cycling shall be 10 cycles of the following: 4 hrs at 100% humidity per ASTM D1735; 16 hours below 0°F; and 4 hours at 140°F.

- b. Corrosion resistance of zinc metallizing/hot dip galvanizing with epoxy coat system or powder coating: A rating of 10 after 1000 hours salt fog (prohesion method) when tested in accordance with ASTM D1654, Procedure A. Scribe shall be cut through all coatings to bare steel substrate. Expose specimens in accordance with ASTM G85.
- c. Powder coating complying with the following ASTM standards:

Adhesion: ASTM D3359, no loss.

Hardness: ASTM D3363 (pencil), H min.

Falling Sand: ASTM D968 20L/mil.

Salt Spray: ASTM B117, passes 3000 hrs.

Humidity: ASTM D2247, 3000 hours, few #8 blisters.

Impact Resistance (3mm): ASTM D2794, no loss.

Color Retention: ASTM D2244, 5 year less than or equal to 5 delta E.

Chalk Resistance: ASTM D4214, #8 rating.

Gloss Retention: ASTM D523, greater than or equal to 30 percent retention.

Erosion Resistance: ASTM B244, less than 10 percent film loss.
Compliance: AAMA 2604.

3. Hot Dip Galvanizing with Powder Coating Finish
 - a. As a system equivalent to zinc metallizing, it is permitted to use the Duncan Colorgalv Thermoset process of hot dip galvanizing with powder coat finish. Galvanizing coating thickness grade per ASTM A123 shall be 100, with DFT mil thickness coating not less than 3.6 to 3.9 mils.
 - b. Powder coating thickness shall be as specified in this specification. Coating shall include an architectural grade primer.
4. Galvanizing repair paint for regalvanizing welds and damaged areas shall conform to ASTM A780 and comply with Military Specification MIL-P-21035, such as ZRC Cold Galvanizing Compound.

2.03 SHOP ASSEMBLY - FABRICATION

A. General

1. Do not fabricate until shop drawings have been reviewed.
2. Fabricate and assemble steel in shop to greatest extent possible. Fabricate items and assemblies in accordance with AISC Specifications and the shop drawings. Properly mark members for field assembly.

B. Shop Connections

1. Weld or high-strength bolt shop connections as indicated on Drawings.
2. High-strength bolt connections are friction (slip-critical) connections. Install high-strength bolts in accordance with Specification for Structural Joints using High Strength Bolts (approved by the Research Council on Structural Connections (RCSC) - 2009). Utilize Class A connections. If steel surface of connection area is prepared to SSPC-SP5 surface preparation, Class B may be utilized pending inspection by the Authority's Special Inspection lab that surface meets the required preparation. Pay all costs to the Authority incurred for this inspection.

3. Welding: Comply with "Structural Welding Code" for procedures, appearance, and quality of welds and methods used in correcting welded work.
4. Holes for other Work
 - a. Provide holes and openings required for securing other Work to steel framing and for passage of other Work through framing members. Coordinate with Drawings of other Work.
 - b. Cut, drill, flame cut, or punch holes perpendicular to metal surfaces. Method of cutting must not produce a roughness of over 1000 microinches. Surfaces exceeding these limits must be repaired by machine grinding. Reinforce all openings with steel shapes as shown on shop drawings.

2.04 SHOP PAINTING

A. General

Apply one shop coat of primer paint on structural steel except as follows:

1. Steelwork or portions of such to receive sprayed fireproofing. Steel that is exposed to the cavity and within the block back-up is to be painted, unless indicated to be galvanized.
2. Top flanges of structural steel members requiring stud shear connectors or supporting metal deck.
3. Contact surfaces of structural steel that are to be bolted or welded together and surfaces within 2" of field welds.
4. Steel members, hardware, and miscellaneous pieces to be galvanized and not specified or indicated to be painted.

B. Cleaning and Surface Preparation

1. Clean all steel first in accordance with SSPC-SP1.
2. Clean steel work not to be painted (except steel work to be galvanized) in accordance with SSPC-SP2.
3. Clean new steel work to be painted within the same day as it will be applied and in accordance with SSPC-SP3 for interior steel and SSPC-SP6 for exterior steel.

C. Shop Coat

1. Apply structural steel primer paint for interior application at a rate to provide dry film thickness of 2.0 to 3.5 mils. Apply primer paint for embedded in exterior masonry wall and exterior application at a rate to provide dry film thickness of 7.0 to 9.0 mils. Provide full coverage of joints, corners, edges, and exposed surfaces. Apply to dry surfaces only, when surface temperatures are above dew-point, by brush, spray, or roller, thoroughly and evenly, in strict accord with manufacturer's instructions for every detail of handling.
2. Apply second coat of the approved primer, in a darker shade, to surfaces inaccessible to painting after assembly or erection.
3. Protect machined surfaces with an approved rust-inhibiting coating that is readily removable prior to erection.

2.05 GALVANIZING

A. General

Galvanize all steel exposed to the weather and other members designated on Drawings to receive it. Galvanize all lintels, attachment clips, shims, and hardware.

B. Cleaning and Surface Preparation

1. Hardware (bolts, nuts, etc.): Clean and leave free of mill scale before galvanizing.
2. Clean all steel first in accordance with SSPC-SP1 if needed.
3. Steel members: Clean in accordance with SSPC-SP8 before hot-dip galvanizing.
4. Steel members: Clean in accordance with SSPC-SP10 before zinc metallizing. Surface shall have a 3-4 mil anchor pattern. Moisture cannot be present on steel and temperature cannot be less than 5°F above the dew point. Thermal spray must be applied within 4 hours of blasting.

C. Shop Coat - Hot-dip Galvanizing Only - Provide for items not to have finish paint coat.

1. Galvanize hardware in accordance with ASTM A153.

2. Galvanize steel shapes, including shims, in accordance with ASTM A123. Apply zinc coating as per Thickness Grade specified in ASTM A123.

D. Hot Dip Galvanizing with Powder Coating Finish

As a system equivalent to zinc metallizing, it is permitted to use the Duncan Colorgalv Thermoset process of hot dip galvanizing with powder coat finish. Galvanizing coating thickness grade per ASTM A123 shall be 100, with DFT mil thickness coating not less than 3.6 to 3.9 mils.

1. Comply with ASTM A123 for fabricated products and ASTM A153 for hardware, with zinc coating thicknesses not less than those specified in this specification Section 05700, 3.6 to 3.9 mils DFT.
2. Fill vent holes after galvanizing, if applicable, and grind smooth.
3. Galvanizing shall exhibit a rugosity (smoothness) 4 rug or less (16-20 microns of variation) when measured by a profilometer over a 1-inch straight line on the surface of elements that are less than 24 pounds per running foot. Profilometer shall be capable of operating in 1 micron increments.
3. The incoming material shall be inspected, material hung on a rack or chain to be galvanized.
4. Material submerged into caustic cleaner removing the organics from the surface and rinsed with water.
5. Material pickled with hydraulic acid removing iron oxides from the surface and rinsed with water.
6. Material submerged into a flux removing any oxides that have formed after pickling and protecting the material from further formation of additional oxides before being galvanized.
7. The material submerged into Zinc bath at 850°F.
8. The material shall be allowed to naturally cool and not quenched with water or chemicals.
9. The galvanizing shall be inspected and pre-finished, removing edge tears, spikes, drips, or sharp protrusions which could cause potential harm to someone handling or using the material.

10. The Galvanized material shall be abraded to create a 1-1.5 mil profile for surface preparation. The profile shall be produced by abrasive blasting and or hand abrading.
11. The galvanized material shall be inspected prior to powder coating to determine conformance of the material to ASTM A123 and this specification Section 05700 for quality and thickness of zinc coating, not less than 3.6 to 3.9 mils DFT.
12. The galvanized surface profile shall be measured at
13. 1-1.5 mils and recorded utilizing Press-O-Film tape.
14. All galvanized material shall be outgassed after profiling and before powder coat application.
15. A coating inspection form shall be filled out completely with material information, application conditions, and quality standards.
16. All powder coating products shall be electrostatically applied following the recommendations of the powder supplier and the requirements of the powder coating Manufacturers Technical Data Sheet, and with Dry Film Thickness not less than is specified in this specification Section 05700.
17. The first coat shall consist of an Epoxy Primer powder applied at not less than 2.0 - 3.0 mils Dry Film Thickness. The powder shall be heated to 400°F to provide adhesion with the next coat of powder, and in accordance with the manufacturer's recommendations.
18. The next coat of powder to be applied shall be Sherwin Williams Powdura Super Durable or approved equal applied at a dry film thickness of not less than 4.0-5.0 mils. The surface of the fabrications after applying the powder shall be heated to 400°F for at least 10 minutes to cure the powder and in accordance with the manufacturer's recommendations. The color of the powder shall match the approved color sample that will be approved by the Project Architect.
19. All repairs of galvanizing shall follow ASTM A780.
20. All repairs to powder coating shall be sanded and feathered with the surrounding area. The damaged

area shall be cleaned and abraded to receive a powder or liquid coating. The liquid coating can be applied using either a spray or brush method.

21. Apply powder coating system within time frame after galvanizing as part of the Duncan Colorgalv process to ensure oxides will not form and GoldGalvthermoset process will be complete

2.06 SOURCE QUALITY CONTROL

A. Testing

1. General

- a. Structural steel work is subject to all tests required by the Special Inspection requirements of the 2014 NYC Building Code.

- b. Cooperate with the Testing Laboratory in making all required tests.

2. Tests: To be performed by the Authority's Testing Laboratory.

- a. Shop bolted connections: Tested in accordance with AISC specifications.

- b. Shop welding - The laboratory will perform the following functions:

- 1) Certify welders.

- 2) Visually inspect all welds, record type and locations of defects, and perform tests if necessary. Check all corrected work.

- 3) Perform non-destructive tests if necessary or as required by the Special Inspector.

B. Inspection

1. Testing Laboratory

- a. The Authority will engage a Testing Laboratory or Special Inspection Agency to assist in the inspection of steel fabrication and conduct tests at the mill, shop, or foundry. The laboratory will assist in checking erection tolerances and provide shop and field testing required for all structural steel and metal deck work, including metal deck and studs.

b. The Testing Laboratory will be responsible to and under the supervision of a Special Inspector.

2. Special Inspector

The Authority will assign, under the requirements of Section BC 1704.3, a Special Inspector to supervise the Work listed above under "Testing Laboratory".

3. Notification: Notify the Authority before beginning fabrication of the structural steel and supply laboratory with copies of agreements, approved drawings, approved prints of all shop details, etc., and all necessary information relating thereto. Do not ship material to job site until after inspection and approval by the Testing Laboratory.

4. Discretionary Inspections: No mill, shop, foundry, or field inspection, such as is above provided for, shall be held to prohibit or preclude inspection of such materials during delivery and erection at the building by such other persons as the Authority shall direct.

5. Reports: Shop and field reports, including shipments, will be submitted by the Testing Laboratory to the Authority as the work proceeds at the shop or job site. A final report will be submitted by the Testing Laboratory when work is completed at the shop, and again when work is completed in the field. The Special Inspector reserves right to reject material not in compliance with specified requirements at any time.

6. Corrections: Correct deficiencies in work which inspections and tests have indicated to not be in compliance with requirements. Pay for additional tests, at own expense, necessary to reconfirm any non-compliance of original work and as necessary to show compliance of corrected work.

7. Contractor's Responsibility: Inspection and acceptance or failure to inspect shall in no way relieve the Contractor or the mill and shops from their responsibility to furnish satisfactory material strictly in accordance with Drawings and Specifications.

PART 3 - EXECUTION**3.01 EXAMINATION**

- A. Verify that field conditions are acceptable and that erection may proceed. Notify the Authority in writing of conditions that adversely affect the Work. Do not proceed with erection until conditions have been corrected. Beginning of installation means the erector accepts existing conditions.

3.02 ERECTION

A. General

1. Erection shall conform to Sections BC 2205.6.3 and BC 3305.2.
2. All work shall be erected plumb, square, and true to lines and levels in strict accordance with the structural requirements of the building.
3. Provide all machinery, apparatus, and staging required for the erection of steel work in a thoroughly safe and efficient manner. Install, maintain and remove, without injury to other Work, such temporary bracing, scaffolding, etc. as may be necessary or required. Care shall be taken that no part of the structure is overloaded during construction.
4. Arrange for deliveries of material to facilitate the rapid and continuous progress of operation, but the site or streets adjacent to same shall not be used for the storage of material unless absolutely necessary and then only with special permission of the Authority and other authorities having jurisdiction.
5. Employ a Licensed Professional Engineer and Land Surveyor to ensure accurate erection of the steel.
6. Do not alter or cut structural members without written approval of the Engineer of Record. Flame cutting in field of members to correct fabrication errors is to be avoided and to be done only upon approval of the Engineer of Record based on the method proposed. Roughness cannot exceed 1000 microinches. Repair of surfaces shall be by mechanical grinding.

B. Temporary Shoring and Bracing

Provide temporary shoring and bracing members with connections of sufficient strength to bear erection

loads and guy wires to maintain structure plumb and in true alignment until completion of erection. Remove temporary work when permanent members and bracing are in place and final connections are made. Fill erection bolt-holes on exposed to view members with plug welds and grind smooth.

C. Anchor Bolts

1. Furnish to the concrete masons anchor bolts and other connectors required for securing structural steel to cast-in-place concrete work, together with instructions, templates, etc. necessary for setting them. Anchor bolts are to be surveyed and any approved modifications made prior to placement of columns.
2. For post-installed expansion/screw/adhesive anchors, drill holes of depth and size required by the manufacturer for the required loading. Holes shall be cleaned completely using wire brush and compressed air following manufacturer's guidelines. For installation in existing substrates not installed as part of the work, have bolt manufacturer perform pullout test in each substrate to verify capacity and quality of substrate prior to final approval of anchor to be utilized.
3. Tighten anchor bolts after support members have been positioned and plumbed. Cut off protruding edges of wedges or shims flush with edge of base or bearing plate prior to packing with grout. Tighten expansion bolts/anchors to torque required by manufacturer.

D. Base Plates

1. Clean concrete and masonry bearing surfaces of loose and bond-reducing materials.
2. Set loose and attached base plates and bearing plates for structural members on shims and other adjusting devices. Plates are to have grout holes, such as leveling plates, within specified tolerances. Elevations of shims and leveling plates shall be surveyed and adjusted to correct elevation prior to placement of column or beam. Plates are to have grout holes.
3. Grouting under plates is part of the Work of Section 03610. Grouting is to be done prior to placement of any concrete on the structure.

E. Field Assembly

1. Erect structural frames accurately to lines and elevations indicated. Align and adjust members forming a part of a complete frame or structure before permanently fastening.
2. Clean bearing surfaces and other surfaces that will be in permanent contact before assembly.
3. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
4. Level and plumb individual members of structure within specified AISC tolerances.
5. Establish required leveling and plumbing measurements on mean operating temperature of structure. Make allowances for difference between temperature at time of erection and mean temperature at which structure will be when completed and in service.
6. Splice members only where indicated and accepted on shop drawings.

F. Connections

1. Field connections between new steel members will typically be bolted unless otherwise indicated on Drawings. Connections made to existing steel shall be welded utilizing E7018 electrode. Follow preheat and interpass temperature requirements given in AWS.
 - a. Provide high-strength bolts for bolted connections except where unfinished bolts are indicated on the Drawings. High-strength bolt connections are friction (slip-critical) connections. Install high-strength bolts in accordance with "Specification for Structural Joints using High Strength Bolts."
 - b. Provide unfinished bolts where indicated on Drawings. Lock nuts by upsetting bolt end or by similar method when unfinished bolts are not encased in concrete. Tighten all bolts and nuts fully.
 - c. For ASTM A307 bolts, hardened washer shall be installed under the turned element. For ASTM F3125, Grade A325, /F1852 bolts, hardened washers shall be installed in accordance with Section 6.2 of

"Specification for Structural Joints using High Strength Bolts."

- d. Expansion/screw/adhesive anchors shall be installed in accordance with the manufacturer's installation instructions. Holes shall be cleaned completely using wire brush and compressed air following manufacturer's guidelines. Tighten to the torque values specified by the manufacturer. Attach plates flush with surfaces after the surfaces have been cleaned. Have bolt manufacturer perform pullout test in each substrate to verify capacity and quality of substrate prior to final approval of anchor to be utilized.

2. Holes

- a. The size of bolt holes shall be in accordance with AISC "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings."
- b. Ream holes that must be enlarged to admit bolts. Burning or use of drift pins is not permitted.

G. Lintels

Erect all exterior steel lintels and relieving angles, connecting steel to members using new clip angles, or other structural member required to match the existing conditions. Shim angles/steel supports to their contract position for proper and plumb installations of masonry.

H. Field Touch-Up

1. Painted Members: After erection, clean all damaged areas in shop coat, exposed surfaces of bolts, bolt heads, nuts and washers, abrasions, and all field welds and unpainted areas adjacent to field welds to the same standards as the shop coat and paint with field touch-up primer paint to same thickness as the shop coat. These areas shall be thoroughly cleaned of rust and other bond inhibiting materials before applying the touch-up paint. Paint all existing steel using the high-solids epoxy specified in Part 2. Finish painting is specified in Section 09900. Provide epoxy coat system for all exterior painting.
2. Galvanized Members: After erection, clean and paint all damaged areas to the galvanizing, welds,

and areas adjacent to welds with the galvanizing repair paint. For galvanized members to be painted, finish painting is specified in Section 09900 and shall be the final two coats of the epoxy paint system.

3.03 TOLERANCES

- A. Erection tolerances shall be in accordance with "Code of Standard Practice for Steel Buildings and Bridges".

3.04 FIELD QUALITY CONTROL

- A. The Contractor shall cooperate with the Special Inspector and the Testing Laboratory performing Special Inspection testing by providing adequate notification for when work is performed that will require the inspection and provide all required access and means for the laboratory to perform the inspection and testing.
- B. The Special Inspector will:
1. Review erection of structural framework and test field bolting and welding as listed in Part 2 of this Section.
 2. Where post-installed anchors are utilized, perform Special inspection on Post-installed anchors as per BC 1704.32. Adhesive anchors installed in concrete in a horizontal or upwardly inclined position supporting sustained tension loads shall be installed under continuous Special Inspection as required by paragraph D9.2.4 of ACI 318-11.
- C. The Contractor shall engage an engineer licensed in the state of New York to check tolerances and inspect the erection.

3.05 CLEANING

- A. Structural steel or portions of such to receive sprayed fireproofing shall be clean of dust, grease, oils, loose material, and any other matter which would impair the adhesion of the fireproofing material to the steel.

END OF SECTION

LIST OF SUBMITTALS

<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>
Product Data:	_____	_____
1. Primer paint, repair paint		
2. Stud shear connectors		
3. Expansion/adhesive anchors		
4. Zinc metallizing		
Shop Drawings:	_____	_____
1. Steel shop drawings		
2. Calculations		
Certificates:	_____	_____
1. Steel affidavit		
2. Bolt test reports		
3. Welders qualifications & license		
4. Material listing		
5. ICC Certification for Mechanical/Adhesive Anchors		
Qualifications	_____	_____
1. Fabricator		
2. Erector		
3. Adhesive anchor installer		
4. Zinc Metallizer		
Test Reports:	_____	_____
Zinc metallizing and epoxy coating		
Sustainability:	_____	_____
1. Mfr's printed literature or statement on recycled material content		

* * *

SECTION 05500
METAL FABRICATIONS

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. Provide metal fabrications and miscellaneous metals as indicated on the Drawings and as specified herein, including, but not limited to the following:
1. Support Inserts
 2. Apparatus supports, miscellaneous hangers and accessories
 3. I-Beam, channel, angle, and other miscellaneous iron work
 4. Steel pipe railings and handrails
 5. Rooftop Equipment Service Access Platforms and Ladders
 6. Miscellaneous bolts, anchors and inserts to be set in concrete
 7. Metal tread nosings on concrete steps

1.02 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

- A. Metal Tread Nosing for concrete steps.

1.03 REFERENCES

- A. References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by governing codes or regulations, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.
- B. ASTM International (ASTM), latest standards

- C. American Welding Society (AWS).
- D. American National Standards Institute (ANSI)
- E. Society for Protective Coatings (SSPC)
- F. Federal Specifications (FS)
- G. National Association of Architectural Metals Manufacturers (NAAMM)
- H. Aluminum Association (AA)
- I. The Building Code of the City of New York, latest edition.
- J. The American Galvanizers Association

1.04 DESIGN REQUIREMENTS

- A. Structural Performance: Design, engineer, fabricate, and install the following metal fabrications to withstand not less than the following structural loads without exceeding the allowable design working stress of the materials involved, including anchors and connections as per Section BC 1607.7 of the 2014 NYC Building Code. Apply each load to produce the maximum stress in each respective component of each metal fabrication. In cases where local requirements are more stringent they shall apply. Where railings support fixtures or other imposed loads, allowance shall be made for the additional loads.
 - 1. Handrails
 - a. Uniform load of 50 lb/ft applied in any direction at the top and to transfer this load to the supports.
 - b. Concentrated load of 200 pounds applied in any direction at any point and to transfer the load to the supports.
 - c. The uniform and concentrated loads need not be assumed to act concurrently.
 - 2. Top Rail of Guardrail Systems
 - a. Uniform load of 50 lb/ft applied in any direction at the top and to transfer the load to the supports.

- b. Concentrated load of 200 pounds applied in any direction at any point and to transfer the load to the supports.
 - c. The uniform and concentrated loads need not be assumed to act concurrently.
- 3. Infill of Rail Systems: panels, balusters, intermediate railings, and other elements composing the infill area must resist the following combination loading. Reactions due to this combination loading are not required to be applied simultaneously with one another and are not required to be superimposed with those in paragraphs 1 and 2 above.
 - a. A concentrated normal load of 50 pounds applied horizontally on an area of 1 ft², including openings and spaces between rails.
 - b. A vertically downward load of 50 lb/ft applied at the most critical locations.
 - c. A concentrated upward load of 50 pounds applied at the most critical location.
- 4. Heavy Duty Metal Bar Gratings: Capable of withstanding a uniform load of 250 psf or a concentrated load of 8,000 pounds, whichever produces the greater stress. Provide heavy duty gratings except where light duty gratings are indicated.
- 5. Light Duty Metal Bar Gratings: Capable of withstanding a uniform load of 75 psf, or a concentrated load of 2,000 pounds, whichever produces the greater stress.

1.05 SUBMITTALS

- A. Product Data, for each item specified.
 - 1. Submit product data sheets for products used in metal fabrications, including anchoring devices. Instructions for installation of anchorage devices built into other work.
 - 2. Submit product data sheets for painting materials.
 - 3. Submit product data sheets for grouts and sealants.

B. Shop Drawings, for each item specified.

1. Show all locations, markings, quantities, materials, sizes and shapes.
2. Indicate all methods of connecting, anchoring, fastening, bracing and attaching to work of other trades.

C. Calculations

1. Where metal fabrications are required to comply with certain design loadings, submit structural design, structural calculations, materials properties, and other information needed for structural analysis, signed and sealed by the New York State licensed Professional Engineer responsible for their preparation.

D. Samples

Where specified, submit samples of fabricated items, hardware, and finishes for selection.

E. Welder certificates signed by the Contractor certifying that welders comply with requirements specified under Article titled "Quality Assurance".

F. Qualification data for firms and persons specified in Article titled "Quality Assurance" to demonstrate their capabilities and experience.

1. Provide proof of Zinc Metallizer's qualifications specified under "Quality Assurance"; certification of qualifications meeting Military Standard by one of the following:
 - a. A branch of the U.S. Dept. of Defense (DoD), or
 - b. A company certified by U.S. Dept. of Defense; submit DoD certification for this company, or
 - c. The Society for Protective Coatings (SSPC).
2. Hot Dip Galvanizer/Powder Coating Applicator: Provide proof of Galvanizer/Applicator's qualifications by submittal of the following:
 - 1) Galvanizer's written Quality Control/Quality Assurance manual for hot dip galvanizing and factory applied coatings.

- 2) Certification from the American Galvanizers Association that Galvanizer has completed all course requirements and is a certified Master Galvanizer.

G. Test Reports

Submit test reports for zinc metallizing or hot dip galvanizing and coating system as specified herein, paragraph titled "Galvanizing by the Zinc Metallizing Process; or Hot Dip Galvanizing; with Finish Coating".

H. Warranty

Warranty as specified herein.

1.06 QUALITY ASSURANCE

- A. Items provided in this Section shall be manufactured and fabricated by firms experienced in the type of Work specified.
- B. Installation shall be by installers experienced in the type of Work specified for the respective item. Installer shall be acceptable to the manufacturer.
- C. Qualify welding processes and welding operators in accordance with AWS D1.1 "Structural Welding Code - Steel", D1.3 "Structural Welding Code - Sheet Steel", and D1.2 "Structural Welding Code - Aluminum".
 1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.
- D. Engineer Qualifications: Professional engineer licensed to practice in jurisdiction where project is located and experienced in providing engineering services of the kind indicated that have resulted in the successful installation of metal fabrications similar in material, design, and extent to that indicated for this project.
- E. Zinc metallizer: The company or individual responsible for application of zinc metallizing shall be certified as qualified to perform this process by one of the following:
 1. Certification in accordance with Mil Std 1687 by a branch of the U.S. Dept. of Defense, or by a company that is certified by the Dept. of Defense in accordance with this military standard.

2. Thermal Spray Certification by The Society for Protective Coatings (SSPC).

The firm providing the zinc metallizing shall also perform the painting of the members at the shop also to provide a single source responsibility.

- F. Hot-Dip Galvanizer/Powder Coating Applicator: The company or individual responsible for application of hot dip galvanizing with a powder coat finish shall be certified as qualified to perform this process by the following:
 1. Certification from the American Galvanizers Association that Galvanizer has completed all course requirements and is a certified Master Galvanizer.
 2. Certification from the manufacturer of the powder coatings that the galvanizer is an approved applicator of said manufacturer's material and meets all application and performance criteria.

1.07 PRODUCT HANDLING

- A. Before shipment to the job, all finishes shall be adequately protected for transporting and erecting periods.
- B. Replace damaged items, with the approval of the Project Architect, and at no additional cost to the Authority.

1.08 PROJECT CONDITIONS

- A. Field Measurements: Check actual locations of walls and other construction to which metal fabrications must fit, by accurate field measurements before fabrication; show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress and work of other trades to avoid delay of work.

1.09 WARRANTY

- A. Warranty for metal fabrication items with galvanizing by zinc metallizing or hot dip galvanizing, and finish coated with epoxy paint system or powder coat system: The coating applicator's/Contractor's warranty that items shall not show signs of rust, and finish shall be fully warranted against peeling, cracking, crazing, blistering, chalking and fading for a period of 5 years from date of installation of products. If rusting or failure of coating occurs, new items shall be provided

or coating shall be refurbished in the shop. Warranty includes labor to remove and replace the items.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Metals

1. Metal Surfaces, General: For metal fabrications exposed to view upon completion of the Work, provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes. Do not use materials whose exposed surfaces exhibit pitting, seam marks, roller marks, rolled trade names, roughness, and, for steel sheet, variations in flatness exceeding those permitted by reference standards for stretcher-leveled sheet.
2. Ferrous Metals
 - a. Steel Plates, Shapes, and Bars: ASTM A36
 - b. Rolled Steel Floor Plates: ASTM A786
 - c. Steel Bars for Gratings: ASTM A1011 or ASTM A36
 - d. Wire Rod for Grating Cross Bars: ASTM A510
 - e. Cold-Formed Steel Tubing: ASTM A500
 - f. Hot-formed Steel Tubing: ASTM A501
 - g. Hot-Rolled Steel Sheet: ASTM A1011
 - h. Cold-Rolled Steel Sheet: ASTM A1008
 - i. Galvanized Steel Sheet: ASTM A653
 - J. Steel Pipe: ASTM A53; finish, type, and weight class as follows:
 - a) Black finish, unless otherwise indicated.
 - b) Galvanized finish for exterior installations and where indicated.
 - c) Type S, Grade A, standard weight (schedule 40), unless otherwise indicated, or another grade or weight or both required by structural loads.
 - k. Gray Iron Castings: ASTM A48, Class 30
 - l. Malleable Iron Castings: ASTM A47, Grade 32510
 - m. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.

- n. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A47, or cast steel, ASTM A27. Provide bolts, washers, and shims as required, hot-dip galvanized per ASTM A153.
 - 1) "Peerless Wedge", Manufactured by "Peerless Hardware Manufacturing Co., Inc.
- o. Welding Rods and Bare Electrodes: Select in accordance with AWS specifications for the metal alloy to be welded.
- p. Stainless Steel bar: ASTM A276, Type 304
- q. Stainless Steel plate: ASTM A240, Type 304.

3. Aluminum

- a. Extruded Bars and Shapes: ASTM B221, alloy as follows:
 - 1) 6061-T6 or 6063-T6 for bearing bars of gratings and shapes.
 - 2) 6061-T1 for grating cross bars.
- b. Aluminum-Alloy Rolled Tread Plate: ASTM B632, alloys as follows:
 - 1) 6061-T6 for platforms.
 - 2) 6061-T4 for treads.
- c. Aluminum Sheet for Expanded Aluminum Grating: ASTM B209, alloy 5052-H32.
- d. Fasteners for Aluminum Gratings: Use fasteners made of same basic metal as fastened metal except use galvanized fasteners complying with ASTM A153 for exterior aluminum units, unless otherwise indicated. Do not use metals that are corrosive or incompatible with metals joined.

B. Grout and Anchoring Cement

- 1. Nonshrink Metallic Grout: Premixed, factory-packaged, ferrous aggregate grout complying with Federal Specification CE CRD-C 621 specifically recommended by manufacturer for heavy-duty loading applications of type specified in this section.

2. Nonshrink Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, non-gaseous grout complying with Federal Specification CE CRD-C 621. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this section.
3. Erosion-Resistant Anchoring Cement: Factory-prepackaged, nonshrink, nonstaining, hydraulic controlled expansion cement formulation for mixing with water at project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without need for protection by a sealer or waterproof coating and is recommended for exterior use by manufacturer.
4. Products: Subject to compliance with requirements, provide one of the following:
 - a. Nonshrink Metallic Grouts:
"Hi Flow Grout", Euclid Chemical Co.
"MasterFlow 885", Master Builders
"Met-ox", ChemMasters Specialty Construction Products
 - b. Nonshrink Nonmetallic Grouts:
"Euco N-S Grout", Euclid Chemical Co.
"Crystex", L & M Construction Chemicals, Inc.
"Masterflow 713", Master Builders
"Five Star Grout", Five Star.
 - c. Erosion-Resistant Anchoring Cement:
"Super Por-Rok", CMP Specialty Products, A division of CGM inc.

C. Fasteners

1. General: Provide galvanized or type 304/316 SS fasteners for exterior use or where built into exterior walls. Select fasteners for the type, grade, and class required.
2. Bolts and Nuts: Regular hexagon head type, ASTM A307, Grade A
3. Lag Bolts: Square head type, ANSI B18.2.1
4. Machine Screws: Cadmium plated steel, FS FF-S-92C
5. Drilled-In Expansion Anchors: Anchors installed in concrete shall have current ICC-ES listing for

performance in cracked concrete as per Section BC 1912.

6. Toggle Bolts: Tumble-wing type, type, class, and style as required.
7. Lock Washers: Helical spring type carbon steel, FS FF-W-84A
8. Vandal resistant fasteners: Torx with pin, or as otherwise indicated. Corrosion resistant.

D. Paint

1. Shop Primer, interior Work: Acrylic rust-inhibitive type containing no lead equal to Tnemec 115 Unibond or Carboline Carbocrylic 3358. Paint must meet SCAQMD standards for VOC emissions.
2. Shop Primer, exterior Work except galvanized items: primer for epoxy coat system as specified in Section 09900-Painting.
3. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12 except containing no asbestos fibers.

E. Galvanizing by the Hot-dip Method - No Finish Coating

Items indicated to be painted shall not be hot-dip galvanized except as specified herein.

1. Galvanize structural shapes in accordance with ASTM A123.
2. Galvanize hardware in accordance with ASTM A153.
3. Galvanizing repair paint for regalvanizing welds and damaged areas shall conform to ASTM A780 and comply with Military Specification MIL-P-21035B, such as ZRC Cold Galvanizing Compound.

2.02 FINISHES

A. General

1. Comply with NAAM "Metal Finishes Manual" for recommendations relative to application and designations of finishes.
2. Finish metal fabrications after assembly.

3. Refer to Articles 2.04 and 2.05 for painting and galvanizing.

B. Aluminum Finishes

1. Finish designations prefixed by "AA" conform to the system established by the Aluminum Association for designating aluminum finishes.
 - a. As Fabricated Finish: AA-M10 (Mechanical Finish: as fabricated, unspecified).

2.03 FABRICATIONS

A. General

1. Form metal fabrications from materials of size, thickness, and shapes indicated but not less than that needed to comply with performance requirements indicated. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of each metal fabrication.
2. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.
3. Allow for thermal movement resulting from the following maximum change (range) in ambient temperature in the design, fabrication, and installation of installed metal assemblies to prevent buckling, opening up of joints, and overstressing of welds and fasteners. Base design calculations on actual surface temperatures of metals due to both solar heat gain and nighttime sky heat loss.

Temperature Change (Range): 180°F

4. Shear and punch metals cleanly and accurately. Remove burrs.
5. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
6. Remove sharp or rough areas on exposed traffic surfaces.

7. Weld corners and seams continuously to comply with AWS recommendations and the following:
 - a. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - b. Obtain fusion without undercut or overlap.
 - c. Remove welding flux immediately.
 - d. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matches those adjacent.
8. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flathead (countersunk) screws or bolts. Locate joints where least conspicuous.
9. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.
10. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. 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.
11. Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware, screws, and similar items.
12. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

B. Support Inserts

1. Provide "Peerless Wedge" hot-dip galvanized inserts for anchorage to concrete at locations shown on the Drawings, or as required. Wedge inserts shall be provided with a 3/4" bolt, nut, and washers, all hot-dip galvanized. Install 3/4" diameter reinforcing bar X 1'-6" minimum length through anchor loop to increase anchorage in

concrete. Space inserts 2'-6" on centers (maximum) starting 6" from face of masonry opening. Submit three (3) samples for approval. Shims shall be square horseshoe shape, hot-dip galvanized, as indicated on the Drawings.

C. Apparatus Supports, Miscellaneous Hangers and Accessories

1. Provide bolts, stud bolts, for all proprietary bolts and fasteners for the support of apparatus and other items as indicated on the Drawings. Secure to steel beams or concrete floor slabs above. Where exposed to view in interior, provide finish paint in addition to shop paint.

D. I-Beam, Channel, Angle, T-Framing, and Miscellaneous Iron Work

All ferrous metal items described in this Paragraph shall be galvanized if located in kitchen areas, in exterior wall or roof construction, or if exposed to the exterior. Where exposed to view, also provide finish paint as specified herein - powder coating or epoxy coating system. Interior items shall receive shop and finish paint.

1. Provide all I-beams, channels, angles, T's, bent plates, steel plates, bent angle frames and all other miscellaneous iron work as indicated on the Drawings, except framing forming a part of the structural steel work. Drill all holes required to secure metal, wood and other materials to the framing.
2. Where indicated on the Drawings, provide framing and stiffening for low partitions; channel framing, hangers, and other items.
3. Provide steel fillers and plates as required for the securing of door holders specified in Section 08710- Finish Hardware.
4. Furnish all steel plates, straps, stiffeners, ties, complete with bolts, washers, and all other items needed for a complete installation, for exterior wood windows. Furnish to the installer in time for its incorporation into the Work.
5. Provide 12 gage channel and 3" x 3" x 1/4" angle frame, or other members indicated on the Drawings, where ducts pass through fire zone partitions.

6. Provide angle lintels of sizes required at openings for outside air intake chambers.
7. Furnish all necessary steel plates, bolts, hangers, and other items needed for a complete installation, for the support of folding partitions, when folding partitions are indicated. All bolts shall be in place before fireproofing.

Bolts required where folding partitions are supported from structural steel shall be furnished and welded in place as part of the Work of this Section. Use bolt spacing templates furnished by partition manufacturer.

8. Provide 4" x 4" x 3/8" angle frame, or other members indicated, secured to hangers for hoods over ranges and dishwasher in kitchen, all as indicated on the Drawings.
9. Provide steel supports for counters and cabinets where shown on the Drawings.
10. Provide all clip angles required for anchoring wood blocking at gravel stops. Secure clip angles, of sizes and spacing indicated on the Drawings, to concrete with threaded bolts; furnish bolts at proper time for setting in concrete. Drill clips to receive bolts for anchoring wood blocking in place.
11. Provide angle frame and shelf angle support for subway type grating as indicated on the Drawings.

E. Steel Pipe Railings and Handrails

1. General: Fabricate pipe railings, including guardrail systems and handrail systems, to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of pipe, post spacings, and anchorage, but not less than that required to support structural loads. Conform to requirements of Article herein titled "System Performance Requirements". For pipe handrails for steel stairs refer to Section 05710.
2. Interconnect railing and handrail members by butt-welding or welding with internal connectors, at fabricator's option, unless otherwise indicated.

- a. At tee and cross intersections, notch ends of intersecting members to fit contour of pipe to which end is joined and weld all around.
3. Form changes in direction of railing members as follows:
 - a. By radius bends of radius indicated.
4. Form simple and compound curves by bending pipe in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross-section of pipe throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of pipe.
5. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated.
6. Close exposed ends of pipe by welding 3/16 inch thick steel plate in place or by use of prefabricated fittings.
7. Toe Boards: Where indicated, provide toe boards at railings around openings and at the edge of open-sided floors and platforms. Fabricate to dimensions and details indicated, or if not indicated, use 4 inches high x 1/8 inch steel plate welded to, and centered between, each railing post.
8. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings, and anchors for interconnections of pipe and attachment of railings and handrails to other work. Furnish inserts and other anchorage devices for connecting railings and handrails to concrete or masonry work.
9. Fillers: Provide steel sheet or plate fillers of thickness and size indicated or required to support structural loads of handrails where needed to transfer wall bracket loads through wall finishes to structural supports. Size fillers to suit wall finish thicknesses. Size fillers to produce adequate bearing to prevent bracket rotation and overstressing of substrate.
10. For exterior steel railings and handrails, form from galvanized steel pipe. Galvanize fittings, brackets, fasteners, sleeves and other ferrous components. If indicated on Drawings to be painted, form from plain steel, galvanize, and

provide finish paint as specified herein with powder coating or epoxy coating system.

11. For interior steel railings form from steel pipe. Provide non-galvanized ferrous metal fittings, brackets, fasteners, and sleeves, except galvanize anchors embedded in exterior masonry and concrete construction. Provide shop and finish paint.
12. Furnish sleeve/base plate to mason for setting in concrete work.
13. Provide pipe railings of the following configurations unless indicated otherwise on the Drawings or required for structural design:

Center rails and free standing end rails on exterior steps: 1½" nominal diameter. Uprights shall be anchored into pipe sleeves in the concrete or masonry. Upright at upper level of center rail: 2" nominal diameter.

Rails at side of exterior steps against walls: 1" nominal diameter, with returns against wall at ends, and supported on brackets and wall plates.

Rails at side of exterior steps against iron fences: 1" nominal diameter, with returns at ends and supported on brackets and plates.

Handrails at area wall: 1¼" nominal diameter.

Exterior barrier guardrails (at areaways and other locations as indicated on the Drawings): 1½" nominal diameter pipe.

Interior barrier guardrails (at pits, changes in floor levels, and other locations as indicated on the Drawings): 1¼" nominal diameter pipe.

F. Rooftop Equipment Service Access Platforms and Ladders

1. Provide complete for service access to rooftop mechanical equipment: steel platforms, steel pipe railings, and steel ladders, as indicated on the Drawings. All items shall be galvanized.
2. Platform shall include light duty welded steel bar grating and steel supporting structure. Ladders and pipe railings shall be as specified herein. Provide steel framing, clips, fasteners, and accessory items, as required to properly support the platform and as indicated on the Drawings.

Miter and weld connections for perimeter frames supporting gratings.

3. Grating platform

- a. Capable of withstanding a uniform load of 75 psf, or a concentrated load of 2000 pounds, whichever produces the greater stress. Limit deflection to $L/240$.
- b. The structure of the platform and the positive anchorage of the platform to the building structure shall be capable of withstanding the effects of earthquake motions determined according to ASCE 7.
- c. Grating bars $3/16"$ thick; spaced $11/16"$ o.c.; ASTM A36 steel. Connections shall be recessed below the walking surface of the grating.
- d. Steel finish: Hot-dip galvanized with a zinc coating weight of not less than 1.8 oz/sf of coated surface. Comply with ASTM A123.
- e. Walking surface: Applied abrasive finish consisting of aluminum-oxide aggregate in an epoxy-resin adhesive.
- f. Comply with NAAMM MBG 531, Metal Bar Grating Manual, and AWS D1.1 Structural Welding Code.

G. Miscellaneous

1. Provide all other miscellaneous metal work. All Work to be embedded in concrete or masonry work or in connection with bolts, anchors, and inserts shall be furnished at the proper time for setting. Those items exposed to the elements or located in exterior walls or roof shall be galvanized. Where exposed to view, also provide finish paint as specified herein with powder coating or epoxy coating system. Interior items shall be shop and finish painted.

H. Metal Tread Nosings on Concrete Steps

1. Provide securely on all concrete steps, 6" wide safety nosing, installed flush with concrete tread and riser:

Abrasive Cast "Ferrogrit" Type-101 as manufactured by Wooster Products Inc., Wooster, OH. Thickness

3/8" minimum. Integral anchors. Abrasive material integrally cast into the metal. Cross-hatched surface. In compliance with ADA requirements.

Length: 6" less than stair width; center nosing length in tread, with ends aligned, 3" from ends of treads.

2. Manufacturers: Wooster Products Inc., Wooster, OH; Safe-T-Metal Co., Syracuse NY; American Safety Tread Co., Helena, AL.

2.04 PAINING

- A. All miscellaneous ferrous metal work, except those members to be galvanized, shall be given one shop coat of paint before leaving the shop. For those items to be zinc metallized or hot dip galvanized and finish painted, apply coatings in the shop as specified herein.
- B. Cleaning and Surface Preparation
 1. Clean all steel first in accordance with SSPC-SP1.
 2. Clean steelwork not to be painted (except steel work to be galvanized) in accordance with SSPC-SP2.
 3. Clean steelwork to be painted within the same day as it will be applied and in accordance with the following methods, determined by location and exposure:
 - a. Interior steel not exposed to view: SSPC-SP2.
 - b. Interior steel exposed to view: SSPC-SP3.
 - c. Cavity wall and exterior steel exposed to weather: SSPC-SP6.
- C. Shop Coat
 1. Apply steel primer paint (general application) at a rate to provide dry film thickness of 2.0 to 3.5 mils. Apply primer paint (cavity wall and exterior application) at a rate to provide dry film thickness of 4.0 to 6.0 mils. Provide full coverage of joints, corners, edges, and exposed surfaces.
 2. Apply to dry surfaces only, when surface temperatures are above dew-point, by brush, spray,

or roller, thoroughly and evenly, in strict accord with manufacturer's instructions for every detail of handling.

3. Apply second coat of the approved primer, in a darker shade, to surfaces inaccessible to painting after assembly or erection.
4. Protect machined surfaces with an approved rust-inhibiting coating that is readily removable prior to erection.

2.05 GALVANIZING AND FINISH COATING

A. General

Galvanize the following Work (items that are to be finish painted shall be galvanized by the zinc metallizing process or hot dip galvanized, and finish coated as specified herein):

1. All angles and other steel items located in exterior wall or roof construction
2. All angles supporting exterior masonry or exposed to the weather.
3. All steel members and fabrications exposed to the exterior.
4. All other steel members and fabrications indicated as galvanized on the Drawings and Specifications.

B. Zinc Metallizing-Finish Coating Applicators:

1. Atlantic Coast Metallizing & Coatings Corp., Melville, NY
2. Avant Guards Manufacturing, Brooklyn, NY
3. East Coast Metallizing & Coating Systems Inc., Westbury, NY
4. Island Wide Sandblasting Inc., Wyandanch, NY
5. Reneuxit LLC, West Chester, PA

C. Cleaning and Surface Preparation

1. Hardware (bolts, nuts, etc.): Clean and leave free of mill scale before galvanizing.

2. Clean all steel first in accordance with SSPC-SP1 if needed.
 3. Steel members: Clean in accordance with SSPC-SP8 before hot-dip galvanizing.
 4. Steel members: Clean in accordance with SSPC-SP10 before zinc metallizing. Surface shall have a 3-4 mil anchor pattern. Moisture cannot be present on steel and temperature cannot be less than 5°F above the dew point. Thermal spray must be applied within 4 hours of blasting.
- D. Shop Coat - Hot-dip Galvanizing -as required for galvanized items not indicated to receive finish paint coat.
1. Galvanize hardware in accordance with ASTM A153.
 2. Galvanize steel shapes in accordance with ASTM A123. Apply zinc coating as per Thickness Grade specified in ASTM A123.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Make all required measurements in the field to ensure proper and adequate fit.

3.02 DISCREPANCIES

- A. Immediately notify the Authority's Representative.
- B. Do not proceed until fully corrected.

3.03 ERECTION/INSTALLATION

- A. Provide anchorage devices and fasteners where necessary for securing metal fabrications to in-place construction; including, threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required.
 1. Provide inserts, setting plates, and other items of concealed work required for attachment of metal fabrications in a timely manner to facilitate on-going construction.
- B. Perform cutting, drilling, and fitting required for installation of metal fabrications. Set work

accurately in location, alignment, and elevation, plumb, level, true, and free of rack, measured from established lines and levels. Do not weld, cut, or abrade surfaces of metal fabrications that have been coated or finished after fabrication and are intended for field connection by mechanical means without further cutting or fitting.

- C. Fit exposed connections accurately together to form tight, hairline or, where indicated, with uniform reveals and spaces for sealants and joint fillers.
- D. Provide temporary bracing or anchors in formwork for items that are to be built into concrete masonry or similar construction.
- E. Install concealed gaskets, joint fillers, insulation and flashings as the work progresses, so as to make work weathertight, sound proof or lightproof as required.
- F. Restore protective coverings that have been damaged during shipment or installation of the work. Remove protective coverings only when there is no possibility of damage from other work yet to be performed at the same location.
- G. Field Welding: Comply with applicable AWS specification for procedures of manual shielded metal-arc welding, for appearance and quality of welds made, and for methods used in correcting welding work. Weld connections that are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed welded joints smooth and restore finish to match finish of adjacent surfaces.
- H. Corrosion Protection: Coat concealed surfaces of aluminum and steel which will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
- I. Adjust metal fabrications prior to anchoring to ensure matching alignment at abutting joints.
- J. Install items as detailed in the drawings; for manufactured items, install as recommended by the Manufacturer, unless indicated otherwise.
- K. Coordinate with other trades involved.
- L. Field Touch-Up

1. Galvanized Members: After erection, clean and paint all damaged areas to the galvanizing, welds, and areas adjacent to welds with the galvanizing repair paint complying to ASTM A780. For galvanized members to be painted, finish painting shall be the final two coats of the epoxy coating system. For powder coating system follow instructions of the powder coat manufacturer, to match surrounding undamaged areas.

3.04 PROTECTION

- A. Protect finishes of metal work from damage during construction period by use of temporary protective coverings approved by ornamental metal manufacturer. Remove protective covering at time of Substantial Completion.
- B. Restore finishes damaged during installation and construction period so that no evidence remains of correction work. Return items which cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION

LIST OF SUBMITTALS

<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>
Product Data: (for each item)	_____	_____
Shop Drawings: (for each Item)	_____	_____
1. Materials, Locations, sizes, shapes		
2. Fastening, anchorage, connections, bracing		
Structural Design & Calculations:	_____	_____
Samples:	_____	_____
Welder Certificates:		
Qualification:	_____	_____
1. Fabricator		
2. Installer		
3. Professional Engineer		
4. Zinc Metallizer or Hot Dip Galvanizer		
Test Reports: Zinc metallizing or Hot dip galvanizing and Finish coatings	_____	_____
Warranty:	_____	_____

* * *

SECTION 05710
STEEL STAIRS

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Provide Steel Stairs Work as described herein and as shown on the drawings, including intermediate landing platforms, as indicated on the Drawings and as specified herein, including, but not limited to the following:

1. Industrial stairs fabricated from steel floor plates and gratings.

2. Installation accessories.

1.02 REFERENCE STANDARDS

A. References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by governing codes or regulations, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

1. American Society for Testing and Materials (ASTM).

A36 Standard Specification for Carbon Structural Steel

A48 Standard Specification for Gray Iron Castings

A500 Standard Specification for Cold-formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes

A501 Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing

A568 Standard Specification for Steel, Sheet, Carbon, and High Strength Low Alloy, Hot Rolled and Cold Rolled

- A53 Standard Specification for Steel, Black and Hot Dipped, Zinc Coated Welded and Seamless Pipe
- A325 Standard Specification for Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength Structural Bolts
- A563 Standard Specification for Carbon and Alloy Steel Nuts
- E70 Standard Test Method for PH of Aqueous Solutions with the Glass Electrode
- E985 Standard Specification for Permanent Metal Railing Systems and Rails for Buildings
- 2. American Welding Society (AWS).
 - D1.1 Structural Welding Code - Steel
 - D1.3 Structural Welding Code - Sheet Steel
 - A5.1 **Specification for Carbon Steel Electrodes for Shielded Metal Arc Welding**
- 3. NAAMM
 - Metal Stairs Manual
 - Pipe Railing Manual
- 4. SSPC "Steel Structures Painting Manual, Volume 2, Systems and Specifications".

1.04 **DESIGN REQUIREMENTS**

- A. Provide steel stairs, landing platforms and treads to support a live load of not less than 100 psf and a concentrated load of 300 lbs. on an area of 4 in² whichever produces the greater stress. Limit deflection on length of treads and tread support to 1/8". Limit deflection of platform support to 1/4". Limit deflection of stair framing members to 1/8".
- B. Hanger supports for steel stairs shall be either steel tubes or angles as indicated on Drawings. Use of rod hangers is not permitted.

- C. Stair framing shall be capable of withstanding stresses resulting from loads specified above as well as stresses resulting from guardrail and railing system loads that are required to meet Section BC 1607.7 of the 2014 NYC Building Code as indicated in paragraphs C and D below.
- D. Handrail assemblies and top rail of guard assemblies, and supports, shall be designed to resist the following loads.
 - 1. Uniform load of 50 lb/ft applied in any direction at the top and to transfer this load to the supports.
 - 2. Concentrated load of 200 pounds applied in any direction at any point and to transfer the load to the supports.
 - 3. The uniform and concentrated loads need not be assumed to act concurrently.
- E. Infill of Rail Systems: Intermediate rails, balusters, and panel fillers shall be designed to resist the following combination loading. Reactions due to this combination loading are not required to be applied simultaneously with one another and are not required to be superimposed with those in paragraph C above.
 - 1. A concentrated normal load of 50 pounds applied horizontally on an area of 1 ft², including openings and spaces between rails.
 - 2. A vertically downward load of 50 lb/ft applied at the most critical locations.
 - 3. A concentrated upward load of 50 pounds applied at the most critical locations.
- F. Make design modifications only as may be necessary to meet performance requirements and coordinate the Work. Variations in details which do not adversely affect appearance, durability or strength shall be submitted to the Authority.
- G. Assume all responsibility for the correctness and accuracy of installation, and take and verify all measurements at the Building. The Contractor shall assume full responsibility for the correctness of dimensions and fit.

- H. Seismic Performance: Provide metal stairs capable of withstanding the effects of earthquake motions determined according to the NYC Building Code.
- I. Tread shall be designed to resist deflection for the stairs. Steel stair and tread manufacturer shall coordinate designs. At a minimum, stair tread pan and riser thicknesses shall be 8 gage. If drawings or calculations require a greater thickness, provide that required to not exceed the maximum indicated deflections.
- J. Provide all work and material necessary to comply with requirements of the NYC Building Code for such stairs.

1.05 SUBMITTALS

A. Shop Drawings

- 1. Submit complete Shop Drawings for all stair work.
- 2. Coordinate the steel stair Shop Drawings with the structural steel and reinforced concrete Shop Drawings.
- 3. All Shop Drawings shall be prepared under supervision of and bear the seal of a New York State Licensed Professional Engineer. Do not submit unchecked shop drawings. First submissions of all drawings shall have one set sealed and signed by the Engineer. After final approval of all shop drawings, submit a final set sealed and signed by the Professional Engineer.
- 4. Shop drawings will be reviewed by the Engineer of Record for size of material and strength of connections only. This review shall not relieve the Contractor of responsibility for the design of the stairs.

B. Calculations

- 1. Submit structural calculations and load test data. Calculations shall bear the seal of a professional engineer registered in the State of New York.

C. Manufacturer's Data

Submit manufacturers' catalog data:

1. Treads.

D. Samples

1. Treads.

E. Certification

Furnish steel manufacturer's certificate certifying welders employed on the Work have met AWS qualifications within the previous twelve months, and for work performed in the field are NYC licensed welders as per Section §28-407.1 of the NYC Administrative Code.

1.06 QUALITY ASSURANCE

A. Fabricators

Five (5) years minimum experience in steel fabrications of stairs or similar Work.

B. Welding - Shop & Field

Certify that each welder has satisfactorily passed qualification tests for welding processes involved and, if pertinent, has undergone recertification.

C. Comply with requirements specified herein of the New York City Building Code.

D. Engineer Qualification: Professional engineer licensed to practice in New York State and experienced in providing engineering services of the kind indicated that have resulted in the successful installation of stairs similar in material, design and extent to that indicated for this Project.

E. Installer Qualifications: Arrange for installation of steel stairs specified in this section by same firm that fabricated them.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Protect stairs and all other fabricated items during shipment, storage, erection, and after erection until the Project Work is completed. Protect precast concrete treads to prevent any cracking, chipping of edges, or other damage.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Steel plate, angles, channels, beams, bars, and other hot-rolled Sections: ASTM A36.
- B. Gray Cast Iron Stair Treads
ASTM A48.
- C. Seamless Tubular Steel
ASTM A500 for Cold Rolled Tubing ASTM A501 for Hot Rolled Tubing
- D. Cold-Rolled Steel Plate
ASTM A568, Grade 36.
- E. Steel Pipe (Handrails)
ASTM A53.
- F. Bolts
ASTM A325; A563 nuts.
- G. Welding Rods
E70 Classification of AWS A5.1.
- H. Primer
 - 1. Shop Primer Paint: Modified alkyd rust-inhibitive type containing no lead equal to Tnemec 10-99 or Carboline Carbocoat 115-SG.
 - 2. Field Touch-up Paint: Acrylic rust-inhibitive type containing no lead equal to Tnemec 115

Unibond or Carboline Carbocrylic 3358. Paint must meet SCAQMD standards for VOC emissions

PART 3 - EXECUTION

3.01 PREPARATION

- A. Coordinate and furnish anchorages, shop drawings, diagrams, instructions, and directions for installation of anchorages, such as concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction.

3.02 INSTALLATION

- A. Fastening to Construction: Provide sleeves, anchorage devices and fasteners for securing steel stairs including, threaded fasteners for inserts, toggle bolts and through-bolts for setting wall brackets and other required connectors.
- B. Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation of steel stairs. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels, ensure placement of hangers and braces for stabilization of installed assemblies. Provide temporary bracing or anchors for items which are to be built into other work.

3.03 CONNECTIONS AND OTHER WORK

- A. Connections: Fit exposed connections accurately to form tight hairline joints. Weld connections which are not to be left as exposed joints. Grind exposed field welds and joints smooth and touch up abraded shop paint coats. Do not weld, cut or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted field connections.
- B. Connect steel stairs to the structural steel framework before concrete and/or sprayed fireproofing is installed. In a reinforced concrete superstructure or portion thereof, secure the steel stairs to the concrete superstructure as indicated on Drawings.

- C. For minor connections, such as brackets to strings; bolt treads to risers, using hexagonal nuts where exposed.
- D. Other connections
Fillet welds; grind smooth, where exposed.
- E. Field Welding: Comply with AWS for procedures of welding, appearance and quality of welds made, and methods used in correcting welding work.
- F. Coordination: Coordinate and schedule this work with the work of other trades. Provide soffit clips on stringers required for securing other work, so as to achieve the proper fire rating.
- G. Adjust railings for alignment at abutting joints. Space posts as required by design loadings. Plumb posts and secure posts and railing ends as detailed

END OF SECTION

* * *

LIST OF SUBMITTALS

<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>
Shop Drawings:	_____	_____
1. Stair Work including treads		
2. Reinforcement detail for precast tread		
Calculations	_____	_____
1. Structural calculations and load test data		
Manufacturers catalog data	_____	_____
1. Abrasive tread strips		
2. Paint Products		
Samples	_____	_____
1. Abrasive tread strips and anchors		
2. Precast concrete		
Certification	_____	_____
1. Welders certificates		
Warranty	_____	_____
1. Manufacturer's warranty for abrasive tread strip		
Sustainable Submittals:	_____	_____
1. Contractor's Sustainable Materials Form (see Section S01352) with materials cost information.		

* * *

SECTION 05720
ALUMINUM RAILINGS

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. Provide ornamental metalwork as indicated on the Drawings and as specified herein, including, but not limited to the following:

1. Aluminum Railings

1.02 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

- A. Not Used.

1.03 REFERENCES

- A. References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by governing codes or regulations, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.
- B. ASTM International (ASTM).
- C. American Welding Society (AWS).
- D. National Association of Architectural Metal Manufacturers (NAAMM).
- E. Federal Specifications (FS).
- F. The Society for Protective Coatings (SSPC, formerly Steel Structures Painting Council).
- G. The American Galvanizers Association

1.04 DESIGN REQUIREMENTS

- A. Definitions in ASTM E985 for railing-related terms apply to this Section.
- B. Structural Performance: Design, engineer, fabricate, and install the following metal fabrications to withstand not less than the following structural loads

without exceeding the allowable design working stress of the materials involved, including anchors and connections as per Section BC 1607.7 of the 2014 NYC Building Code. Apply each load to produce the maximum stress in each respective component of each metal fabrication. In cases where local requirements are more stringent they shall apply. Where railings support fixtures or other imposed loads, allowance shall be made for the additional loads.

1. Handrails
 - a. Uniform load of 50 lb/ft applied in any direction at the top and to transfer this load to the supports.
 - b. Concentrated load of 200 pounds applied in any direction at any point and to transfer the load to the supports.
 - c. The uniform and concentrated loads need not be assumed to act concurrently.
2. Top Rail of Guardrail Systems
 - a. Uniform load of 50 lb/ft applied in any direction at the top and to transfer the load to the supports.
 - b. Concentrated load of 200 pounds applied in any direction at any point and to transfer the load to the supports.
 - c. The uniform and concentrated loads need not be assumed to act concurrently.
3. Infill of Rail Systems: panels, balusters, intermediate railings, and other elements composing the infill area must resist the following combination loading. Reactions due to this combination loading are not required to be applied simultaneously with one another and are not required to be superimposed with those in paragraphs 1 and 2 above.
 - a. A concentrated normal load of 50 pound applied horizontally on an area of 1 sq. ft., including openings and spaces between rails.
 - b. A vertically downward load of 50 lb/ft applied at the most critical locations.
 - c. Concentrated upward load of 50 pounds applied at the most critical location.

1.05 SUBMITTALS

A. Product Data: Manufacturer's technical data for products and processes used, including finishes and anchorage materials.

B. Shop Drawings

1. Show all locations, markings, quantities, materials, sizes and shapes.

Show full size details of fabrication and installation for each ornamental metal item required including plans, elevations, profiles of fittings, connections, anchors, details of components and attachments to other units of Work.

- a. Indicate materials, profiles of each ornamental metalwork member and fitting, joinery, finishes, fasteners, anchorages and accessory items.

- b. Include setting drawings, templates, and directions for installation of anchor bolts and other anchorages to be installed as unit of Work of other Sections.

2. Do not fabricate before approval of Shop Drawings.

C. Calculations

Where metal items are required to comply with certain design loadings, submit structural design, structural calculations, materials properties, and other information needed for structural analysis, signed and sealed by the New York State licensed Professional Engineer responsible for their preparation.

D. Samples

1. Submit sample of each item of hardware provided in this Section.
2. Upon request of the Authority, submit one sample of each item included in this Section, for approval.
3. Samples for verification: Prepare samples of each type of metal finish required on metal of same thickness and alloy indicated for final work. Where finish involves normal color and texture variations, include sample sets composed of two

(2) or more units showing limits of such variations expected in completed work.

a. Include 6 inch long samples of linear shapes

b. Include 6 inch square samples of plates.

c. Include full-size samples of castings and forgings.

E. Qualification data for firms and persons specified in Article titled "Quality Assurance" to demonstrate their capabilities and experience.

G. Warranty

Warranty as specified herein.

1.06 QUALITY ASSURANCE

A. All fabricated items

Fabricator shall have a minimum of three (3) years successful experience in the fabrication of items of type specified.

B. Shop assemble items wherever possible.

C. The installer shall have a minimum of three (3) years successful experience installing work of the type specified.

Installer shall be acceptable to the fabricator.

D. Engineer Qualifications: Professional engineer licensed to practice in jurisdiction where project is located and experienced in providing engineering services of the kind indicated that have resulted in the successful installation of metal items similar in material, design, and extent to that indicated for this project.

1.07 PRODUCT HANDLING

A. Tag all items to agree with shop drawing designations.

B. Brace and support large components to prevent deformation in transit, and store in dry area.

- C. Before shipment to the job, all finished metal shall be adequately protected for transporting and erecting periods.
- D. Store components and materials in clean, dry location, away from uncured concrete and masonry. Cover with waterproof paper, tarpaulin or polyethylene sheeting in a manner that permits air circulation within covering.
- E. Replace damaged items, with the approval of the Project Architect, and at no additional cost to the Authority.

1.08 JOB CONDITIONS

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible, to ensure proper fitting of ornamental metalwork. Do not delay job progress; allow for adjustments and fitting where taking of field measurements before fabrication might delay Work.
- B. Determine location of supporting construction provided by other trades.
- C. Interface With Other Systems: Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchors, including concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors, which will be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.
- D. Coordinate with other trades in scheduling delivery and installation.

1.09 WARRANTY

- A. Finish Warranty not used.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Metals

- 1. Aluminum: Provide alloy and temper recommended by aluminum producers or finisher for type of use and finish indicated, and with not less than the strength and durability properties of the alloy and temper designated below for each aluminum form required.

- a. Extruded Bar and Shapes: ASTM B221, 6063-T6
- b. Extruded Pipe and Tube: ASTM B429, 6063-T6
- c. Drawn Seamless Tube: ASTM B483, 6063-T832
- d. Plate and Sheet: ASTM B209, 6061-T6 [3003-H16]. [Use alloy 5005-H16 for anodic coatings.]
- e. Castings: ASTM B26 or ASTM B108

G. Miscellaneous Materials

- 1. Welding Electrodes and Filler Metal: Provide type and alloy of filler metal and electrodes as recommended by producer of metal to be welded, complying with applicable AWS specifications, and as required for color match, strength, and compatibility in fabricated items.
- 2. Fasteners: Use fasteners of same basic metal as the fastened metal, unless otherwise indicated. Do not use metals which are corrosive or incompatible with materials joined.
 - a. Provide concealed fasteners for interconnection of ornamental metal components and for their attachment to other work except where exposed fasteners are unavoidable or are the standard fastening method for ornamental metal system indicated.
 - b. Provide Phillips truss or pan-head machine screws for exposed fasteners, unless otherwise indicated.
 - c. Provide vandal resistant fasteners where indicated on the drawings.
- 3. Anchors and Inserts: Provide anchors of type, size, and material required for type of loading and installation condition shown, as recommended by manufacturer, unless otherwise indicated. Anchors installed in concrete shall have current ICC-ES listing for performance in cracked concrete as per Section BC 1912. For those anchors exposed to the elements, provide galvanized, stainless steel, or brass depending on the material being anchored.

4. Grout and Anchoring Cement

- a. Nonshrink Metallic Grout: Premixed, factory-packaged, ferrous aggregate grout complying with Federal Specification CE CRD-C 621 or ASTM C1107 specifically recommended by manufacturer for heavy-duty loading applications of type specified in this section.
- b. Nonshrink Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, non-gaseous grout complying with Federal Specification CE CRD-C 621 or ASTM C1107. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this section.
- c. Erosion-Resistant Anchoring Cement: Factory-prepackaged, nonshrink, nonstaining, hydraulic controlled expansion cement formulation for mixing with water at project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without need for protection by a sealer or waterproof coating and is recommended for exterior use by manufacturer.
- d. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Nonshrink Metallic Grouts:
 - "Hi **Flow** Grout", Euclid Chemical Co.
 - "**Masterflo** 885 and **Embeco** 636", Master Builders
 - "**Met-Ox**", **ChemMasters** **Specialty Construction** Products
 - 2) Nonshrink Nonmetallic Grouts:
 - "NS Grout", Euclid Chemical Co.
 - "Crystex", L & M Construction Chemicals, Inc.
 - "Masterflow 713", Master Builders
 - "Five Star Grout", **Five Star**.

2.02 METAL FINISHES

A. Not Used.

2.03 FABRICATION

A. General

1. Fabricate ornamental metal to design, dimensions and details shown. Provide ornamental metal members in sizes and profiles shown, and not less than required to comply with requirements indicated for structural performance.
 - a. Fabricate surfaces exposed to view from materials that are smooth and free of surface blemishes.
 - b. Do not use materials which have strains, imperfections and discolorations, including welds at metal surfaces.
 - c. Fabricate and assemble items with directional finishes so that finish is uniform and in the same direction, unless otherwise indicated.
2. Allow for thermal movement resulting from the following maximum change (range) in ambient temperature, in the design, fabrication, and installation of installed metal assemblies to prevent buckling, opening up of joints and overstressing of welds and fasteners. Base design calculations on actual surface temperatures of metals due to both solar heat gain and night time sky heat loss.
 - a. Temperature Change (Range): 100°F (55.5°C).
3. Form exposed work true to line and level, with flush surfaces and accurate angles. Ease exposed edges to radius of approximately 1/32 inch, unless otherwise indicated. Miter exposed corner joints unless otherwise indicated, and machine fit to hairline joint.
4. Complete cutting, fitting, forming and drilling, including grinding of metalwork, prior to cleaning, finishing, surface treatment and application of finishes.
5. Provide reinforcement and anchorage required to fulfill performance requirements. Provide

brackets and miscellaneous components required for complete installation. Provide reinforcement sufficient to withstand the anticipated loading and stresses at anchorage and fastener locations, and hardware connections.

6. Provide brackets, plates and straps with each assembly, as required for proper support and anchorage to other work.
7. Cut, reinforce, drill and tap ornamental metalwork to receive hardware and similar items.
8. Nonwelded Connections: Fabricate ornamental metal for interconnection of members by means of concealed mechanical fasteners and fittings unless otherwise indicated. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
9. Conceal fastenings unless otherwise shown and accepted on final shop drawings.
10. Welded Connections: Use welding method which is appropriate for metal and finish indicated and which develops strength required. Finish exposed welds and surfaces smooth, flush, and blended to match adjoining surfaces.
11. Weld corners and seams continuously and in accordance with recommendations of AWS and CDA. Grind exposed welds smooth and flush, to match and blend with adjoining surfaces.
12. Form changes in direction of ornamental metal members by radius bends, or by mitering.
13. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain profile of member throughout entire bend without buckling, twisting, or otherwise deforming exposed surfaces of ornamental metal components.
14. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
15. Shop Applied Finishes: Apply shop finishes to match accepted control samples, with direction of grain as indicated on accepted shop drawings, for

uniform appearance unless otherwise shown or directed by the Architect.

16. Separate dissimilar metals with separator material or coating recommended by fabricator to prevent corrosion and galvanic action. Do not extend coating onto exposed surfaces.
17. Provide factory applied protective covering as required to protect assemblies from damage during shipping and installation.

B. Aluminum Railings

1. Provide aluminum railings as indicated on the Drawings. Rail systems, including guardrail systems, handrail systems, and infill, shall meet or exceed requirements for structural performance described in Article titled "System Performance Requirements".

PART 3 - EXECUTION

3.01 INSPECTION

- A. Make all required measurements in the field to ensure proper and adequate fit.

3.02 DISCREPANCIES

- A. Immediately notify Architect.
- B. Do not proceed until fully corrected.

3.03 FURNISHED IN THIS SECTION, INSTALLED IN OTHERS

- A. For items furnished under this Section and installed under other Sections, submit items to installer at such time that will not impede the progress of the installer's other Work.

3.04 ERECTION OR INSTALLATION

- A. Provide anchorage devices and fasteners where necessary for securing ornamental metal items to in-place construction; including, threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required.
 1. Provide inserts, setting plates, and other items of concealed work required for attachment of

ornamental metalwork, in a timely manner to facilitate on going construction.

- B. Perform cutting, drilling, and fitting required for installation of ornamental metalwork. Set work accurately in location, alignment, and elevation, plumb, level, true, and free of rack, measured from established lines and levels. Do not weld, cut, or abrade surfaces of ornamental metal components that have been coated or finished after fabrication and are intended for field connection by mechanical means without further cutting or fitting.
- C. Fit exposed connections accurately together to form tight, hairline or, where indicated, with uniform reveals and spaces for sealants and joint fillers. Where cutting, welding and grinding are required for proper shop fitting and jointing of ornamental metal items, restore finishes to eliminate any evidence of such corrective work.
- D. Do not cut or abrade finishes that cannot be completely restored in the field. Return items with such finishes to the shop for required alterations, followed by complete refinishing or provide new units as required.
- E. Install concealed gaskets, joint fillers, insulation and flashings as the work progresses, so as to make work weathertight, soundproof or lightproof as required.
- F. Restore protective coverings that have been damaged during shipment or installation of the work. Remove protective coverings only when there is no possibility of damage from other work yet to be performed at the same location.
 - 1. Retain protective coverings intact and remove simultaneously from similarly finished items to preclude non-uniform oxidation and discoloration.
- G. Field Welding: Comply with applicable AWS specification for procedures of manual shielded metal-arc welding, for appearance and quality of welds made, and for methods used in correcting welding work. Weld connections that are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed welded joints smooth and restore finish to match finish of adjacent surfaces.
- H. Corrosion Protection: Coat concealed surfaces of aluminum and steel which will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

- I. Adjust ornamental metalwork prior to anchoring to ensure matching alignment at abutting joints.
- J. Install items as detailed in the drawings; for manufactured items, install as recommended by the Manufacturer, unless indicated otherwise.
- K. Coordinate with other trades involved.

3.05 PROTECTION

- A. Protect finishes of ornamental metalwork from damage during construction period by use of temporary protective coverings approved by ornamental metal manufacturer. Remove protective covering at time of Substantial Completion.
- B. Restore finishes damaged during installation and construction period so that no evidence remains of correction work. Return items which cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION

LIST OF SUBMITTALS

<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>
Product Data: (Each Item)	_____	_____
Shop Drawings: (Each Item)	_____	_____
1. Locations, materials, sizes, shapes, details		
2. Fastening, anchorage, connections, templates.		
Structural Design & Calculations:	_____	_____
Samples:	_____	_____
1. Hardware items		
2. Ornamental metal items (Upon request)		
3. Finish samples		
Qualification Data:	_____	_____
1. Fabricator		
2. Installer		
3. Professional Engineer		
Warranty	_____	

* * *

SECTION 07270
FIRESTOPPING/SMOKE SEALS

PART 1 - GENERAL**1.01 DESCRIPTION OF WORK**

- A. Provide firestopping at all penetrations and juncture joints of fire-rated walls, floors and ceilings in accordance with the requirements of the NYC Building Code.
- B. Firestopping and Smoke Seals shall be provided, but not limited to the following specific locations:
 - 1. Penetrations for the passage of duct, cable, cable tray, conduit, piping and electrical busways and raceways through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor slabs and floor/ceiling assemblies), and vertical service shafts.
 - 2. Openings between floor slabs and curtain walls and fire rated walls and curtain walls.
 - 3. Openings between structurally separate sections of walls or floors.
 - 4. Construction Joints between the top of walls and floor or roof slab and steel deck assemblies, or, concrete floor or roof slab.
 - 5. Vertical service shafts at each floor level.
 - 6. Expansion joints in walls and floors.
 - 7. Openings and penetrations in fire-rated partitions or walls containing fire doors.
 - 8. Locations shown specifically on the Drawings.
- C. Where firestopping will be exposed to public view, select firestopping material/assembly that can be painted as permitted by the assembly. Paint shall be as approved by the manufacturer and color shall match adjoining painted areas.

1.02 REFERENCES

- A. References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated

by governing codes or regulations, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

1. American Society for Testing and Materials (ASTM)
2. Underwriters Laboratories, Inc. (UL)
3. National Fire Protection Association (NFPA)
4. Warnock Hersey

1.03 **DEFINITIONS**

- A. Penetration: Any opening or foreign material passing through or into a fire-rated barrier.
- B. Fire-Rated: Have the ability to withstand the effects of a standard fire exposure for a specified time period, as determined by qualified testing.
- C. Fire-Rated Barrier: A floor, wall, partition or floor-ceiling assembly able to withstand a standard fire and hose stream test without failure.
- D. Fire resistance rating: The ability of a structure to act as a barrier to the spread of fire and to confine it to the area of origin. Ratings are expressed in hours and apply to beams, columns, floors, ceilings, roofs, walls and partitions.
- E. Firestopping: A means of sealing openings in fire-rated barriers to preserve or restore the fire resistance rating.
- F. Firestop System: A material, or combination of materials, installed to retain the integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke or gases through penetrations in fire-rated barriers.
- G. F Rating: The time period that the through-penetration firestop system limits the spread of fire through the penetration when tested in accordance with ASTM E814.
- H. T Rating: The time period that the penetration firestop system, including the penetrating item, limits the maximum temperature rise to 325°F (163°C) above its initial temperature through the penetration on the non-fire side when tested in accordance with ASTM E814.

1.04 DESIGN REQUIREMENTS**A. Technical Requirements**

1. Firestopping materials shall be UL Classified as "Fill, Void or Cavity Material" for use in Through-Penetration Firestop Systems.
2. Firestop Systems shall provide a fire resistance rating at least equal to the hourly resistance rating of the fire-rated barrier and resist passage of smoke and other gases.

B. General Considerations

1. Firestop Systems do not re-establish the structural integrity of load bearing partitions. The Contractor shall consult the Authority's Representative prior to penetrating any load bearing assembly.
2. Firestop systems are not intended to support live loads or traffic. Contractor shall consult the Authority's Representative if there is reason to believe these limitations may be violated.

1.05 SUBMITTALS**A. Product Data**

1. Submit manufacturer's product information for each type of firestopping/smoke seal and assembly installed, including application instructions and specifications.
2. Product data for paint to be used indicating compliance with the related firestopping/smoke seal assembly used.

B. Shop Drawing

Submit shop drawings of each firestopping or smoke seal system/assembly to be installed in the project, showing all parts of the system, required clearances.

C. Quality Control Submittals**1. Certificates**

- a. Furnish manufacturer's certification that materials meet or exceed specification requirements for each of the performance

tests specified in Part 2. Provide testing certification.

- b. Furnish applicator's certification that material has been completed as specified to meet fire resistance ratings, thickness requirements, and application requirements of the applicable assembly.
- c. Furnish UL, BSA, MEA, or OTCR approval of material.
- d. Furnish certificate stating each material is 100% asbestos free.

2. Contractor Qualifications

Provide proof of Manufacturer and Applicator qualifications specified under "Quality Assurance".

D. Mock-up

Provide mock-up as indicated under Quality Assurance.

E. Guarantee

- 1. Contractor and installer's installation guarantee.

F. Low Emitting Materials Compliance Submittals.

- 1. Provide documentation for each sealer to be used on site, indicating that the sealers comply with low V.O.C. requirements as stated in Specification Section G01600.

1.06 QUALITY ASSURANCE

A. Qualifications

- 1. Manufacturer: Company specializing in the manufacture of firestopping/smoke seal materials to be used in this Contract shall have a minimum of five years experience.
- 2. Installer: All firestopping Work shall be performed by a Subcontractor who will be acceptable to the firestopping manufacturer in the application of its products and systems and have a minimum of three years experience and shall have worked on at least two projects with similar quantities of materials used.

B. Regulatory Requirements

1. Building Code: Material and application shall meet the requirements for firestopping materials in accordance with the NYC Building Code.
2. Material must have UL or NYC BSA, MEA or OTCR approval for each assembly utilized. Comply with the following for firestopping that is required to be in compliance with BC 713 of the 2014 NYC Building Code:
 - a. ASTM E84 - Surface Burning Characteristics of Building Materials.
 - b. ASTM E814 - Fire Tests of Through Penetration Firestops.
 - c. UL 1479 - Fire Tests of Through-penetration Firestops.
 - d. UL - Fire Resistance Directory; Through-Penetration Firestop Systems (XHEZ), and Fill, Void or Cavity Materials (XHHW).
 - e. UL 723 - Standard Test Method for Surface Burning Characteristics of Building Materials.

C. Manufacturer's Certification

1. Manufacturer shall provide written certification stipulating that its products and systems used in this Project, if installed in accordance with the manufacturer's recommendations, shall provide the firestopping specified in this Section, as indicated by its UL rating for that specific installation.
2. The certification shall not include either or both of the following statements, or variations thereof:

"Owner or User shall determine suitability of the product or system for its intended use and assume all risks and liabilities connected therewith".

and,

"Owner or User shall test application of product or system for its specific use".

D. Mock-up

1. Install, on representative substrates (on site), one mock-up of each type of firestopping system to be used on Project, for each fire rating required and for each type of wall, floor, and ceiling. Acceptable mock-up installations may remain as part of the completed work.
2. **Where firestopping system is intended to be painted, separate mock-up(s) including painting shall also be provided. Such mock-up may not be part of the completed work.**

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original, unopened packages bearing name of manufacturer, product identification, and the proper UL labels for fire hazard and fire-resistance classification.
- B. Reject damaged packages found unsuitable for use and remove from job site.
- C. Store materials off ground, under cover, and away from damp surfaces.
- D. Keep materials dry at all times. Wet material shall be discarded.
- E. Rotate stock material and use prior to expiration date.

1.08 ENVIRONMENTAL REQUIREMENTS

- A. Maintain air and substrate temperature at a minimum temperature of 50°F for 24 hours before, during, and for 24 hours after application of the material or as required by the product literature, which ever is more stringent. Contractor shall provide enclosures with heat to maintain temperatures.

1.09 GUARANTEE

- A. Submit a guarantee, executed by the Contractor and co-signed by the installer, agreeing to repair/replace firestopping work performed under this Contract which has cracked, flaked, dusted excessively, peeled, or has separated or fallen from the substrate due to defective workmanship for a period of two (2) years from the date of substantial completion.

PART 2 - PRODUCTS**2.01 MANUFACTURERS**

- A. Hilti Construction Chemicals, Inc., Tulsa, OK.
- B. The Carborundum Company, Niagara Falls, NY.
- C. 3M Fire Protection Products, St. Paul, MN.
- D. Tremco Commercial Sealants & Waterproofing, Beachwood, Ohio
- E. Specified Technologies, Inc., Somerville, NJ
- F. W. R. Grace & Co., Macungie, PA
- G. RectorSeal Corp., Houston, TX

2.02 MATERIALS

- A. Grout and sealant systems, as well as integral firestopping sleeves and membranes, shall meet or exceed requirements as specified in Part 1 of this Section and shall be acceptable to the Authority.
- B. Listing of manufacturer does not mean that manufacturer has firestopping assemblies for all conditions to be encountered in the Work. Contractor is responsible for selection of material and system appropriate to the condition.
- C. Through-penetration firestop systems shall meet the requirements of ASTM E814 or UL 1479, which include, but are not limited to, the following:
 - 1. Prevent flame pass-through.
 - 2. Restrict temperature to not exceed 325°F over ambient on side of assembly opposite flames.
 - 3. Provide a positive smoke seal.
 - 4. Withstand hose stream test with a minimum positive pressure differential of 0.01 inch (2.49 pa.)
 - 5. Provide an F rating of not less than the required fire rating of the wall penetrated.
 - 6. Provide an F rating and a T rating for floor penetrations of not less than 1 hour but not less than the required fire rating of the floor penetrated, except as follows:

- a. Floor penetrations contained and located within the cavity of a wall do not require a T-rating.
 - b. Metallic piping or tubing penetrating a single fire rated floor, having a maximum 6" diameter can be firestopped with concrete, grout or mortar of thickness to maintain the fire rating of the floor penetrated. No limit to the number of floors penetrated if the area of the aggregate area of penetration does not exceed 144 square inches in any 100 square feet of floor area.
- D. Firestopping materials shall be asbestos-free, emit no toxic or combustible fumes and be capable of maintaining an effective barrier against flame, smoke, gas, and water in compliance with requirements of this Section.
 - E. Firestopping materials/systems shall be flexible to allow for normal movement of building structure and penetrating items(s) without affecting the adhesion or integrity of the system.
 - F. Firestopping materials shall not require hazardous waste disposal of used containers/packages.
 - G. On insulated pipe, the fire-rating classification must not require the removal of the insulation.
 - H. Firestopping materials shall be free of solvents. Shrinkage while curing shall not exceed shrinkage experienced during specified testing. Firestopping shall remain in complete contact with adjacent construction when fully cured.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine and confirm the compatibility of surfaces to receive firestopping materials. Verify that surfaces are sound, clean and dry and are ready to receive the firestopping.
- B. Verify that penetration elements are properly located and securely fixed, with the proper space between the penetration element and surfaces of the opening.

3.02 PREPARATION

- A. Protect adjacent surfaces and equipment from damage.
- B. Clean surfaces of opening.

3.03 INSTALLATION

- A. Install firestopping system in strict accordance with the manufacturer's instructions to obtain/maintain the fire-rating required at the specific location. The Contractor and the Authority shall be immediately notified of conditions that will not allow the proper installation of the material to achieve the required rating, such as the annular space between the penetration and sleeve not being wide enough to meet the requirements of the assembly.
- B. Provide escutcheons for piping at each side of penetration when subject to view and/or if required by the UL assembly.
- C. For firestopping to be painted, do not paint until special and/or progress inspections have been completed and are acceptable to the Special Inspector.

3.04 FIELD QUALITY CONTROL**A. Special Inspection**

- 1. The Authority will assign under the requirements of Section BC 1704.27 a Special Inspector who will inspect the firestopping/smoke seal installation to meet both the Special and Progress Inspection requirements of the 2014 NYC Building Code.
- 2. The Special Inspector will make inspections and any testing deemed necessary.
- 3. Special/Progress inspections will be performed in accordance with both paragraphs 10.9.1 (witnessing) and 10.9.2 (destructive verification) of ASTM E2174. The inspector will witness and verify firestopping and smoke sealing installations. The installation process of a minimum of 10% of all firestopping/smoke seals shall be witnessed and 2% of all firestop/smoke seal installations will be verified utilizing destructive means.

B. Nonconforming Firestopping/Smoke Seal Installation

- 1. When inspection indicates firestopping does not comply with the required assembly, remove and replace firestopping. Failures will result in additional areas of destructive testing.
- 2. Areas of repair or replacement will be reinspected for compliance to the approved assembly. The costs for additional inspections and testing as

required by the inspector shall be borne by the Contractor.

C. Contractors Responsibility for Quality Control

1. Inspect all installations to ensure that all work meets the requirements specified as the Work progresses.
2. Cooperate with the Special Inspector performing Special and Progress Inspections. Provide all access, including scaffolding and ladders. Provide a minimum of 72 hours notice prior to each day of firestopping installation to ensure Inspector is available to witness or verify the requisite number of installations.
3. The Contractor shall include all cost of complying with inspections performed in accordance with ASTM E2174.
4. Do not cover firestopping work until it is accepted and approved by the Special Inspector.
5. The Contractor shall include repair of all firestopping and smoke sealing damaged as a result of the ASTM E2174 destructive verification requirements.
6. The Contractor shall replace all firestopping/smoke sealing of a certain type if 10% of the witnessed or verified types are determined to be non-compliant. This replacement shall be at no cost to the SCA.

3.05 CLEANING

- A. Remove excess materials, droppings, and debris; remove excess materials from adjacent surfaces.

3.06 PROTECTION

- A. Protect firestopping installations from damage until completion of all Project Work.

END OF SECTION

LIST OF SUBMITTALS

<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>
Product Data:	_____	_____
1. Manufacturer's product and installation instructions		
2. Paint data		
Shop Drawings	_____	_____
1. Each firestopping or smoke seal system		
Certifications:	_____	_____
1. Mfr's. certification that materials and systems meet specified requirements test reports		
2. Completion of firestopping in accordance with Building Code and the Specifications		
3. UL or MEA, BSA, OTCR approval of systems and materials		
4. Asbestos-free certification		
Qualifications	_____	_____
1. Manufacturer		
2. Applicator		
Mock-up Samples:	_____	_____
1. Each type of substrate, each Fire-rating		
2. Mock-up with finish paint		
Guarantee:	_____	_____
1. Firestopping/smoke seals		
Low Emitting Materials:	_____	_____
1. Documentation of VOC content for each sealer used inside the building to show compliance with Section G01600.		

* * *

SECTION 07565
COLD FLUID-APPLIED RESIN ROOFING - PROTECTED
MEMBRANE KEMPEROL SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. Provide fluid-applied resin membrane Kemperol roofing system, and all other ancillary work, including all necessary and ancillary and auxiliary materials, where indicated on Drawings including all penetration flashings, miscellaneous flashing work, and all required accessories (fasteners, adhesives, etc.). All Kemperol roofing system shall be installed as per manufacturer's installation instructions and modification with appropriate accessories without any additional cost to the Authority.
- B. Several different types/chemistries of material systems are included in this specification. Design documents may indicate a certain material and detailing which shall be considered as the "Basis of Design". The Contractor shall incorporate details and material as required by the manufacturer and provide protection as required due to varying unpleasant odors levels, temperature conditions, etc. associated with the actual material selected.
- D. Not all manufacturers may be able to address all details that are part of the project with their material, such as field-fabricated flashings. Manufacturer and Contractor are to verify that the product the Contractor proposes will be able to address all conditions on the project. If the material cannot, the Contractor is to select material that will.

1.02 RELATED SECTIONS

- A. Flashing and Sheet metal.....Section 07600
- B. Joint Sealers.....Section 07900

1.03 REFERENCES

- A. References and industry standards listed in this Section are applicable to the Work. Unless more restrictive

criteria or differing requirements are explicitly stated in the Specifications, or mandated by governing codes or regulations, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

- B. ASTM International (ASTM).
- C. Underwriters Laboratories, Inc. (UL).
- D. National Roofing Contractors Association (NRCA).
- E. Factory Mutual Global (FM)

1.04 SUBMITTALS

A. Membrane System Product Data

1. Manufacturer's current standard printed product literature indicating characteristics of membrane materials, flashing materials, components, and accessories, product specification and installation instructions for each waterproofing material required. Include data substantiating compliance with specification requirements provided in Part 2 of this Section.
2. Provide copy of warranty to be submitted at end of the project. Warranty is to specifically indicate removal and replacement of overburden.

B. Shop Drawings

1. Submit installation details for roofing systems. Provide an overall detail showing the overall roof system cross section with all roof components and, as a minimum, details at drains, at reinforcing, at flashing, at terminations, at joints in structure below, at intersection of horizontal and vertical surfaces, at penetrations, and at roof parapets.
 - a. Submit details for typical and non-typical conditions of Project. Manufacturer's standard data sheets are not acceptable for shop drawings.
 - b. On the details, indicate and identify materials to be incorporated in the work as well as the

dimensions, thickness of each material, and relationships to adjacent construction.

- c. When there is a proposed deviation from the Contract Documents, submit the revised detail labeled as such for approval.
- D. Samples: Submit the following, with manufacturer's printed product identification on each item:
 - 1. Flashing and membrane sample w/reinforcement and indicating finish color, 6"x6".
 - 2. Reinforcing Sheets: Each type required for project, 12" x 12".
- E. Quality Control Submittals
 - 1. Fire Hazard Certification
 - a. Written certification that the entire roof assembly, including the specific insulation, has been tested in conjunction with the type of structural roof deck and roof slope applicable to the project and has achieved an Underwriters Laboratories or Factory Mutual Class A external fire resistance rating.
 - b. Certification: Letter from Underwriters Laboratories or Factory Mutual, or a copy of the Underwriters Laboratories or Factory Mutual classification listing for the roofing system.
 - 2. Material Certifications
 - a. Letter from the roofing membrane manufacturer certifying that the insulation, drainage

composites, and other such materials are approved for use with the roofing system.

- b. Certification of single source for all materials.

3. Qualifications

- a. Membrane Manufacturer
- b. Applicator's Certifications
- c. LVEIT firm qualifications

F. Test Reports

- 1. Evaluation of moisture content of substrate materials.
- 2. Daily Reports of the following, kept in a log book, with the data taken at the beginning and end of each work shift:
 - a. Temperature Charts (air and substrate)
 - b. Relative Humidity (RH) and Dew Point
 - c. Substrate moisture content
- 3. Evaluation of tensile bond strength of membrane to substrate, if requested.

G. Contract Closeout Submittals

- 1. Contractor's 2-year guarantee
- 2. Manufacturer's 25-year guarantee

1.06 QUALITY ASSURANCE

A. Qualifications

- 1. Membrane Manufacturer

- a. Company specializing in manufacturing the products specified in this section or similar with minimum of 5 years of successful documented experience. Membrane manufacturer shall submit the following certificates for review:
 - 1) Substrates and conditions are acceptable for purpose of providing specified warranty.
 - 2) Material supplied shall meet the specified requirements.
 - b. Source Control: Obtain primary materials from single source; provide secondary materials only by manufacturers recommended by primary materials manufacturer.
2. Contractor
- a. The Contractor installing the system shall be trained and certified by the membrane manufacturer. The Contractor's personnel shall be certified to apply the specified material/systems. Application personnel shall wear Certification Badges at all time when mixing and applying materials.
 - b. The Contractor shall have minimum 3 years of experience in the installation of fluid-applied roofing and waterproofing systems.
3. Roofing Installation Qualifications
- a. Roofing Firm Qualifications
 - 1) Installation of a minimum of 5 waterproofing systems of similar type specified herein.

(List last 5 such jobs, including address, type of system, square footage, date installed and owner/agent with whom contracted).
 - 2) In continuous operation of installing such waterproofing systems for 3 years or more under the same company name.

- 3) Shall be certified by or have a certificate of training from the roofing material manufacturer.

b. Project Foreman Qualifications

(Note: For field foremen to be assigned to this Project, identify and substantiate).

- 1) Installation of a minimum of 5 waterproofing systems of type specified herein or similar for which this individual served as field foreman in direct responsible charge of all waterproofing work crews.

(Note: List last 5 such jobs, including address, type of system, square footage, date installed and owner/agent with whom contracted, and name of waterproofing firm with which employed).

- 2) Successful completion of a formal instructional and training program for the installation of the specified waterproofing system, as evidenced by:

- a) A certificate of journeyman roofer/waterproofer as issued under a union apprenticeship-journeyman training program duly registered with the New York State Department of Labor (or other State Labor Department); or

- b) A certificate or diploma issued by a vocational training school or national roofing/waterproofing manufacturer attesting to successful completion of an equivalent formal training program, (Submit copy of certificate for above); or

- c) A minimum of 5 years of practical experience in the installation of all aspects and details of the specified waterproofing system including related sheet metal work as determined from a pre-

qualification interview conducted by the Authority's Facilities Inspection Division.

- 3) Must be able to read and communicate in English and be able to read construction drawings and specifications.

4. Low-Voltage Electric Integrity Testing (LVEIT) Firm Qualifications: Engage the services of an LVEIT Consulting firm to perform testing of all membranes. Obtain from the membrane manufacturer the name of an LVEIT firm(s) they will accept to provide the report that will be used as part of the basis for the membrane manufacturer issuing the warranty. The firm shall have no less than a 5-year track record in the use of LVEIT technology.

B. Buildings Department Requirements

Comply with all requirements of the New York City Department of Buildings.

C. Fire Hazard Classification

The roof system assembly shall have an Underwriters Laboratories or Factory Mutual Class A External Fire Resistance rating; as determined by tests conducted in conformity with UL 790 or ASTM E108.

1. The roof system and all its components, which includes a specific generic type of insulation and in some instances a specific name brand insulation, shall have been tested in conjunction with the type of structural roof deck and roof slope applicable to the project.

D. Company Field Advisor

Secure the services of a Company Field Advisor of the membrane manufacturer for a minimum of 30 working hours. The Field Advisor shall be certified in writing by the manufacturer to be technically qualified in design, installation, and servicing of the required products. Personnel involved solely in sales do not qualify. The Field Advisor shall be present at the beginning of the actual membrane installation for the purpose of:

1. Verifying that conditions are satisfactory for installation of the membrane.

2. Rendering technical assistance to the Contractor regarding installation procedures of the system.
3. Familiarizing the Authority's Representative with all aspects of the system including inspection techniques.
4. Answering all questions that might arise.

The Field Advisor shall also make, at a minimum, weekly visits during the active installation of the Work, and shall certify roof upon completion.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Delivery of Materials: Materials shall be delivered to the project site in manufacturer's unopened containers with manufacturer's brand name, instructions for use, all identifying numbers clearly marked thereon.
- B. Storage
 1. Store containers of materials on end, on wood or other clean rigid pad, a minimum of 6" off the ground, to prevent adherence of foreign material. Roll goods shall be stored on end in unopened packages.
 2. Store in a neat, safe manner, clean and dry, protected from water, sunlight, excessive heat and humidity and open flame.
 3. Materials shall be stored per manufacturer's specifications and shall never be allowed to freeze.

1.08 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply waterproofing membrane during or with the threat of inclement weather.
- B. Application of cold fluid-applied reinforced resin membrane may proceed while air temperature is between 40°F and 85°F providing the substrate is above the dew point. Variations based on material selected shall be submitted from the manufacturer and reviewed by the Designer of Record. For PMA and PMMA based materials, the temperature range is typically to be between 32°F and 95°F.

- C. When ambient temperatures are at or expected to fall below 50°F, or at 75°F or higher, follow recommendations for weather related additives and application procedures.
- D. Ensure that substrate materials are dry and free of contaminants. DO NOT commence with the application unless substrate conditions are suitable. Contractor shall demonstrate that substrate conditions are suitable for the application of the materials by applicable testing as required per manufacturer.
- E. Condition all materials as required per manufacturer prior to application.

1.10 GUARANTEE AND WARRANTY

A. Contractor's Guarantee

- 1. The Contractor agrees as part of this Contract that all Roofing, Flashing, Sheet Metal Work, Parapet, Coping, and the entire envelope of the roofing system of this contract will be watertight and free from defects due to workmanship and material for a period of two years. Time of guarantee shall commence with approval of the substantial completion payment for the Work, or the final payment for the work if no substantial completion payment is made.
- 2. Should any defects develop or any leaks occur during the period of guarantee, such defects or leaks shall at once be remedied and all damage caused by such defects or leaks shall be repaired and corrected, including all overburden removal and replacement/reinstallation, without cost or expense to the Authority.
- 3. In the event of failure on the part of the Contractor to commence within three (3) days after the notification by the Authority, any Work required to be performed under the terms of the guarantee, and to complete the same within a reasonable time thereafter, the Authority may have such work done by other parties and charge the cost thereof to the Contractor and the Surety herein.
- 4. The Performance Bonding Company's guarantee shall be for the entire two-year guarantee period.

B. Manufacturer's Warranty

1. Furnish the membrane manufacturer's printed single source No-Dollar-Limit 25-year warranty for the Work of this Section. The roof system shall be warranted to remain watertight for twenty-five years.
The warranty shall include but not be limited to, repair of leakage caused by defects in materials and/or workmanship. The warranty shall include but not be limited to, repair or replacement of components of the roofing system that fail in materials or workmanship. Failure includes roof leaks.
3. This warranty is in addition to the Contractor's guarantee described in this Section.

1.11 PROTECTION

- A. Against Loads: Protect work of this Section against concentrated loads and any other loads or equipment that would damage the materials or work. Use insulation and 3/4" thick minimum plywood or other approved means to safely distribute the loads.
- B. Against Traffic: Do not permit traffic on work of this Section, except for workmen doing the work, during the installation and after the installation until membrane systems are protected. Use 3/4" thick minimum plywood and insulation for temporary pathways if required.
- C. Rejection of Damaged Work
 1. Materials or installed work damaged during project construction activities will be subject to rejection.
 2. Rejected materials or work must be immediately removed and replaced with new materials, at no additional cost to the Owner.

PART 2 - PRODUCTS**2.01 MANUFACTURER**

- A. The following manufacturer and product systems shall be construed to mean the establishing of a minimum quality and performance standards for the specified item. Minimum thicknesses are indicated but each manufacturer

will have a specific minimum thickness that may be greater than that provided to meet the performance requirements and warranty provisions and must be provided if a thicker membrane is required. All other products must be submitted to the Authority for approval before they are deemed equal:

1. Kemper System America, Inc., West Seneca, NY,
2. Siplast, Inc., Irving, TX
3. SOPREMA, Inc., Wadsworth, OH
4. ALT Global/WestWood, Fairfield, NJ
5. Sika Corporation, Lyndhurst, NJ
6. Johns Manville, Denver, CO
7. Tremco, Inc., Beachwood, OH

2.02 RESIN ROOFING SYSTEM DESCRIPTION

A. Urethane Based-Resin Roofing

Odorless, 100% solid, color formulated, UV and color-stable cold fluid-applied reinforced polyurethane waterproofing membrane with a 360 degree needle punched non-woven 165 grams/m² polyester reinforcing fleece or a 100% stitch-bonded polyester reinforcing mat, for a finished dry film membrane minimum thickness of 90 mil; (colored aggregate topcoat surfacing as selected by Authority from manufacturer's standard palette of colors. Subject to compliance with requirements, provide products manufactured and supplied by the following:

1. Roofing system shall meet or exceed such wind performance criteria as would be required to achieve the equivalent of a FM I-90 classification.
2. Material shall obtain a Class A fire resistance rating.
3. Membrane - Physical Properties:

Property	Value	Test Method
Physical state	Cures to solid	-
Min thickness (165 fleece or 100% stitch-bonded polyester reinforcing mat)	≥90 mils	-
Tensile strength @ break	≥70 lbf – CMD,100 lbf - MD	ASTM D4073

Elongation	≥30%	ASTM D5147
Tear resistance	≥60 lb/in	ASTM D4073
Surface hardness	≥70	ASTM D2240
Crack spanning	2mm/0.08 inch	-
Resistance to temperatures up to (short term)	250°C/482°F	-
Usage time*	30 minutes	-
Rainproof after*	2 hours	-
Solid to walk on after*	24 hours	-
Solid to drive on with air rubber tires after*	48 hours	-
Overburden may be applied after	2 days	-
Completely hardened after	3 days	-
Solid Content	100 %	-
Solvent content	0%	-
*all times are approximate and depend upon wind, humidity and temperature.		

4. Flashings

Membrane Flashings: Same resin material as field membrane with 165 grams/m² fleece reinforcement **or** with a 100% stitch-bonded polyester reinforcing mat.

5. Ancillary Materials

a. General

Provide related waterproofing materials as manufactured by or acceptable to the membrane manufacturer, including flashings, adhesives, sealants, reinforcing fabric and protection sheet.

b. Epoxy Primer for Concrete/Masonry (Protection from Substrate Wetness)

Two-Component, solvent free epoxy primer for use in improving adhesion of membrane to cementitious/masonry substrate surfaces. Monitor application rate and adjust depending on substrate absorbency.

c. Primer for Other substrates

1. Two-Component, solvent free, high solids polyurethane resin for use in improving adhesion of Kemper membrane to non-porous substrate surfaces, including metal, glass, plywood, pvc, and some existing membranes and coverboards. Monitor application rate and adjust depending on substrate absorbency.

2. Water-based, quick-drying, brush-grade one-part primer for use as an adhesion promoter for urethane sealants and coatings to non-porous surfaces for Tremco membrane.
3. Water-based, polymer modified primer that promotes adhesion for the Tremco membrane to new and aged asphaltic or single ply membranes.
4. One-Component, solvent-based polyurethane primer for use in improving adhesion of Tremco membrane to existing membrane for tie-ins, modifications, and repairs.

d. Cold Activator

Additive specifically designed to increase resin catalyzation process at ambient temperatures below 50°F (10°C). Cold activator to be used with white resin prior to mixing of multicomponent resin. Continuously, monitor substrate surface temperatures.

e. Tools, Accessories, and Cleaners

Supplied and/or approved by membrane manufacturer for product installation.

f. Surfacing Aggregate Topcoat

Kiln-dried Surfacing Silica Sand shall be washed kiln-dried and dust free with the following size specification:

1) Non-vehicular:	0.45 - 0.55 mm
2) Vehicular:	0.70 - 1.20 mm

g. Leveling Mix of Resin and Sand

Silica sand shall be washed, kiln-dried, and dust-free, size as approved by membrane manufacturer. Mixing Proportion shall be a ratio of resin to sand at 1 by volume or as approved by membrane manufacturer.

- h. Fabric Reinforcing Sheet: polyester fabric with the following physical properties; as recommended by the manufacturer of the membrane.

<u>Property</u>	<u>Test Method</u>	<u>Requirement/Result</u>
Elongation	ASTM D2523	≥42% min.
Tear Strength	ASTM D2263	≥14 lb.
Breaking Strength	ASTM D2523	≥18 lb.

- i. Field Fabricated Control or Expansion Joint Flashing

Two layers of cold fluid applied reinforced waterproofing membrane with a 360 degree needle punched non-woven 165 grams/m² polyester reinforcing fleece bottom layer and 165 grams/m² polyester fleece top layer, or with a 100% stitch-bonded polyester reinforcing mat in both layers, for a finished dry film membrane thickness of 90 mil nominal minimum per ply (or greater if recommended by manufacturer); (colored top surfacing as selected by Authority from manufacturer's standard palette.

6. Provide products manufactured and supplied by the following:
- a. Kemperol 2K FR UV and color-stable resin system by Kemper System America, Inc
 - b. AlphaGuard BIO by Tremco, Inc.

D. Membrane Color

1. Provide STONE GRAY by Kemperol or comparable color by another manufacturer.

2.03 AUXILIARY MATERIALS

- A. General: Provide related waterproofing materials as manufactured by or acceptable to the membrane manufacturer.
- B. Wood Nailers

Pressure treated meeting the AWPA U1-15 standard, Use Class UC3A, #2 or better lumber.

C. Miscellaneous Fasteners

Appropriate for purpose intended and approved by membrane system manufacturer; length required for thickness of material (with metal washers); as supplied by membrane manufacturer.

2.04 PRE-INSTALLATION CONFERENCE

- A. Before the roofing Work is scheduled to commence, a conference will be called by the Authority's Representative at the site for the purpose of reviewing the Drawings and the Specifications and discussing requirements for the Work. The conference shall be attended by the Contractor, the authorized roofing applicator, the membrane manufacturer's Company Field Advisor, the Authority's Construction Inspection Division Roofing Inspector, the Architect/Engineer of Record's representative, and all trades that works penetrate or interface with the membrane (Plumbing, mechanical, electrical, lightning protection).
- B. Prior to the conference, the Contractor shall have registered the project with the membrane manufacturer and shall have submitted the membrane manufacturer's letter of intent to warranty the project. A copy of the letter is to be brought to the conference.
- C. The Authority's CID Inspector will specify the milestone inspection requirements e.g. initial substrate approval, moisture verification and/or testing and primer installation in the pre-installation conference.

PART 3 - EXECUTION

3.01 VERIFICATIONS OF CONDITIONS

Not Used.

3.02 EXAMINATION

- A. Verify that Work of other trades has been completed.
- B. Examine surfaces for inadequate anchorage, foreign material, moisture, and unevenness that would prevent the

execution, and quality of application, of the system as specified.

- C. Do not proceed with application of system until defects are corrected.
- D. Verify substrates prepared and in place.

3.03 PREPARATION

- A. Coordinate the work with the installation of associated work as the work of this section proceeds.
- B. Building components shall be protected adequately (with tarp or other suitable material) from soil, application. Contractor shall be responsible for preventing damage from any operation under its Contract. Any such damage shall be repaired at Contractor's expense to Authority's satisfaction or be restored to original condition.
- C. Provide barricades, retaining ropes, safety elements active/passive) and any appropriate signage required by OSHA, NIOSH, and NSC and/or the Authority or designated Representative.
- D. Determine substrate moisture content through-out the work and record with Daily Inspection Reports or other form of reporting acceptable to the Owner or his designated representative and membrane manufacturer. Utilize procedure recommended by roofing manufacturer (e.g. ASTM D4263, NRCA deck dryness test, with heated waterproofing, etc.)

3.04 REMOVALS AND PROTECTION

- A. Not Used.

3.05 PREPARATION OF SUBSTRATE

- A. Prepare surfaces as follows:
 - 1. Inspect substrates, and correct defects before application of new roofing. Fill all surface voids greater than 1/8 inch wide with an acceptable fill material.
 - 2. Remove all ponded water, snow, frost and/or ice from the work substrate prior to installing new waterproofing work.

3. The final substrate of membrane shall be clean, dry, free of loose, spalled or weak material, oil, grease, contaminants, abrupt changes in level, waterproofing agents, curing compounds, and free of projections that could damage membrane materials and shall comply with ASTM D5295.
4. Contractor is responsible for verification of substrate dryness suitable for membrane application.

B. Concrete

1. New concrete shall be cured a minimum of 28 days in accordance with ACI 308 unless fast set concrete fill specified in Section 03735 is used, in which case the time may be reduced to one days if the concrete passes the moisture test.
2. New or existing concrete shall be free of oil, grease, curing compounds, loose particles, moss, algae growth, laitance, friable matter, dirt, bituminous products and previous waterproofing materials or any other material that could affect adhesion of the waterproofing system.
3. New or existing concrete shall be dry with a maximum moisture content of five (5) percent and/or a maximum internal relative humidity of 75% when tested in accordance with ASTM D2170. Determination of moisture content shall be performed by the Contractor. Contractor shall be responsible to perform periodic evaluations of moisture content during the work. Moisture evaluation results shall be submitted in writing to the Authority or his designated Representative and Waterproofing manufacturer for acceptance. Where the substrate moisture content exceeds acceptable levels, or where moisture migration to the area below the membrane application cannot be positively eliminated, the Contractor may utilize a manufacturer approved epoxy based, moisture mitigation system in lieu of the manufacturer's typical primer. The use of moisture mitigation system shall be contingent on the written approval by Waterproofing Manufacturer's Technical Department.
4. Concrete shall be abrasively cleaned in accordance with ASTM D4259 to provide a sound substrate free

from laitance with an open concrete surface. Profile shall be CSP 2 to 4 as designated by the International Concrete Repair Institute. The surface profile is not to exceed 1/4" (peak to valley).

5. The substrate shall be sound and all spalls repaired prior to placement of the primer coat. Spalls and other deterioration shall be repaired in accordance with the requirements of the Owner or his designated Representative.
6. Areas of minor surface deterioration of 0.50" (13mm) or greater in depth shall be repaired to prevent possible ponding of the system, leading to excessive usage of primer and resin.

Extent and location of thin surface patching shall require approval of the Authority's or its designated Representative and Waterproofing Manufacturer prior to the application of any system component.

C. Masonry

1. Replace Areas of spalled or damaged bricks, and repair poor mortar joints or damaged concrete, or walls with broken, damaged copings by the Contractor in accordance with the requirements of SCA and acceptable by the roofing manufacture to receive the membrane without additional cost to SCA.
2. Where the substrate moisture content exceeds acceptable levels, or where moisture migration to the area below the membrane application cannot be positively eliminated, Contractor may utilize an approved epoxy based, moisture mitigation system in lieu of the manufacturer's typical primer. The use of epoxy shall be contingent on the written approval by Waterproofing Manufacturer's Technical Department.

- D. Steel/Metal: Clean and prepare metal surfaces in accordance with SSPC - SP3 (power tool clean) or as required by membrane manufacturer. Notch steel surfaces to provide a rust-stop. Stainless steel (series 400,300) shall be abraded to provide a rough open surface.

- E. Other Flashing Surfaces: Remove all contaminants as required by membrane manufacturer. Surface preparation shall be performed by means approved by Authority or its designated Representative.

3.06 INSTALLATION - GENERAL

- A. At the start of the installation, the system manufacturer's representative shall be present at site to advise on the work.
- B. Any substrate to receive membrane materials shall be clean, dry, free of loose spalled or weak material, oil, grease, contaminants, abrupt changes in level, waterproofing agents, curing compounds, and free of projections, which could damage membrane materials. Perform a test patch to test adhesion.
- C. Do not start any work until surfaces to be covered are suitable to receive membrane application.
- D. Where preparation of substrate materials requires the use of power driven or actuated tools, observe applicable use and safety requirements.
- E. Install the fluid-applied membrane waterproofing in accordance with the manufacturer's written instructions, except where more stringent requirements are shown or specified to provide a waterproof membrane which are show or specified to provide a waterproof membrane which does not permit water penetration into the structure.
- F. Provide flashing materials at cracks and penetration as required and with such materials and designs as recommended by the manufacturer of the fluid-applied waterproofing.
- G. Fill non-moving cracks and joints with sealant or other compounds as recommended by the fluid-applied membrane waterproofing materials manufacturer for compatibility.
- H. Prime and seal concrete if required by membrane manufacturer. Use products and methods recommended by the fluid-applied membrane waterproofing materials manufacturer.

3.07 MEMBRANE INSTALLATION

- A. General

Comply with manufacturer's instructions, except where more stringent requirements are indicated.

B. Primer Application

1. Apply primer in strict accordance with written instructions of Membrane Manufacturer. Use only approved materials, as supplied by the membrane manufacturer.
2. Do not thin primer. Determine required primer coverage for each substrate material/condition and apply in strict accordance with written instructions of Membrane Manufacturer.
3. Apply primer direct in one step utilizing a brush or paint roller. Do not allow ponding.
4. Allow primer to fully cure and become tack free for the time recommended by the manufacturer for the type of material utilized. Follow limitations on how long it can be exposed before exposure to moisture or how long it can be left open before finished material is placed. Do not apply new primer to exposed primer that is older than that permitted by the manufacturer, was prematurely exposed to moisture, or used as temporary waterproofing unless approved in writing by the Technical Department of Membrane Manufacturer.
5. Do not apply primer past the required extent of the membrane flashings termination.

C. Membrane Application

1. Mix and apply reinforced fluid-applied waterproofing membrane in strict accordance with written instructions of Membrane Manufacturer. Use only proprietary membrane resins and materials, as supplied by the membrane manufacturer.
2. Immediately prior to the application of any component of the system, the substrate shall be dry, with any remaining dust or loose particles removed using clean, dry, oil-free compressed air, industrial vacuum, cloth-wipe or a combination.
3. Apply mixed resin liberally to the prepared surface with a roller using a broad, even stroke.

4. Roll out dry polyester fleece onto the liquid resin mix, making sure the smooth side is facing up (natural unrolling procedure). The fleece will begin to rapidly saturate with the liquid resin mix. Allow fleece to saturate with resin from bottom up prior to pouring additional resin on top of surface. Roll the fleece with a medium nap roller to eliminate air bubbles, wrinkles, etc.
5. Apply additional liquid resin mix on top of fleece until fully saturated and continue to work resin. The correct amount of resin will leave no whiteness in fleece and there will be a slightly fibrous surface texture. However, allow no ponding or excessive build of the resin. The coating should be smooth and uniform.
6. Do not install the membrane on any substrate containing newly applied and/or active asphalt, materials unless approved in writing by the Technical Department of Membrane Manufacturer. Some substrates may require additional preparation before applying membrane.
7. Do not allow waste products containing petroleum, grease, acid, solvents, vegetable or mineral oil, animal oil, animal fat, etc. or direct steam venting to come into direct contact with the membrane.
8. At membrane tie-offs, clean in-place membrane with membrane manufacturer's recommended solvent when resin has cured. Allow solvents to fully evaporate before application of new resin.
9. Closely follow the Membrane Manufacturer's recommendation for hot and cold weather application. Monitor surface and ambient temperatures, including the effects of wind chill.
10. Cover membrane with insulation, filter fabric, drainage panels and ballast within time period recommended by membrane manufacturer, and not to exceed 30 days.

D. Slip-Resistant Aggregate

1. Mix and apply finish aggregates in strict accordance with written instructions of Membrane

Manufacturer. Use only proprietary materials, as supplied by the membrane manufacturer.

3.08 FLASHING INSTALLATION

A. Flashings - General

1. Provide the height of flashing for all flashing terminations as shown on the drawings. Flashing height shall be at least as high as the potential water level that could be reached as a result of a deluging rain and/or poor slope. Do not flash over existing through-wall flashings.
2. All flashings shall be terminated as required by the Membrane Manufacturer.

B. Membrane Flashings

All membrane flashings shall be installed concurrently with the waterproofing membrane as the job progresses. Temporary flashings are not allowed without prior written approval from the Authority's Architect/Engineer and membrane system manufacturers' Technical Department. Should any water penetrate the new waterproofing membrane because of incomplete flashings, the affected area shall be removed and replaced at the contractor's expense.

C. Flashing Penetrations

1. Pipes, Conduits, And Unusual Shaped Penetrations:
 - a. Flash all penetrations using reinforced fluid-applied resin membrane (with approved broadcast mineral aggregate topcoat.) Flashing material shall be the same resin and fleece reinforcement used in the field membrane.
 - b. Flash in accordance with details or recommendations by Membrane manufacturer.

D. Walls, Curbs and Base Flashings

1. Flash all base flashings with reinforced fluid-applied resin membrane, with approved broadcast mineral aggregate topcoat (if required for UV and

Fire protection). Use a reinforcing fleece bottom layer and reinforcing fleece top layer.

2. Flash in accordance with details and recommendations by membrane manufacturer.

E. Field Fabricated Control or Expansion Joint Flashings

1. Flash all expansion joints with two layers of cold fluid-applied reinforced waterproofing membrane. First layer shall reinforce the 90-degree angle change. Second layer shall be full-height flashing, and shall use the same resin and fleece reinforcement used in the field membrane.
2. Flash in accordance with the details and recommendations by membrane manufacturer.

3.09 ALKALINITY PROTECTION/BONDING LAYER/UV MEMBRANE PROTECTION

- A. Where placement of concrete, mortar or adhesive setting beds are required over sections of the waterproofing membrane or flashing, or where UV protection is required by the manufacturer for exposed areas, provide manufacturer's recommended material over the membrane as a protective/bonding measure, typically consisting of combinations of resins and broadcasted aggregate. If membrane is UV resistant, obtain a written statement from membrane manufacturer.
- B. Provide continuous cleaning with water and brush to eliminate settlement of concrete residues on in-place waterproofing membrane adjacent to area of concrete placement.

3.10 FIELD QUALITY CONTROL

- A. Progress inspections of the roofing system installation by CID's Inspector, including reviewing the temperature charts, will be done on regular visits. Roofing deficiencies are to be addressed for compliance verification prior to proceeding with the next phase of the system installation.
- B. Random tests to determine tensile bond strength of membrane to substrate shall be conducted by the Contractor at the job site using an Elcometer Adhesion Tester Model 106 or similar device. Contractor shall perform tests at the beginning of the Work, and at

intervals as required to assure specified adhesion with a minimum of three (3) tests per 5000 s.f. Smaller areas shall receive a minimum of three (3) tests. Test results shall be submitted to the Authority or his designated Representative and the membrane manufacturer. Contractor shall immediately notify the Authority or his designated Representative & membrane manufacturer in the event tensile bond test results are below specified values.

1. Adequate surface preparation will be indicated by tensile bond strength of membrane to substrate greater than or equal to 110 psi.
2. In the event the tensile bond strengths are lower than the minimum specified, additional substrate preparation is required. Repeat testing to verify suitability of substrate preparation.

C. Test Strip (if requested by the Authority)

1. When and where directed by the Authority's Representative, and before insulation is installed over the completed membrane, cut a strip thru all plies of the roofing membrane. Number of such test strips may be as required by the Representative. After removal of the strip, immediately repair the area in accordance with instructions of the membrane manufacturer. Turn the test strips over to the Authority's Representative for examination.
2. If the test strips indicate the roofing system complies with the Specifications, the Authority will bear the cost of the test strip Work.
3. If the strips indicate the roofing system does not comply with the Specifications, the Contractor shall bear the cost of the test strip Work, and shall repair or replace all roofing Work as required to comply with the Specifications, at the Contractor's expense.
4. Failure of the test strip samples to meet the Specification requirements will be cause for rejection of the Work.

3.11 JOB COMPLETION

- A. Contractor shall inspect the completed roof assembly and correct all defects.
- B. A representative of the membrane manufacturer (Company Field Advisor) shall inspect the roof assembly and notify the contractor of any defects. All defects must be corrected. The representative shall submit written certification to the Authority that representative has consulted on and inspected the work and that the materials and installation are in conformance with the manufacturer's published physical properties and installation recommendations and with the Contract Documents.
- C. Clean up all debris and equipment. Remove spatters and clean soiled surfaces. Check drains to ensure proper function.

3.12 PROTECTION

- A. Upon completion of flashings (including all associated work), institute appropriate procedures for surveillance and protection of waterproofing during remainder of construction period. Protect all areas where membrane has been installed.
- B. Protection of Installed Material
 - 1. Against Loads: Protect work of this Section against concentrated loads and any other loads or equipment that would damage the materials or work. Use boards or other approved means to safely distribute the loads.
 - 2. Against Traffic: Do not permit traffic on work of this Section, except for workmen doing the work, during the installation and after the installation until membrane systems are protected.
 - 3. Rejection of Damaged Work
 - a. Materials or installed work damaged during project construction activities will be subject to rejection.
 - b. Rejected materials or work must be immediately removed and replaced with new materials, at no additional cost to the Owner.

05/09/2023

DESIGN NO. D019998

END OF SECTION

SUBMITTALS

<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>
Product Data:	_____	_____
1. Manufacturer's specs, Catalog sheets, Installation instructions.		
2. Sample copy of mfr's 25-year warranty		
Shop Drawings:	_____	_____
1. Layout of W.P., flashings, reglets, methods of seaming, etc.		
Samples:	_____	_____
1. Each type of materials, membranes & auxiliary as indicated on Section 1.04D		
Certifications:	_____	_____
1. Certification of fire resistance rating		
2. UL certification		
3. Single source certification.		
Membrane Mfr's. Qualifications:	_____	_____
1. 5-year marketing letter		
Applicator's Qualifications:	_____	_____
1. Membrane mfr's. approval		
2. List of 5 projects and 3 years		
3. Foreman qualifications		
Contract Closeout:	_____	_____
1. Contractor's 2-Year Guarantee		
2. Mfr's 25-Year Warranty		

* * *

SECTION 07600
FLASHING AND SHEET METAL

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Provide all flashing, trim and sheet metal Work as indicated on the Drawings, as required for the completed Work, and as specified herein. The Work shall include, but shall not be limited to, the following:

1. Roof Flashings (various types)
2. Wall Flashings (various types)

1.02 REFERENCES

- A. References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by governing codes or regulations, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.
- B. Sheet Metal and Air Conditioning Contractors National Association (SMACNA).
- C. Copper Development Association (CDA).
- D. American Society for Testing and Materials (ASTM).

1.03 SUBMITTALS

- A. Shop Drawings
1. Show the manner of forming, jointing, and securing the metal flashings, trim, and other specified sheet metal items. Include expansion joint connections, and the method of forming waterproof connections to adjoining construction.
- B. Product Data
1. Catalog sheets, specifications, installation instructions for each item specified except for shop or job formed items, solder and flux.

C. Samples

1. Materials for Flashings: One 6" sq piece, for each type material specified.
2. Anchors: Two, each type required.
3. Cap Flashings: Full section, 6" long.
- .
4. Termination bar, 12" section. Termination bar fasteners, stainless steel, 3 of each type. Termination bar sealant, 1 container.

D. Guarantee

E. Certificates of qualifications as specified under Article titled "Quality Assurance".

F. Product Certificates

Certify that materials of this Section, such as copper/fabric flashing, sealants, termination bar, and fasteners, are compatible with all components of the air barrier system and other Project materials that contact them.

1.04 QUALITY ASSURANCE

A. Except as otherwise shown or specified, comply with applicable recommendations, details, and standards of CDA, and SMACNA.

B. All metal Work shall be ink-stamped at intervals, identifying

Manufacturer, type metal, and gage or thickness.

C. Manufacturer's Recommendations

For factory fabricated items, follow the manufacturer's recommendations and installation instructions unless specifically shown or specified otherwise.

D. Materials containing asbestos are prohibited.

E. Project Foreman Qualifications

1. Successful completion of a formal instructional and training program for the installation of the specified roofing/flashing systems, as evidenced by:
 - a. A certificate of journeyman roofer as issued under a union apprenticeship-journeyman training program duly registered with the New York State Department of Labor (or other State Labor Department); or
 - b. A certificate or diploma issued by a vocational training school or national roofing manufacturer attesting to successful completion of an equivalent formal training program. (Submit copy of certificate for above).

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products of this Section in such manner to protect them from damage.

1.06 PROJECT CONDITIONS

- A. Do not execute the Work of this Section unless the Authority's Representative is present, unless otherwise directed.
- B. Make the roof and all uncompleted flashings watertight at the end of each work day.

1.07 GUARANTEE

- A. The Contractor shall provide a two (2) year written guarantee, covering the flashing and sheet metal materials and workmanship. Should any defects occur during the stated period, they shall be corrected immediately, and all damage caused by such defects shall be corrected; all corrective Work shall be at the Contractor's expense.

PART 2 - PRODUCTS

2.01 MATERIALS FOR FLASHING FABRICATION

- A. Plain Copper Sheet
Cold rolled copper, ASTM B370.

C. Stainless Steel Sheet

Dead soft fully annealed stainless steel sheet, ASTM A240, Type 304 or Type 316, sulfur content .030% or less, 2D dull finish.

2.02 MANUFACTURED MATERIALS

A. Copper/fabric flashing: consisting of a full sheet of copper, weight of copper core not less than 5 ounces per square foot, permanently bonded with rubber based adhesive to and between 2 layers of fiberglass or polymer fabric. Each layer of fabric shall be 0.3 oz. per sq. ft. minimum weight, with minimum 10x20 threads per inch. Flashing shall be compatible with air barrier system, sealants, adhesives, and other adjacent materials.

1. Manufacturers/Products

- a. York Manufacturing, Inc., Sanford, Maine: Multi-Flash 500 Copper Fabric Flashing.
- b. Advanced Building Products Inc., Springvale Maine: Copper Sealtite 2000.
- c. Hohmann & Barnard, Inc., Hauppauge, NY: Copper NA.

2.03 FASTENERS

A. Nails

"Stronghold" type large flat head roofing nail.

1. For Copper: Hardened copper.
2. For Stainless Steel: Stainless steel.

B. Screws, Bolts, and other Fastening Accessories

1. For Copper: Copper or brass.
2. For Stainless Steel: Stainless steel type 316.

C. Anchors

Provide one of the following types:

1. Hammer driven anchors, consisting of a stainless steel drive pin and a corrosion resistant metal expansion shield inserted thru a stainless steel disc with an EPDM sealing washer.
2. Self-tapping, corrosion resistant, concrete and masonry screw inserted thru a stainless steel disc with an EPDM sealing washer.

D. Fasteners for Through-Wall Flashing Termination Bar

1. Tapcon Concrete Screw: stainless steel.

2.04 MISCELLANEOUS MATERIALS

A. Solder

Composition of block tin/pig lead of proportion recommended by the metal manufacturer, stamped either 50/50 or 60/40 "Warranted".

B. Flux

Paste or acid type as recommended by the metal manufacturer.

C. Type 3 Sealant (For concealed sealant joints of thru-wall cap receivers and other areas which require concealed sealant).

One part butyl rubber sealant; Pecora BC-158, PTI 707, or Woodmont chem-Calk 300.

D. Termination Bar (For thru-wall copper/fabric flashing)

Plastic. Provide material compatible with the air barrier system. York Manufacturing Co., Sanford, Maine.

E. Flashing Sealants and Adhesives

Provide products recommended in writing by the flashing manufacturer, and compatible with all adjacent materials, including components of the air barrier system. Materials containing asbestos are prohibited. Asphalt mastics and other asphaltic materials shall not be used.

1. Where low modulus silicone sealant is indicated provide ASTM C 920, single-component, neutral-

curing silicone; Class 100/50, Grade NS, Use NT, Use O.

2.05 FABRICATION

A. General: Where practicable, form and fabricate sheet metal Work in the factory or shop. Produce bends and profiles accurately to the indicated shapes. Where not indicated or specified, follow the applicable requirements of the reference standards listed in PART 1. All corners to be factory prefabricated. Hem exposed sheet metal to eliminate all sharp edges and corners.

B. Cap Flashing (one-piece): Fabricated to be spring-tight against wall/base flashing. All corners shall be factory prefabricated: mitered and lapped approximately 1" at corner, and fully soldered or welded. At expansion joints, provide v-notch splice joint with 6" lap each side.

1. Stainless Steel: 26 ga (0.018").

C. Cap Flashing (two-piece) with In-Wall, Thru-Wall, or Coping Cap Receiver; All corners of coping flashing and of cap receivers shall be factory prefabricated: mitered and lapped approximately 1" at corner, and fully soldered or welded. At expansion joints, provide v-notch splice joint with 6" lap matching three-way fabrication each side of joint. Cap flashing fabricated to be spring tight against wall/base flashing.

1. Cap Flashing: three-way mortar bond type receiver with snap fit cap flashing.

Acceptable manufacturers / products:

- a. Keystone Flashing Co., 5119 N. Second Street, Philadelphia, PA. "Keystone Two-Piece cap Flashing".
- b. Cheney Flashing Co., 623 Prospect St., Trenton, NJ. "Cheney Prefabricated Snap Lock Cap Flashing".
- c. LITSCO, Long Island Tinsmith Supply Corp., 76-11 88th St., Glendale, NY. Two-piece snap fit cap flashing; with 3-way mortar bond receiver.

- d. B & B Sheet Metal, 25-40 50th Ave. Long Island City, NY. Two-piece snap fit cap flashing; with 3-way mortar bond receiver.
 - e. WG Sheet Metal Corporation. 341 Amber Street Brooklyn, NY. Cap Flashing with 3-way mortar bond receiver.
2. Thru-wall Coping Flashing, with and without receiver: Three-way mortar bond flashing, with snap fit cap flashing for flashing with receiver. Allow for 1/2" extension of flashing beyond masonry face below stone prior to the bend for the drip to allow for raking and sealing of mortar joint below flashing for faces without receiver.

Acceptable manufacturers / products:

- a. Keystone Flashing Co., 5119 North Second Street, Philadelphia, PA. "Keystone Thru-wall Flashing".
 - b. Cheney Flashing Co., 623 Prospect St., Trenton, NJ. "Cheney 3-way Sawtooth Thru-Wall Flashing"
 - c. LITSCO, Long Island Tinsmith Supply Corp., 76-11 88th St., Glendale, NY. Thru-wall coping flashing; with 3-way mortar bond.
 - d. B & B Sheet Metal, 25-40 50th Ave. Long Island City, NY. Thru-wall coping flashing; with 3-way mortar bond.
 - e. WG Sheet Metal Corporation. 341 Amber Street Brooklyn, NY. Thru-wall coping flashing; with 3-way mortar bond.
3. Materials
- a. Stainless Steel: 26 ga (0.018").

D. Cap Flashing with Concrete Reglet

- 1. Reglet with 45-degree slot, and snap fit cap flashing. Hooked edge of cap flashing shall lock into reglet. Acceptable products: "Cheney Type-A Snap Lock Concrete Reglet"; and "Keystone Concrete Reglet".

2. Materials

- a. Stainless Steel: 26 ga (0.018").

E. Base Flashing

Note: This base flashing is not to be used for roofs; refer to Roofing Sections for roof base flashing.

1. Stainless Steel: 24 ga (0.025").

R. Thru-Wall Flashing

1. Manufactured copper/fiberglass fabric flashing.

S. Sealant Edge Flashing

1. Stainless Steel: 26 gauge, hemmed edge.

2.06 MISCELLANEOUS FABRICATED SHEET METAL ITEMS

- A. Not Used.

PART 3 - EXECUTION**3.01 EXAMINATION**

- A. Coordinate the work of this Section with other Work for the correct sequencing of items that make up the entire system of weatherproofing or waterproofing.

3.02 PREPARATION

- A. Do not install the Work of this Section unless all necessary nailers, blocking and other supporting components have been provided.
- B. Do not install the Work of this Section unless all substrates are clean and dry. Do not cover air barrier membrane until the completion of a curing period if recommended by the membrane manufacturer.

3.03 INSTALLATION**A. Isolation**

Separate dissimilar metals from each other with a dielectric coating to prevent galvanic action. Coating shall be synthetic material as required for compatibility with adjacent materials.

B. Tinning and Soldering

1. Use soldering irons (heavy coppers) as Industry Standard. Torch soldering is not acceptable.
2. Clean, flux and tin all surfaces to be soldered.
3. Sweat solder thoroughly into seams, completely filling the seam for the full width.
4. Upon completion of soldering, remove all traces of flux residue, and if required, apply a neutralizing wash followed by a clean water wash.

C. Installing In-Wall and Thru-Wall Cap Flashing Receivers, In-Wall/Through-Wall Flashing and Thru-Wall Coping (with or without receiver) Flashing

1. Set the flashing so there is mortar above and below the built-in portion. Bonding ribs shall be completely filled with mortar.
2. Do not mallet, bend or deform the exposed portion.
3. Lap all end joints so they interlock at the first raised rib. Apply Type 3 sealant between the mating surfaces of the built-in portion of the flashing before interlocking end joints.
4. All corners shall be factory prefabricated: mitered and lapped approximately 1" at corner, and fully soldered or welded by the manufacturer.
5. Provide splice plate at all expansion joints, 12" wide, with 6" lap each side and v-notch in center of joint.
6. Flashings that end at vertical surfaces, into windows, cavities shall be turned up 2" to form a pan.

D. Installing Concrete Reglet

1. Furnish reglet for installation with formwork, complete with fasteners and filler.

E. Installing Cap Flashing

1. General: Form and install the cap to provide a spring tight fit against the base flashing. Lap all end joints a minimum of 6" and base flashing a minimum of 4". Extend the cap continuously around corners or provide lock seams. Install waterstop flashing at expansion joints.
2. Cap Flashing for Installation in Reglets:
 - a. Extend the cap flashing into the reglet, applying pressure to securely lock it into position along its entire length.
 - b. Pack the reglet with lead wool to within 1/4" of the reglet opening, then fill with sealant and tool to a slightly concave surface.
3. Surface Mounted Cap Flashing:
 - a. Form the top portion of the cap flashing which comes in contact with the wall surface with a 1" wide bearing surface. Form a 45 degree x 1/4" wide stiffener and calking flange along the top edge.
 - b. Apply Type 2 sealant on the backside of the bearing surface.
 - c. Secure the cap flashing to the wall with fasteners spaced 12" oc thru the bearing surface.
 - d. Apply Type 2 sealant along the calking flange.
4. In-Wall Cap Flashing (New Masonry Construction):
 - a. Extend the built-in portion of the cap a minimum of 4" into the wall. Form the edge of the built-in portion with a 1/4" hook dam.
 - b. Set the cap so there is mortar above and below the built-in portion.

- c. Lap all seams a minimum 6" and apply Type 3 sealant between the mating surfaces of the built-in portion of the flashing.
5. Provide a cap flashing at roof terminations at roof curbs such as at mechanical equipment.
6. Cap flashing For Installation in Receivers: Insert the cap flashing into the receiver locking slot. Apply upward pressure along the entire length of the cap flashing so that it is securely locked into position. Nail 1" wide strap of same material as flashing at 32" o.c. prior to inserting cap in receiver. After cap installation, bend strap over edge of flashing by 1/2" to prevent flashing from coming out of receiver.
7. Pre-tin and solder with soldering irons (heavy coppers) all inside and outside corners. Install a separate reinforced mitered corner lapping the flashing 4" each side soldered at the receiver and sown the sides.
8. Where applicable, release existing soldered lap with soldering iron, install base flashing, dress down and re-solder existing lap.

F. Dressing Down Existing Cap Flashing

1. Turn up all cap flashings as required to perform the Work. Upon completion of the Work, dress down all disturbed cap flashings so they lie flat against the base flashing.
2. Secure the cap flashing to the wall surface with fasteners spaced 18" oc.
3. Install matching metal patches at corners of cap flashings which have been cut to perform the Work. Lap the patches a minimum of 1" on each side of the cap flashing.
 - a. Secure the patch by pop-riveting or by soldering.

G. Installing Base Flashings

1. Form the base flashing with locked and soldered joints into lengths not more than 24'-0" oc.

2. Provide expansion joints a maximum of 24'-0" oc on straight runs and a maximum of 4' from corners. Form expansion joints with a 3" loose locked seam filled with Type 3 Sealant.
 - a. Expansion Joint: slit the cross folded portion of the flashing where it is bent at a right angle. Solder a patch over the slit to avoid binding at the cross fold.
 3. Extend the vertical portion of the base flashing a minimum of 3" up behind the cap flashing.
 - a. Where shown on the Drawings, lock the base flashing to the cap flashing with a minimum 3/4" loose lock joint.
 4. Extend the horizontal portion of the base flashing a minimum of 4" and terminate in a 1/2" folded edge. Secure with nails spaced 3" oc staggered.
- Q. Installing manufactured copper/fiberglass fabric flashing.
1. Installation
 - a. All surfaces to receive the copper/fiberglass flashing shall be reasonably smooth, free from irregularities.
 - b. On horizontal masonry surfaces, lay flashing in a coat of manufacturer recommended sealant, and with a fresh bed of mortar above the flashing. Spot vertical surfaces with sealant or other recommended material to hold flashing in place until masonry is set, and secure as detailed. Trim flashing to terminate flush with the exposed face of masonry wall, except at masonry indicated to have deeply raked joints, and as otherwise indicated.
 - c. For installation in conjunction with "sealant edge" indicated below, lay flashing in a coat of manufacturer recommended sealant on top of sealant edge, with the fabric flashing cut back from the finished face.

- d. Install the flashing in continuous lengths with the minimum number of joints. Door and window flashing shall be installed in one continuous length from side to side. All seams are to have silicone sealant for entire length.
 - e. At corners, beams, columns, and at other junctures, fit flashing to the proper contour.
 - f. Fold flashing at ends to form dams at all edges.
2. Over Concrete Foundations: Lay flashing in a fresh bed of mortar above and below. When recommended by the flashing manufacturer the flashing may be laid on a coat of recommended sealant, and with a fresh bed of mortar above the flashing. At the intersection with column, bring flashing a minimum of 10" up the column and affix with mastic or other recommended material.
3. Spandrels: Start flashing cut flush with the outside face of the wall; go over the stainless steel sealant edge as shown on Drawings, adhered to sealant edge flashing with a full coat of low modulus silicone sealant. Go up inside the wall cavity as indicated on the Drawings. Then go thru the wall turning up on the inside face of the wall not less than 2", or provide a continuous termination bar as indicated on the Drawings to seal flashing to backup masonry or concrete after air barrier membrane is applied. Fasten bar to substrate 8" on center, with stainless steel fasteners anchored into pre-drilled pilot holes. Provide a continuous bead of low modulus silicone sealant along top of termination bar to completely seal the bar and flashing to the substrate. Confirm that all materials are compatible with the air barrier system.
4. Heads: Start flashing covering the toe of lintel angle or as shown on the Drawings; go over the lintel on a full coat of low modulus silicone sealant. Go up inside the wall cavity as indicated on the Drawings. Then go thru the wall turning up at the inside not less than 2", or where indicated on the Drawings provide a continuous termination bar as specified for Spandrel flashing. Extend flashing at least 6" on each side of the opening.

Turn flashing at the ends, forming a 2" deep pan running entirely thru the wall. All corners shall be folded, not cut.

5. Thruwall: Start flashing cut flush with the outside face of wall. Lay flashing on masonry in a fresh bed of mortar above and below. Extend flashing up thru the wall turning up at the inside not less than 2", or provide continuous termination bar as indicated on the Drawings to seal flashing to backup masonry or concrete after air barrier membrane is applied. Fasten bar to substrate 8" on center, with stainless steel fasteners anchored into pre-drilled pilot holes. Provide a continuous bead of low modulus silicone sealant along top of termination bar to completely seal the bar and flashing to the substrate. Confirm that all materials are compatible with the air barrier system. Where flashings end at vertical surfaces, into windows, cavities, etc., turn flashing up 2" high, fully soldered, to form a pan.
6. Joints: Lap joints at least 6", coating the contacting surfaces with sealant recommended by flashing manufacturer.

R. Sealant Edge

Provide stainless steel sealant edge flashing on relieving angles as indicated on the Drawings and wherever else indicated. Form flashing as required to suit lipped brick or other configuration. Adhere to relieving angle with a full coat of low modulus silicone sealant. Seal joints with sealant. Provide factory prefabricated corners and lap pieces a minimum of 4", with a full coat of low modulus silicone. Edge shall be hemmed.

END OF SECTION

* * *

LIST OF SUBMITTALS

<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>
Shop Drawings:	_____	_____
1. Flashing, trim, and other specified sheet metal items		
Product Data:	_____	_____
1. Catalog sheets		
2. Specifications		
3. Installation instructions		
Samples:	_____	_____
1. Flashing		
2. Anchors		
8. Termination bar, fasteners & sealant		
Project Closeout:	_____	_____
1. Guarantee		
Quality Assurance:	_____	_____
1. Training Certificate		
Product Certificates:	_____	_____
1. Compatibility		

* * *

SECTION 07900
JOINT SEALERS

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Provide all joint sealer Work as indicated on the Drawings, as required for the completed Work, and as specified herein. This Section includes joint sealants for the following applications:

1. Exterior joints in the following vertical surfaces and horizontal nontraffic surfaces:
 - a. Control and expansion joints in unit masonry.
 - b. Other joints as indicated.

1.02 REFERENCES

A. References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by governing codes or regulations, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work

1. American Society for Testing and Materials (ASTM)

1.03 SUBMITTALS

A. Product Data

Catalog sheets, specifications, and installation instructions for each type of joint sealant product specified except miscellaneous materials.

B. Samples for Initial Selection:

1. Provide Manufacturer's color charts consisting of strips of cured sealants showing the full range of Manufacturer's standard colors available for each product exposed to view.

C. Samples for Verification: For each type and color of joint sealant required, provide Samples with joint sealants in 1/2"wide joints formed between two 6" long strips of material matching the appearance of exposed surfaces adjacent to joint sealants

D. Quality Control Submittals

1. Product Certificates: For each type of joint sealant and accessory, signed by product manufacturer.
2. Installer's Qualifications Data: Affidavit required under Quality Assurance Article.
3. Company Field Advisor Data: Name, business address, and telephone number of Company Field Advisor.
4. Preconstruction Test Results
 - a. Sealant manufacturer's test reports certifying compatibility and adhesion with all contiguous materials.
 - b. Sealant manufacturer's test reports certifying that the sealant will not stain contiguous materials.
 - c. The results of field adhesion testing.

E. Mockups

In accordance with Article titled Quality Assurance.

F. Low Emitting Materials Compliance Submittals

1. Provide documentation for each sealant, sealant primer and cleaner to be used on site and within the weatherproofing/waterproof membrane (interior) of the building, indicating that the sealants and primers meet V.O.C. requirements as stated in Specification Section G01600.

1.04 QUALITY ASSURANCE

A. Installer's Qualifications

The persons installing the sealants and their supervisor shall be personally experienced in the installation of sealants and shall have been regularly employed by a

company engaged in the installation of sealants for a minimum of two years.

1. Furnish a letter from the sealant manufacturer, stating that the Installer is authorized to install the manufacturer's sealant materials.

B. Container Labels

Include manufacturer's name, trade name of product, kind of material, federal specification number (if applicable), expiration date (if applicable), and packaging date or batch number.

C. Preconstruction field-adhesion testing

Before installing sealants, field test their adhesion to Project joint substrates as follows:

1. Locate test joints as directed by Architect.
2. Conduct field adhesion tests for each kind of sealant and joint substrate.
3. Test using ASTM C1193 Method A: For joints with dissimilar substrates, verify adhesion to each substrate separately
4. Do not use sealants that fail to adhere to joint substrates during testing.

D. Mockups

Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle joint sealer materials as recommended by the Manufacturer, to protect from damage.

1.06 PROJECT CONDITIONS

A. Environmental Requirements

1. Temperature: Unless otherwise approved or recommended in writing by the sealant manufacturer,

do not install sealants at temperatures below 40°F or above 85°F.

2. Humidity and Moisture: Do not install the Work of this Section under conditions that are detrimental to the application, curing, and performance of the materials.
3. Ventilation: Provide sufficient ventilation wherever sealants, primers, and other similar materials are installed in enclosed spaces. Follow manufacturer's recommendations.
4. Do not proceed with installation of joint sealants under the following conditions
 - a. When joint substrates are wet.
 - b. Where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
 - c. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.
 - d. Surfaces are frozen.
 - e. Surfaces are superheated by the sun.

B. Protection

1. Protect all surfaces adjacent to sealants with non-staining removable tape or other approved covering to prevent soiling or staining.
2. Protect all other surfaces in the Work area with tarps, plastic sheets, or other approved covering to prevent defacement from droppings.
3. Protect any painted surfaces which are not included in the Work from impact or damage.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Momentive Performance Materials-GE Silicones, Waterford, NY 12188

- B. Dow Corning Corp., Midland, Michigan 48686
- C. Pecora Corp., Harleyville, PA
- D. Tremco Sealants and waterproofing, Beachwood, OH 44122
- E. Bostik, Middleton, MA 01949
- F. Sika Corporation, Lyndhurst, NJ 07071
- G. Schul International, Pelham, NH 03076

2.02 SEALANTS

- A. Type 1 Sealant (for use in vertical expansion joints where movement occurs; for general purpose use around windows, door frames, louvers, and other junctures).
 - 1. One-part low-medium modulus silicone sealant (plus or minus 50% movement); ASTM C920 classifications type S, grade NS, class 25, uses NT, M, G, and A: General Electric Silpruf SCS2000, Dow Corning 791, Pecora 864NST, Tremco Spectrem 2 or Sika SikaSil WS 295.

Silicones shall meet the following requirements:

- ASTM C719 - Low-Medium Modulus (+ or - 50%). Sealants shall not exhibit any cracking or surface degradation after 5000 hours exposure in the Atlas Twin Arc Weatherometer.
- ASTM C661 - Shall not incur a durometer increase greater than 10 points.
- Sealants shall contain zero parts of toxic isocyanurate ingredients.

2.03 JOINT FILLERS

- A. Elastomeric Tubing Sealant Backings: (for precast panel joints not compatible with Silicone Sealants): Neoprene, butyl or EPDM tubing complying with ASTM D1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26°F (minus 32°C). Provide products with low compression set and of size and shape to provide a secondary seal, to control

sealant depth, and to otherwise contribute to optimum sealant performance.

ASTM D1056, Class SC (oil resistant and medium swell), 2 to 5 psi compression deflection.

- B. Expanded Polyethylene Joint Filler (for existing joints) Flexible, compressible, closed-cell polyethylene of not less than 10 psi compression deflection (25 percent).
- C. ASTM D1056, Class RE41 (for masonry joints) where shown on the Drawings.

2.04 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
 - 1. For primers used on site and within the weatherproofing/waterproof membrane (interior) of the building comply with V.O.C. requirements specified in Section G01600.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
 - 1. For cleaners used on site and within the weatherproofing/waterproof membrane (interior) of the building comply with V.O.C. requirements specified in Section G01600.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.
- D. Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

1. Cylindrical Sealant Backings: ASTM C1330, Type C (closed-cell material with a surface skin), Type O (open-cell material) or Type B (bicellular material with a surface skin), as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

E. Bond Breaker Tape

Polyethylene or other plastic tape as recommended by the sealant manufacturer; non-bonding to sealant; self-adhesive where applicable.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine all joint surfaces for conditions that may be detrimental to the performance of the completed Work. Do not proceed until satisfactory corrections have been made.

3.02 PREPARATION

- A. Clean joint surfaces immediately before installation of sealant and other materials specified in this Section.
 1. Remove all loose materials, dirt, dust, rust, oils and other foreign matter that will impair the performance of materials installed under this Section.
 2. Remove lacquers, protective coatings and similar materials from joint faces with manufacturer's recommended solvents.
 3. Thoroughly clean surfaces on which sealant is to be applied using methods such as grinding, acid etching or other approved and manufacturer's recommended means, if required, to clean the joint surfaces, assuring that the sealant materials will obtain positive and permanent adhesion.
 4. Prime surfaces, if required, as recommended by Manufacturer before applying sealant.

3.03 JOINT BACKING INSTALLATION

- A. Install bond breaker tape in relaxed condition as it comes off the roll. Do not stretch the tape. Lap individual lengths.
- B. Install backer rod of sufficient size to fill the joint width at all points in a compressed state. Compress backer rod at the widest part of the joint by a minimum of 25 percent. Do not cut or puncture the surface skin of the rod.

3.04 SEALANT INSTALLATION

- A. Except as shown or specified otherwise, install sealants in accordance with the manufacturer's printed instructions.
- B. Install sealants with ratchet hand gun or other approved mechanical gun. Where gun application is impracticable, install sealant by knife or by pouring, as applicable.
- C. Finishing

Tool all vertical, non-sag sealants so as to compress the sealant, eliminating all air voids and providing a neat smoothly finished joint. Provide slightly concave joint surface, unless otherwise indicated or recommended by the manufacturer.

- 1. Use tool wetting agents as recommended by the sealant manufacturer.

3.05 FIELD QUALITY CONTROL

- A. Field Adhesion Testing of Sealants - Test completed elastomeric joints as follows:
 - 1. Extent of Testing: Test completed elastomeric sealant joints as follows:
 - a. Perform 10 tests for the first 1000 feet of joint length for each type of elastomeric sealant and join substrate.
 - b. Perform one test for each 1000 feet of joint length thereafter or one test per each floor per elevation.

2. Test Method - Test joints by hand pull method described below:
 - a. Make knife cuts from one side of the joint to the other, followed by two cuts approximately 2 inches long at sides of joint and meeting cross cut at one end. Place a mark 1 inch from cross-cut end of 2 inch piece.
 - b. Use fingers to grasp 2 inch piece of sealant between cross-cut end and 1" mark, pull firmly at a 90 degree angle or more in direction of side cuts while holding a ruler along sides of sealant. Pull sealant out of joint to the distance recommended by the sealant manufacturer for testing adhesive capability, but not less than that equaling specified maximum movement capability in extension, hold this position for 10 seconds.
 - c. For joints with dissimilar substrates, check adhesion to each substrate separately. Do this by extending cut along one side, checking adhesion to opposite side.
3. Inspect joints for complete fill, for absence of voids, and for joint configuration complying with specified requirements. Record results in a field-adhesion-test log.
4. Inspect tested joints and report on the following:
 - a. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.
 - b. Whether sealants filled joint cavities and are free of voids.
 - c. Whether sealant dimensions and configurations comply with specified requirements.
5. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test

locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.

6. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.
7. Evaluation of Field Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.06 CLEANING

- A. Immediately remove misapplied sealant and droppings from metal surfaces with solvents and wiping cloths. On other materials, remove misapplied sealant and droppings by methods and materials recommended in writing by the manufacturer of the sealant material.
- B. After sealants are applied and before skin begins to form on sealant, remove all masking and other protection and clean up remaining defacement caused by the Work.

END OF SECTION

* * *

LIST OF SUBMITTALS

<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>
Product data:	_____	_____
1. Catalog sheets, specifications, installation instructions for each item specified		
Samples:	_____	_____
1. Manufacturer's color charts for Initial Selection		
2. Samples for Verification for each type and color of joint sealant		
3. Color samples for paint for type of sealant/application		
Quality Assurance	_____	_____
1. Manufacturer's Product Certificates		
2. Installer's Qualifications Data		
3. Company Field Advisor Data		
4. Manufacturer's test reports certifying compatibility		
5. Manufacturer's test reports certifying that sealant will not stain		
6. Pre-construction field adhesion test reports		
Mockups:	_____	_____
1. Each location		
Low Emitting Materials:	_____	_____
1. Documentation of VOC content for each sealant, sealant primer and cleaner to be used inside the building to show compliance with Section G01600.		

* * *

SECTION 08315
FLOOR ACCESS DOORS

PART 1 - GENERAL**1.01 DESCRIPTION OF WORK**

- A. Provide all floor access doors and frames, complete with accessories, as indicated on the Drawings and as specified herein.

1.02 REFERENCES

- A. References and industry standards listed in this section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by governing codes or regulations, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

1. New York City Building Code

1.03 SUBMITTALS

- A. Product Data

For each type of door and frame indicated. Include catalogue cuts, construction details relative to materials, individual components and profiles, finishes, and fire ratings (if required) for access doors and frames.

- B. Shop Drawings

Schedule: Provide complete door and frame schedule, including types, general locations, sizes, construction details, latching or locking provisions, and other data pertinent to installation.

- C. Calculations

Where metal fabrications are required to comply with certain design loadings, submit structural design, structural calculations, materials properties, and other information needed for structural analysis, signed and sealed by the New York State licensed Professional Engineer responsible for their preparation.

- D. Certification and listing by an Approved Agency in accordance with NYC Dept. of Buildings rules, indicating that the materials and assemblies as regulated by the NYC Building Code is acceptable for the intended use. When test methods are stipulated in the NYC Building Code, the tests utilized shall be stated in the Certification. Prior MEA and BSA approvals are acceptable for materials conforming to current Code requirements.

D. Keys

Furnish 6 keys/devices for all locks

1.04 QUALITY ASSURANCE

A. Fire rated Doors

1. Not Used.

1.05 COORDINATION

- A. Verification: Determine specific locations and sizes for access doors needed to gain access to concealed equipment, and indicate on schedule specified in "Submittals" Article.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle floor access doors and frames as recommended by the Manufacturer, to protect from damage.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Karp Associates, Inc., Maspeth, NY 11378
- B. Milcor, Inc., Lima, OH 45804
- C. Nystrom Building Products, Minneapolis, MN 55413
- D. Or approved equal.

2.02 FLOOR ACCESS DOORS

- A. Frames
- 6063-T5 extruded aluminum.

1. Flange: Integral exposed flange not less than 3" wide around the perimeter.

B. Door Panel

1/4" thick 6061-T651 aluminum.

1. Hinges: Tamper-proof stainless steel.
2. Finish: Mill aluminum. Finish flooring as scheduled.
3. Door Panel: Smooth plate with 1/8" recess for resilient flooring and angle/channel reinforcing for listed loads.

C. Locks:

1. Latch and Lock: Furnish interior side opening latch and exterior side flush keyed lock or vandal resistant pentahead lock. Provide exterior side flush and recessed lift handle/mechanism.

D. Delegated Design:

1. Door and complete assembly, including all appurtenances and anchors/fasteners, to be engineered and designed by manufacturer for 300 lbs/sq. ft. live loads with max deflection of 1/150.

E. Accessories:

1. Provide compressions spring assist with 90 degree auto lock hold open.
3. Provide neoprene gasket set into aluminum frame profile.

2.06 FABRICATION AND MANUFACTURE

- A. Manufacture access door assemblies as integral units complete with all parts and ready for installation. Fabricate units of continuous welded aluminum construction unless otherwise indicated or specified. Grind welds smooth and flush with adjacent surfaces. Attachment devices shall be of size and type required to secure access doors to types of supports indicated on the Drawings.

1. Size: Floor access doors are custom size units, not standard sizes. Field verify size of opening prior to manufacture.

2.07 PAINT

- A. Not used.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install the access doors in accordance with the manufacturer's printed installation instructions, except as shown or specified otherwise.
- B. Coordinate access door installation with installation of supporting construction.
- C. Set units accurately in position and securely attach to support with face panel level and flush in relation to adjoining finish surface. Units not set properly will be completely removed and reset properly at no additional cost to owner.
- D. Install bitumastic coating on frame exterior in contact with concrete to prevent hydrolysis.

3.02 ADJUSTMENT

- A. Adjust hardware and doors for proper operation.
- B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION

AS:as

LIST OF SUBMITTALS

<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>
Product Data:	_____	_____
Catalog cuts, Construction Details, Finishes, Fire Ratings		
Shop Drawings:	_____	_____
1. Details of construction		
2. Schedule		
3. Fastening, anchorage, connections, bracing		
Structural Design & Calculations:	_____	_____
Certification and listing by an approved agency for fire-rated doors:	_____	_____
Keys:	_____	_____
Furnish <u>6</u> keys for all locks		

* * *

SECTION 09205
INTERIOR FURRING AND LATHING

PART 1 - GENERAL**1.01 DESCRIPTION OF WORK**

- A. Furnish and erect all metal furring and lathing including accessories and trim, as required by Drawings. Lathing is intended to receive plaster or setting beds. Furring is intended to receive any finish Work other than heavy masonry, concrete, etc.

1.02 REFERENCES

- A. References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by governing codes or regulations, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

- B. American Society of Testing and Materials (ASTM), latest editions.

C37 Standard Specification for Gypsum Lath

C841 Installation of Interior Lathing and Furring

1.03 DEFINITIONS

- A. Gages

1. Sheet Steel: US Standard

2. Steel Wire: US Steel Wire Gage

- B. Galvanizing

Hot-dip process, unless otherwise indicated.

1.04 SUBMITTALS

- A. Product Data

Submit manufacturer's specifications and installation instructions for the following products: Lath, furring channels and accessories.

B. Samples

1. Submit three (3) samples of the following for approval prior to delivery to job site;
 - a. Lathing - coated and uncoated - 12 inches square.
 - b. Furring Channels - 8 inches long min.

C. Quality Assurance Submittals

1. Installer's affidavit certifying minimum of 5 years experience installing items specified.
2. Certification and listing by an Approved Agency in accordance with NYC Dept. of Buildings rules, as applicable.

1.05 QUALITY ASSURANCE

A. Qualifications

Installer is to be a firm with not less than (5) years of successful experience in the installation of specified materials.

B. Regulatory Requirements

1. Building Code: Work of this Section shall conform to all requirements of the NYC Building Code and all applicable regulations of other governmental authorities.
2. Certification and listing by an Approved Agency in accordance with NYC Dept. of Buildings rules, indicating that materials and assemblies regulated by the NYC Building Code are acceptable for the intended use. When test methods are stipulated in the NYC Building Code, the tests utilized shall be stated in the certification. Prior MEA and BSA approvals are acceptable for materials conforming to current Code requirements.
3. Fire Resistance Ratings: Where ratings are indicated, match applicable assemblies tested per ASTM E119 by Fire Testing Laboratories.

1.06 DELIVERY, STORAGE, AND HANDLING**A. Delivery**

Deliver materials in original packages, containers or bundles with identification of product and manufacturer's names clearly visible.

B. Storage

Store materials inside, under cover and keep them dry and protected from contamination, aging, corrosion and damage.

C. Handling

1. Protect metal corner beads and trim from being bent or damaged.
2. All furring and lathing showing signs of rust will be rejected. All rejected Work is to be removed from the premises and replaced with new.

1.07 PROJECT CONDITIONS**A. Coordination of Work.**

1. Coordinate layout and installation of furring and lathing with installation of the material that supports it.
2. Coordinate layout and installation of furring and lathing with installation of Support System for Suspended Ceilings and Soffits specified in Section 05170 of this Specification in conformance with NYC Building Code Reference Standard 5-16 and all other regulatory agency requirements.
3. All Work by other trades, above, supported by or penetrating walls, ceilings and soffits including electrical, heating and ventilation and plumbing and drainage Work is to be coordinated with the lath and plaster installation.

PART 2 - PRODUCTS**2.01 MANUFACTURERS**

- A. Subject to compliance with requirements, provide products of one of the specified manufacturers
1. Dietrich Metal Framing
 2. Millicor Division; Inryco Inc.

3. Phillips Manufacturing Co.
4. Gold Bond Building Products Division; National Gypsum Co.
5. United States Gypsum Co.

2.02 MATERIALS

A. Furring Channels

3/4" deep x 7/16" wide flanges, 16 gage, cold-rolled channels, 300 lbs. per 1000 ft. painted, 316 lbs. per 1000 ft. galvanized. $S(\text{in}^3) = 0.02$; $I(\text{in}^4) = 0.0075$. Use painted channels unless indicated otherwise.

B. Metal Lath

1. Diamond Mesh Metal Lath: Galvanized steel expanded diamond mesh. Weight not less than 3.4 lbs. per sq. yd. Where self-furring lath is specified mesh shall have indentations or dimples that will hold lath not less than 3/8" from backing. Indentations spaced not more than 2" o.c. each way.
2. Rib Metal Lath: Asphaltum painted copper alloy steel. Flat rib depth of not over 1/8" and weighing not less than 3.4 lbs. per sq. yd. When rib depth of 3/8" is indicated, weight is not less than 4.0 lbs. per sq. yd.
3. Gypsum Lath: Perforated type complying with ASTM C37. Thickness and face dimensions as specified in schedule.

C. Metal Corner Beads

Type as indicated below of zinc coated (galvanized) steel, #22 gage minimum:

1. Small nose with expanded flanges, not less than 2 1/2" wide, each side.
2. Small nose with perforated flanges, not less than 2 1/2" wide, each side for use on curved corners.
3. Small nose with expanded flanges reinforced by perforated stiffening rib, for use on columns and finishing masonry corners, not less than 2 1/2" wide.

D. Casing Beads

Metal bead, expanded flange type fabricated of not less than 24 gage galvanized steel, 3" wide minimum.

1. Square edge, or quarter round edge at perimeter of openings.
2. Modified or semi-square edge where plaster abuts dissimilar material.

E. Wire for Furring Channels and Ties

1. ASTM A641/A641M, Class 1 zinc coating, soft temper.
2. Use .0475" diameter for tying lath and not less than .062" diameter for all other tying.

F. Base Screeds

24-gage min. sheet steel, hot galvanized with key holes or expansion type.

2.03 PAINTING

- A. All steel members, unless galvanized, shall be dipped or painted one coat of acrylic rust-inhibitive type containing no lead equal to Tnemec 115 Unibond or Carboline Carbocrylic 3358. Paint must meet SCAQMD standards for VOC emissions.

PART 3 - EXECUTION**3.01 EXAMINATION**

A. Verification of Conditions

1. Structural support of mechanical equipment and ductwork, electrical lighting and equipment and plumbing and drainage piping in the suspended ceilings and walls will be furnished and installed in the Section of this Specification relating to the specific installation.
2. Openings in wall or ceilings required by the Work of other trades will have to be coordinated with the Contractor in order that he may properly place anchors, hangers and carrying bars, if necessary, to avoid such ducts, pipes conducts, etc. Any changes required to be made in the locations of anchors, hangers and carrying bars by reason of the Contractor's failure to observe this

requirement shall be made by the Contractor without additional cost to the Authority.

3. Where the above Work or any other Work of the various trades makes necessary a departure from the standard form of furring and lathing as specified or shown, obtain Architects approval before installing such Work and execute such Work in the manner determined or approved by the Architect without additional cost to the Authority.

3.02 INSTALLATION

A. General

Install Work of this Section in accordance with the provisions of ASTM C841, except as otherwise indicated.

B. Openings

Frame openings with extra furring members of same size and weight as runner bars unless otherwise indicated.

1. Suspended Ceilings: Frame openings for registers, grilles, access doors, recessed electric fixtures and other items with rigid frames of furring channels or angles, bolted to running channels.

C. Furring

Erect furring to form a true plane, or curved surface where so designed, and securely fasten in place. Space furring channels not to exceed 12 inches on center. Set furring at right angles to running channels, and with webs at right angles to surface of plaster. Except as otherwise indicated, secure furring to running channels or supporting structure with tie wires, clips, bolts or screws as applicable. Reinforce system at corners with extra furring members.

1. Splicing Furring Materials: Overlap spliced materials minimum 8". Then join materials by wire tying, screwing or bolting together.
2. Wire-tying Furring Channels to Running channels: Tie with eight strands of wire at each intersection of furring channel with running channel, two strands to each corner of the intersection crossing diagonally on top of running channel and twisted at top of running channel.
3. Clipping Furring Channels to Running channels: Clinch clips over top of running channels.

D. Lathing

Apply lath to form true surfaces, free from sags and buckles, and secure to furring or directly to supporting structure as indicated. Apply lath with the long dimension of sheets at right angles to the direction of bearing.

1. Metal Lath:

- a. Laps: Lap sides of sheets not less than 1/2 inch, nesting ribs if any. Lap ends of sheets not less than one inch, and locate end laps over bearings.
- b. Reinforcement for Internal Corners: Reinforce internal angles of lathed surfaces and intersections of lathed surfaces with masonry (to be plastered) with continuous corner reinforcing except at junctions of load bearing and non-load bearing elements.
- c. Fastening: Secure metal lath to each furring channel with lacing wire, on not exceeding 6 inch centers. Fasten side laps together with lacing wire midway between bearing, and fasten terminating side edge. Secure reinforcement to other lathing with lacing wire, and to masonry with galvanized nails, on not exceeding 6 inch centers. Twist ends of wire ties together, cut off 1/2 inch from twist, and bend ends back against the lath.

2. Gypsum Lath and Base: Butt edges of adjoining sheets together. Locate end joints on bearing, and stagger in successive courses. Reinforce corners of doors, windows and other openings with 18 inch long piece of strip reinforcing installed diagonally at corner.

- a. Fastening Gypsum Lath: Nail or screw lath to support system where possible. Clip or wire-tie to non-nailable supports. Use continuous wire clip system for securing lath to furring bars on ceilings.
- b. Fastening Gypsum Base: Anchor base (for veneer plaster) to support system with drive screws or self-tapping screws. For double-layer applications, anchor both layers to supports with screws.

E. Attached Ceilings

1. Metal Stairs: Form attached ceilings at soffits of metal stairs with furring channels and diamond mesh metal lath.
2. Steel Joists: Form attached ceilings on steel joists with rib mesh metal lath for joist spacing not over 24", and with furring channels and diamond mesh metal lath for spans over 24". Secure lath or furring channels to joists with tie wire.

F. Suspended Ceilings

1. Form suspended ceilings using furring channels, together with hangers and running channels specified in Section 05170-Support System for Suspended Ceilings (in compliance with N.Y.C. Building Code).
2. Verify that running channels are spaced properly for installation of furring channels.
3. Space furring channels 12" on center maximum, and secure to running channels with tie wire or clips.
4. Do not permit any part of suspension grillage to be in contact with walls or partitions.

G. Furred Ceilings

Form furred ceilings with furring channels and diamond mesh metal lath unless otherwise indicated. Space furring 12" on center maximum, and secure to supporting construction with clips, expansion bolts, or by other approved equal method.

H. Furring Channel Enclosures

1. Secure 3/4 inch furring channels set vertically on 12 inch centers, to floor and ceiling plates. If pieces of bars shorter than height of partition are used, splice pieces by lapping not less than 8 inches with flanges interlocked and securely wired together. Use at least one full length between spliced channels.
2. Cover furring channels with diamond mesh metal lath.

I. Beams, Cornices, Columns and Pilasters

Form the shape and design of plastered beams, cornices, columns and pilasters with furring bars and diamond mesh metal lath unless otherwise indicated, except where masonry backing of the required design is provided. Frame required shapes with furring channels spaced 12" on centers.

J. Miscellaneous Furring and Lathing

1. On areas to be plastered, lath over metal in masonry surfaces, close chases, reinforce joints between dissimilar materials (except at control and expansion joints), and install other furring and lathing as required to complete the plastering. Install reinforcement where indicated.
2. Use diamond mesh or rib mesh metal lath. The span between supports shall not exceed 12" for diamond mesh metal lath or 24" for rib mesh metal lath; install furring as required to provide such support. Lap lath 6" beyond each side of items being covered.

K. Accessories

1. General: Set accessories in designed location, flush with finished plaster line, true to line and level or plumb. Align joints with concealed splices and tie plates. Use shims where necessary. Securely fasten in place without dependence upon the plastering. Beads and screeds shall be in one piece where height or length of straight run does not exceed 10 feet.
2. Corner Beads: Install continuous corner beads at all external corners of plaster, except where corners are rounded or covered by trim. Space fasteners not more than 12" on center on both sides of bead.
3. Casing Beads: Unless otherwise indicated, install continuous casing beads to terminate plaster at head and jambs of doors and windows, around the perimeter of suspended ceilings, at each side of expansion joints and at internal corner junctions of load bearing and non-load bearing elements. Space fasteners not more than 9" on center.
4. Screeds: Unless otherwise indicated, install screeds at control joints, slightly below top edge of vinyl and rubber bases, along top of tile and

lime-Portland cement plaster wainscots, and along top of flush terrazzo and cement. Space fasteners not more than 9" on center.

L. Control Joints

1. Portland Cement Plaster: Install control joints as indicated on the Drawings and at locations complying with the following criteria:
 - a. Where a control joint occurs directly behind plaster.
 - b. Where distance between control joints in plastered surface exceeds 10 ft. in either direction.
 - c. Where area within Portland cement panels exceeds 100 sq. ft.
 - d. Where Portland cement plaster panel changes size. Extend joints full width or height of plaster panel.
2. Gypsum Plaster: Install control joints as indicated on the Drawings and at locations required by reference standard and by plaster manufacturer. Space control joints not more than 30 feet on center.

3.03 FURRING APPLICATION

- A. Furnish and install hung or furred ceilings in all locations indicated on Drawings.
- B. Provide furring channels, stiffeners, and other furring members required to support the lathing for furred and hung ceilings, plaster enclosures for sheet-metal ducts, chases, furred beams and girders, range hood enclosures in kitchen, exposed portion of walk-in refrigerators extending from floor to kitchen ceiling, window soffits, cornices, arches, pilasters, etc., together with all clips, knees, clamps, bolts, etc. required to secure the various members together and to the structural Work. Drill all holes required for this Work.
- C. Plaster soffit of proscenium arch over auditorium platform shall be braced with channels, angles, etc., as required and as indicated on the Drawings.
- D. Where plastered partitions occur within 2 feet of the side of fireproofed steel or concrete beam parallel to the partition, the space between partition and beam

shall be furred and lathed so that the plaster will finish flush with soffit of beam.

- E. Furr out wall spaces between window head and ceilings.
- F. Include all furring angles, braces and clips required by Drawings in classrooms, and all other furring required.
- G. Provide channels, metal lath, etc., as required, for furring above and below panel boards located in wall finished with structural facing tile facing or wainscot.
- H. In corridors provide furred soffits and furred out spaces at drinking fountains, at window heads, fire extinguisher recesses, panel boxes, display cabinets and other locations. Include furring required above cases and cabinets where indicated.
- I. All furring shall be done with vertical members plumb, horizontal members level and all true and even, so that the proper thickness shall be provided for the lathing and plastering. Where required, furring shall conform to shapes of arches, cornices, pilasters, ceiling beams, etc.
- J. Furring members shall not be supported by partitions, except in closets 3 feet or less in horizontal dimensions. In such instances the furring channels shall be built in the partitions as Work progresses.
- K. When indicated on Drawings furred enclosures shall be provided for horizontal ducts and flues and for solenoid gas valve enclosure in Home Economics Rooms and in Kitchen of Cafeteria.
- L. Furnish and erect channel furring across entire furred out space above pupils' wardrobes, cases, cabinets, teachers' lockers, as indicated on Drawings and details. Include furring at soffits and space from window head to ceiling at windows in Gymnasium, Auditorium, and other locations where indicated on Drawings.
- M. For all plaster cornices having a projection of more than 6", and for all other ornamental plaster work, provide suitable brackets built up of angles, channels, flats, etc., so as to conform to the profile of the molded work, with horizontal string pieces connecting the brackets and bolted to same with 5/16" bolts. In all cases where heavy ornamentation or other special conditions occur special provisions shall be made to safely sustain the load imposed. All

such provisions shall be subject to the review and approval of the Architect.

- N. Spaces around panel boards, boxes or casing shall be furred out with metal lath and plastered flush with face of boxes.
- O. Where steel plate access doors and frames or grille openings occur in bottom or sides of metal ducts, corresponding openings shall be framed in the furring directly under or opposite the openings in the ducts.

3.04 LATHING APPLICATION

- A. Furnish approved metal lathing as required for furred and hung ceilings, enclosures for sheet-metal ducts and flues, furred beams and girders, window soffits, cornices, arches, pilasters, chases, stud partitions, furred out spaces over display cabinets and other cabinets, drinking fountains, fire extinguisher recesses, above wardrobes, cases, book cabinets, teacher's lockers and at all other places where required, to properly provide for the plastering, and secure same to the furring at the location indicated on Drawings and as hereinafter specified. The lathing of furred and hung ceilings when joining plastered walls or partitions shall turn down 3" and be stapled to same.
- B. Door and window studding that project beyond the line of trim shall have a strip of metal lath 6" wide, covering the joint between studding and fireproofing.
- C. Chases formed in partitions for electric conduits, panelboards, piping, etc., shall be covered with metal lathing extending 3" beyond line of opening on each side, but not put on until directed. All strips of metal lathing shall be secured at the edges to the studding or to fireproof blocks as the case may be.
- D. Where pipes (plumbing or heating) and conduit occur within partitions that are to be plastered, provide and install metal lath (nailed or otherwise secured to the partitions) which shall span across the pipes and shall extend three inches beyond opening on each side. This shall apply whether or not the space is built up solidly with masonry. Similar lath shall be provided at electrical installations where unable to build in masonry around the installations. Lath for this Work shall be herringbone mesh pattern with 3/8" V-shaped ribs spaced at 4½" intervals, on both sides of partitions.

- E. Where plastering is required at the flush junctions between concrete and any of the materials specified for partitions, a strip of wire lath shall be provided and installed extending three inches on either side of such junctions to prevent the cracking of the finished plaster.
- F. Where convector openings occur in narrow partitions, the backs of such openings shall be enclosed with furring channels tap screwed to frame, and metal lath covering the entire opening, secured to furring channels with approved wire ties; see details.
- G. Lath sheets shall be at right angles to the furring bars. Lath shall be securely tied to each furring bar at intervals of 6", with wire specified.
- H. All wire used by the lathing sub-contractor at the job shall be of one type. Wherever wire is required for tying splices or channels to running bars, it shall be the same wire as is used for tying lath to channels. The only other acceptable means of fastening is by means of approved clips or bolts.

3.05 CORNER BEADS AND PLASTER STOPS - APPLICATION

A. Corner Beads

- 1. For the full height of all vertical salient angles in plastered walls.
- 2. For the full length of all horizontal salient angles in plastered surfaces which occurs 8'-0" or less above finished floor.
- 3. For the full length of all horizontal salient angles in plastered surfaces which may occur above the 8'-0" level as follows:
 - a. Soffits of window openings.
 - b. Dropped ceilings, beam soffits, etc.
 - c. Window pockets in furred or hung ceilings.

B. Casing Beads

At all locations where plaster terminates or abuts dissimilar materials including concrete ceilings and concrete beam haunches, except where covered by trim.

C. Base Screeds

Furnish and set approved base screeds for all cement bases, and at the top of all Portland or Keene's cement wainscot.

END OF SECTION

LIST OF SUBMITTALS

<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>
Product Data:	_____	_____
1. Manufacturer's specifications		
2. Installation instructions		
Samples:	_____	_____
1. Lathing, furring channels.		
Quality Assurance:	_____	_____
1. Affidavit of experience		
2. Certification and listing by an Approved Agency.		

* * *

SECTION 09210
INTERIOR PLASTER

PART 1 - GENERAL**1.01 DESCRIPTION OF WORK**

- A. Provide materials, labor, equipment and services necessary to complete all plastering required.

1.02 SUSTAINABILITY REQUIREMENTS

- A. Not Used.

1.03 REFERENCES

- A. References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by governing codes or regulations, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.
- B. ASTM International (ASTM)
- C 28 Gypsum Plasters
 - C 35 Sand
 - C 150 Portland Cement
 - C 206 Finishing Hydrated Lime
 - C 631 Bonding Compounds for Interior Plastering
 - C 842 Application of Interior Gypsum Plaster
 - C 897 Specification for Aggregate for Job Mixed Portland-Cement Based Plasters
 - C 926 Application of Portland Cement-Based Plaster
- C. Gypsum Construction Handbook, USG Corporation, latest edition.

1.04 SUBMITTALS

- A. Product Data

Provide manufacturers' specifications and application instructions for each type of material specified, including the following:

1. Plaster
2. Bonding Compound
3. Plaster Accessories
4. Hydrated Lime
5. Aggregates for Base Coat Plaster

B. Quality Control Submittals

1. Certificates: Provide material certificates from Manufacturers, Material supplier, and Contractor certifying that each material complies with, or exceeds the specified requirements.
2. Certificates - Bonding Agent for white coat plaster ceilings: Provide all manufacturers' certificates of compliance (above), together with a copy of the approved testing laboratory reports and samples for test and approval.

C. Quality Assurance Submittals

1. Installers affidavit certifying a minimum of five years experience installing items specified and three projects of similar scope.

1.05 QUALITY ASSURANCE

A. Qualifications

Company specializing in plaster installation having more than five years experience with the application of specified materials and experience on at least three projects of similar scope to project specified.

B. Regulatory Requirements

1. Building Code: Work of this Section to conform to all requirements of the New York City Building Code and all applicable regulations of other governmental authorities.
2. Fire Resistance Ratings: Where ratings are indicated, match applicable assemblies tested per ASTM E 119 by Fire Testing Laboratories.

C. Single Source Responsibility

Obtain materials from a single source for each type of material required to assure consistency in quality of performance and appearance.

D. Plaster Mock-up Samples.

1. Before commencing plaster work, submit the following mock-up samples to the Project Architect for approval:
 - a. 8"x16"x2" concrete block with a two-coat system of plaster (base and finish), stepped to show construction and thickness of each coat. Provide sample for each type of plaster to be used on project.
 - b. 12"x12" metal lath with a three-coat system of plaster (scratch, brown, finish), stepped to show construction and thickness of each coat. Provide sample for each type of plaster to be used on project.

E. Field Samples.

1. At the commencing of plaster work provide a completed plastering of two classroom walls, including an inside corner, floor to ceiling for approval. If initial Work is not acceptable, make corrections until Work is approved.
2. Do not proceed until the plastering work on the sample walls has been approved in writing by the Project Architect.
3. All subsequent plastering work to conform in workmanship and appearance to that of the sample walls.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver manufactured materials in original sealed container, with manufacturer's label intact and legible.
- B. Store all cement, gypsum and lime off ground, under cover and in a dry area.
- C. Protect contiguous Work from soiling, spattering, moisture, deterioration and other harmful effects which might result from plastering.

1.07 PROJECT CONDITIONS**A. Environmental Requirements**

1. Do not use frozen materials in plaster mixes.
2. Do not apply plaster to surfaces that are frozen or contain frost.
3. Do not apply plaster when ambient temperature is less than 50°F, unless permission is given in writing by the Authority.
4. Maintain required temperatures for a minimum of 24 hours prior to application, during application and until plaster has cured.

1.08 SEQUENCING AND SCHEDULING

- A. Coordinate plaster installation with all other Work by other trades, above, supported by or penetrating walls, ceilings and soffits, including electrical, heating and ventilating and plumbing and drainage.

PART 2 - PRODUCTS**2.01 MANUFACTURERS AND PRODUCTS****A. Gypsum Plaster**

Subject to compliance with requirements, provide products from one of the following manufacturers, conforming to ASTM C28:

1. Gold Bond Building Products Div., National Gypsum Co., Charlotte, NC.
 - a. Gypsum Neat Plaster: "Two-Way Hardwall Plaster".
 - b. Gypsum Gauging Plaster: "Super-White Gauging Plaster".
 - c. Gypsum Ready-Mixed Base Coat Plasters. "Gypsolute".
2. United State Gypsum Co.; Architectural Products Division, Chicago, IL.
 - a. Gypsum Neat Plaster / Basecoat Plaster: "Red-Top Gypsum Plaster".

"Red-Top Two-Purpose Plaster".

"Structo-Base", where high strength gypsum neat plaster is shown.

b. Gypsum Gauging Plaster:

"Champion White Gauging Plaster"

"Red-Top Gypsum Plaster"

"Star White Gauging Plaster"

"Red Top - Keene's Cement"

"Structo - Gauging Plaster"

B. Portland Cement Plaster

Subject to compliance with requirements, provide products conforming to ASTM C926

1. Base Coat Cements: ASTM C926

a. Portland Cement ASTM C150, Type I or III.

2. Finish Coat Cements

a. Portland Cement, ASTM C150, Type I, white.

C. Finishing Hydrated Lime

Subject to compliance with requirements, provide products conforming to ASTM C206, Type S or Type N.

1. United States Gypsum Co.

a. "Ivory Finish Lime" - Type S

b. "Red Top Finish Lime" - Type N

2.02 MATERIALS

A. Aggregates for Base Coat Plaster; ASTM C35. Type as listed below:

1. Sand aggregate, conforming to ASTM C897

2. Perlite aggregate, conforming to ASTM C 35

3. Vermiculite aggregate, where shown.

B. Water

Potable, free of substances capable of affecting plaster set or of damaging plaster, lath or accessories.

C. Bonding Agent

Comply with ASTM C631; and requirements listed below:

1. Material for Bonding agent: a resinous water-emulsion that will bond new plaster base or finish coats to concrete surfaces.
2. Material Viscosity: equal to that of ordinary paint and suitable for application by brushing or spraying.
3. Inert to oxygen and perfectly stable when water has dried out.
4. Vermin-proof, non-toxic, non-deteriorating and incapable of supporting flame.
5. Temperature range of from minus 35°F to plus 300°F. without failure of bond.
6. Minimum tensile strengths varying from 50 to 600 lbs. per sq. inch, depending upon materials being bonded together, and a minimum shear strength of 175 lbs. per sq. inch when properly cured and dried samples are tested.
7. Bonding agent shall be job-approved for at least five years without any failures.

2.03 MIXES

A. Gypsum Plaster Base Coat Compositions

Comply with ASTM C842 and manufacturer's directions for gypsum plaster base coat proportions which correspond to application methods and plaster bases indicated below:

1. Three-Coat Work Over Metal Lath:
 - a. Scratch Coat: 1 part Gypsum neat plaster with 2 parts sand.
 - b. Brown Coat: 1 part Gypsum neat plaster with 3 parts sand.
 - c. Finish Coat: as in B below.

2. Two-Coat Work Over Concrete:

- a. Base coats of 1 part Gypsum neat plaster with $2\frac{1}{2}$ parts sand.
- b. Finish coat: as in B below.

3. Two-Coat Work Over Unit Masonry:

- a. Base coats of 1 part Gypsum neat plaster with 2 parts sand or Gypsum Ready-mix plaster with mill mixed perlite.
- b. Finish coat: as in B below.

B. Gypsum Troweled Finish Coat

Comply with ASTM C842 and manufacturer's directions and proportion materials in parts by dry weight for finish coat as follows:

1. Gypsum Gauging Plaster: 1 part plaster to 2 parts lime.
 - a. Over lightweight aggregate base coats, if any, add $\frac{1}{2}$ cu. ft. of perlite finish or 50 lbs. of No. 1 white silica sand per 100 lbs. of plaster.
 - b. Where float finish is shown, add 8 parts of sand.
 - c. Mechanically mix aggregate materials for plaster to comply with referenced application standard and with recommendations of plaster manufacturer.

C. Portland Cement Base Coat Compositions

Comply with ASTM C926 and manufacturer's directions for Portland cement base coat proportions that correspond to application methods and plaster bases indicated below:

1. Base coat over concrete or unit masonry: 1 part Portland cement to 3 parts sand with 10% hydrated lime added.
2. First coat must dry out and be thoroughly wet down before applying second or finishing coat.

D. Portland Cement Finishing Coat over Concrete or Unit Masonry:

Comply with ASTM C926 and manufacturer's directions for Portland cement finishing coat proportions.

1. 1 part Portland cement to 2 parts sand with 10% hydrated lime added.

E. Vermiculite Plaster Mix.

1. Three coats over metal lath for fireproofing in areas where required:
 - a. Scratch coat - 100 lbs. Gypsum to 2 cubic ft. Vermiculite.
 - b. Brown coat - 100 lbs. Gypsum to 2 cubic ft. Vermiculite.
 - c. Finishing coat - White finishing coat as specified in Article 2.03 G below.
2. In certain locations, the vermiculite plaster fireproofing serves as the finished exposed ceiling. Finishing coat to be a white finishing coat as specified in Article 2.03 G below.
3. Total thickness of vermiculite plaster, including white finishing coat, when required, of one inch measured from the face of the metal lath unless otherwise shown on Drawings.

F. Keene's Cement Plaster Mix

For use on walls, ceilings, and other surfaces indicated on Drawings or specified to be of Keene's Cement (Toilet Rooms, or areas of High Moisture):

1. Three coat application over concrete or unit masonry.
 - a. Base coat: 1 part Portland cement to 3 parts sand with 10% hydrated lime added.
 - b. Brown coat: to 150 lbs. of lime putty add 1,000 lbs. (60-No.2 shovelfuls) of sand and gage this mixture with 100 lbs. of Keene's cement.
 - c. Finish coat: 400 lbs. of Keene's cement to 100 lbs. of lime putty. Soak hydrated lime used for the lime putty in water tight boxes at least 24 hours before using for Type N and 30 minutes for Type S.

G. White Finishing Coat Mix

For use on all plastered surfaces, unless otherwise specified or indicated on Drawings:

1. Hard plaster white finishing coat: 3 parts white lime putty, one part of Plaster of Paris, and the addition of a small portion of fine white sand.
2. Lime Putty: Properly slacked quicklime or finishing hydrated lime wet into a paste and allowed to stand for 24 hours for Type N or 30 minutes for Type S before Plaster of Paris is incorporated. Sieve hydrated lime into a watertight box three-quarters full of water.
 - a. Add a small portion of fine white sand to lime putty before Plaster of Paris is incorporated.
 - b. Add sand to the quicklime while it is being slacked or to hydrated lime while being sieved into water.
 - c. Do not add neat gypsum plaster, retarder or dope to the white finishing plaster.

H. Cement leveling coat for Mosaic Artwork - Where specified.

1. Provide a cement leveling coat in thickness indicated on Drawings to receive Mosaic Artwork mixed in the following proportions:
 - a. One part Portland cement, one-half part hydrated lime and three parts clean sand.
2. Application to the surface shall be straight and plumb to within 5/8-inch of the finished Mosaic surface and then given a fine cross scratch for binding purposes. Coordinate with Artist/Architect.

2.04 MECHANICAL MIXING

- A. Mechanically mix cementitious and aggregate materials for plasters to comply with applicable reference standard and with recommendations of plaster manufacturers.

PART 3 - EXECUTION**3.01 EXAMINATION OF SURFACES**

- A. Examine substrate surfaces to receive Work of this Section, preparatory Work performed by other trades, and conditions at the building. Report any defects or unsatisfactory conditions for correction to the Authority.
- B. Starting of Work will be construed as acceptance of all substrate surfaces and conditions as satisfactory.
- C. Partitions, grounds, furring, corners, lathing, etc., shall be in place, straight and plumb, before beginning plastering, and if any of the Work is found to be imperfect notify the Authority to rectify it.
- D. Do not start plastering until all plaster work can be satisfactorily protected from exposure to water including water infiltration from roof leaks, wall openings, groundwater, flooding and other sources.
- E. Do not apply finish plastering unless the permanent glazed windows have been installed throughout the building, except by special permission of the Authority in writing.
- F. Mixing of scratch and brown coats of plaster inside of any part of the building is prohibited. Mixing finish white coat of plaster is permitted inside of the building in locations approved by the Authority.
- G. The use of a machine made lime mortar mixed at the building or an approved gypsum plaster for all surfaces required to be plastered, except surfaces as are specified to have other finishes, shall be an option subject to review and approval by the Authority.

3.02 PREPARATION

- A. Protection
 - 1. Provide protection for radiators and convectors in rooms to be plastered.
 - 2. Protect the Work of other trades from soiling or spattering using cover cloths or other approved means of protection. Should soiling or spattering occur, it can be removed by cleaning with wet sponges or brushes before the plaster or mortar sets, in a manner to avoid scratching, staining or other damage.

3.03 PLASTER APPLICATION, GENERAL

- A. Apply gypsum plaster materials, composition, mixes and finishes indicated to comply with ASTM C 842.
- B. Apply portland cement plaster materials, compositions, and mixes to comply with ASTM C 926.
- C. Provide a two coat leveling surface where cork display board is indicated as a wall surface, consisting of one brown coat and one white coat. See Drawings for extent of Work.
- D. Plaster concrete surfaces and concrete fireproofing with scratch and brown coats of "Bond Plaster" with a white finishing coat. Scratch coat of neat bond plaster. Brown coat of neat bond plaster and sand in equal parts by weight. Apply brown coat to the scratch coat before the scratch coat has set. Do not exceed 1/4" thickness.
- E. Allow each coat of gypsum mortar, excepting where bond plaster is required, to dry out in accordance with the manufacturer's directions prior to application of the following coat. After coat has dried out, thoroughly dampen surface prior to application of the following coat.
- F. Bring first coat of plaster to a plane by screeding horizontally or other approved method. Float to an even, straight and true surface. Travel finish coat to a compact, hard, very smooth, polished surface. Soft, porous or unpolished surfaces and surfaces that show brush marks will not be accepted and such rejected white finish plastering will have to be removed down to the brown coat and properly re-plastered.
- G. Plaster well up to the grounds and down to floor lines, and screed all walls true and plumb. No imperfect angles or corners will be acceptable under any circumstances and any imperfect Work will call for re-plastering of all portions rejected by the Authority.
- H. Do all patching required to complete the general construction Work of this Contract, leaving the Work clean and perfect in every particular at completion of the building.
- I. Extend the plaster work of ceilings so as to cover the concrete filling of the holes left for steam pipes, finishing around the sleeves to make the ceiling work complete. If the sleeves are not set and the holes not filled when the plastering is begun, plaster as

far as the pipe holes where keys are formed. Extend the plaster work and finish after the sleeves are set and the holes filled.

- J. Extend all plastering close to all openings and pipes, down to floors and behind all cabinets, wardrobes, trim, base and other wood finishes. White coat may be omitted behind wood finish, such as paneled wall surfaces and behind cabinets with solid backs, provided that the brown coat is finished smooth to receive the vinyl base.
- K. White coat is required behind all movable cabinets and behind all cabinets furnished by others or any other movable equipment indicated to be furnished "by others". Install white coat on all locations where acoustic tile is to be cemented in place.
- L. In rooms and locations where vinyl base is to be installed, extend plastering, including white coat, down to the cement under floor. Finish to be smooth to receive the base.
- M. Plaster finish walls above the Keene's cement wainscots flush with the screeds specified.
- N. Finished surfaces to be plumb and level, or uniformly sloped or curved where so required. Intersections of walls and ceilings and all intersections of walls and other surfaces to be finished square unless otherwise shown. Do not deviate more than 1/8" in 10'-0" from a true plane in finished plaster surfaces, as measured by a 10'-0" straight edge placed at any location on surface.
- O. Sand smooth-troweled finishes lightly to remove travel marks and arises.

3.04 OPTIONAL WHITE COAT PLASTER CEILING

- A. Apply one full covering of bonding agent by brushing or spraying over concrete beams and the underside of concrete slabs to receive the white coat of plaster. Prior to application of bonding agent, remove all oil, dust, dirt, grease, wax and loose material from concrete surfaces.
- B. In areas where slabs or beams have bulges or depressions more than 1/2" in 4-feet when measured with a straight edge, they shall be leveled-up with a brown coat of gypsum plaster and screeded to within 1/8" to 3/16" below the finished plaster surface. The brown coat for leveling shall be applied over the bonding agent.

- C. Apply a white skim coat of plaster 1/8" to 3/16" thick over the bonding agent or brown coat.
- D. Metal cornerites (strips of metal lath) will not be required at interior corners between white coat plaster ceilings and plaster walls.

3.05 PATCHING AND PROTECTING

- A. Repair, point up and patch plaster surfaces after work of other trades is in place and at such times as directed by the Architect.
- B. Point up around fixtures, outlet boxes, switches, plates, fittings, piping, conduit, frames and other items abutting or extending through the plaster.
- C. Just before painting is started, thoroughly examine all plaster surfaces. Cut out and repair all imperfect portions, cracks and other defects and leave all plaster in a sound, unblemished, clean and satisfactory condition.
- D. Protect finished plaster surfaces against damages, soiling and defacement.
- E. Protect plaster work against freezing and premature drying.

3.06 CLEANING

- A. Remove temporary protection and enclosure of other Work. Promptly remove plaster from door frames, windows, and other surfaces which have been stained, marred or otherwise damaged during plastering. When plastering is completed, remove unused materials, containers and equipment and clean floors of plaster debris.
- B. Provide final protection and maintain conditions in a manner suitable to the Architect which ensures plaster work being without damage or deterioration at time of issuance of the Certificate of Final Completion.

END OF SECTION

LIST OF SUBMITTALS

<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>
Product Data:	_____	_____
1. Manufacturer's specifications and application instructions.		
Quality Control Submittals:	_____	_____
1. Certificates - materials comply with requirements.		
2. Bonding Agent - test reports.		
Quality Assurance Submittals:	_____	_____
1. Installer's affidavit certifying experience		
2. Mock-up Samples		
8"x16" sample on block for each plaster system, 2-coat.		
12"x12" sample on metal lath for each plaster system, 3-coat.		
4. Field samples:		
Plastering of 2 classroom walls.		

* * *

SECTION 09650
RESILIENT FLOORING

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. Provide all resilient tile, resilient base, and other accessories noted herein.

1.02 RELATED SECTIONS

- A. Not Used.

1.03 SUSTAINABILITY REQUIREMENTS

- A. Sustainability requirements included in the Section are as follows:1. Meet established minimum pre-consumer percent content for vinyl composition tile and sheet vinyl products and documentation of Recycled materials.

1.04 REFERENCES

- A. ASTM International, latest editions.

D2047 Standard Test Method for Static Coefficient of Friction of Polish-Coated Floor Surfaces as Measured by the James Machine

E84 Test Method for Surface Burning Characteristics of Building Materials.

E648 Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.

E662 Test Method for Specific Optical Density of Smoke Generated by Solid Materials.

F710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring

F1066 Standard specification for Vinyl Composition Floor Tile

F1700 Standard specification for Solid Vinyl Floor Tile

F1869 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

F1861 Standard Specification for Resilient Wall Base

F1913 Standard Specification for Vinyl Sheet Floor Covering Without Backing

B. California Air Resource Board (CARB)

C. National Fire Protection Association (NFPA)

Standard 253 Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.

D. Underwriters Laboratories

UL 410 UL Standard for Safety Slip Resistance of Floor Surface

1.05 **SUBMITTALS**

A. Product Data

Manufacturers' specifications, installation instructions, surface preparation requirements and maintenance manuals for each material specified.

B. Samples

1. For Initial Selection: Submit actual sections of resilient flooring materials, showing full range of colors and patterns available, for each type of resilient flooring required

2. For Verification, prior to installation, submit the following:

a. Resilient tile: Full size, each type, size and color specified:

1) Light Reflectivity (L.R.): Sample tiles submitted must have light reflective values of each tile noted either by Light Reflectivity (L.R.) Sample tiles submitted must have light reflective values of each tile noted either by

Stamping L.R. value on back or Stamping L.R. value on back or Printed schedule form (submit in triplicate).

- b. Vinyl Sheet: 12 square section.
- c. Resilient Base: 12" long sections, each type and color specified.
- d. Feature Strip: 12" long section, each color selected
- e. Detectable Warning Surfaces: one tile or 12" x 12" piece.

C. Quality Assurance

- 1. Furnish Installer's certification that it is a firm with not less than 5 years of successful experience in the installation of specified materials.
- 2. Manufacturer's certification from an independent testing laboratory that resilient flooring complies with the fire test performance requirements
- 3. Certification from flooring installer that the substrate surfaces have been examined and are acceptable

D. Extra Materials

E. FloorScore Certification

- 1. Provide documentation that each product is FloorScore™ certified.

F. Low Emitting Materials Compliance Submittals

- 1. Provide documentation for each adhesive to be used indicating that the adhesives comply with V.O.C. requirements as stated in Specification Section G01600.
- 2. Provide documentation that floor polish has 0% VOC or complies with CARB 2007 requirements.

G. Sustainability Submittals

- 1. Recycled Content

- a. Submit documentation of recycled content consisting of product data or manufacturer's statement as applicable for the following:

- 1) Vinyl composition tile.

- 3) Resilient base

1.06 QUALITY ASSURANCE

A. Qualifications

1. Furnish Installer's certification that it is a firm with not less than 5 years of successful experience in the installation of specified materials.

B. Certifications

1. Furnish manufacturer's certification from an independent testing laboratory acceptable to authorities having jurisdiction that resilient flooring complies with the fire test performance requirements specified herein.
2. Furnish certification from flooring installer that the substrate surfaces have been examined and are acceptable for installation of the Work of this Section.

C. Fire Test Performance

Provide resilient flooring and wall base material that comply with the following performance criteria as determined by an independent testing laboratory acceptable to authorities having jurisdiction.

1. Resilient flooring - Shall conform to Class 1:
 - a. Critical Radiant Flux (CRF): Not less than 0.45 watts per sq. cm. as per ASTM E648 or NFPA 253
 - b. Specific Optical Density Rating: Less than 450 as per ASTM E662.
2. Resilient base - Shall conform to either Class B per ASTM E84 or Class 1 per ASTM E648 or NFPA 253:

Compliance with Sections BC 803.1.1 and BC 806.6 of 2014 NYC Building code is also required.

a. Class B per ASTM E84

- 1) Flame Spread Index: Not more than 75 as per ASTM E84.
- 2) Smoke Density Index: Not more than 450 as per ASTM E84.

b. Class 1 per ASTM E648 or NFPA 253: Critical Radiant Flux (CRF) of not less than 0.45 watts per sq. cm.

D. Slip Resistance

1. All flooring materials with coatings shall have a slip resistance of at least 0.50 when tested in accordance with ASTM D2047.
2. Flooring materials without coating shall have a slip resistance of at least 0.5 when tested in accordance with UL 410.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Delivery

Deliver material in good condition to the site in manufacturer's original unopened containers with label information clearly marked thereon.

B. Storage

Store materials (resilient flooring, base and adhesives) in location protected from the weather and having a minimum temperature of 68°F for at least 24 hours prior to start of laying of flooring.

1.08 PROJECT CONDITIONS

A. Environmental Requirements

Continuously heat spaces to receive flooring to a temperature of 68°F for at least 48 hours prior to flooring installation, and for 48 hours after installation. Maintain a minimum temperature of 55°F. thereafter. Do not install products until they are at

the same temperature as the spaces in which they are installed.

- B. Install resilient flooring and accessories after other finishing operations, including painting, have been completed. Do not install resilient flooring over concrete slabs until the latter has been cured and is sufficiently dry to achieve bond with adhesive as determined by manufacturer's recommended bond and moisture test. The Contractor shall allow sufficient time for the slab to dry out before installation of resilient flooring is started.

1.09 MAINTENANCE

A. Extra Materials

- 1. Furnish additional floor covering materials for replacement and maintenance to the Authority's Representative (to be transferred to the custodian), including manufacturer maintenance information.
- 2. Furnish materials of each size, color pattern, and type of material included in the Work. All materials must be new, clean, undamaged and in original containers.
- 3. Furnish materials at the rate of one (1) carton for each 1000-1500 sq. ft of material installed.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Vinyl Composition Tile/Vinyl Tile

- 1. Armstrong Flooring, Lancaster, PA:
"Standard Excelon Imperial Texture".
- 2. Tarkett Inc. Houston Texas: Azrock® by Tarkett-
Standard VCT and
Expressions™ by Tarkett
- 3. Mannington Mill, Salem, NJ: "Bond, Structure"

E. Resilient Wall Base and Accessories (Vinyl or Rubber base)

- 1. Johnsonite/Tarkett

2. Armstrong Flooring
3. Stoler Industries/Allstate Rubber Corp., Dalton GA
4. Roppe, Fostoria, OH
5. Burke by Mannington

H. Moisture Test Kits:

1. WagnerMeters Rouge River, OR
2. Floor Seal Technology, Inc. Milpitas, CA 95112

2.02 MATERIALS

- A. Vinyl Composition Tile/Vinyl Tile: Contractor may select either material where VCT is indicated.

- ## 1. Vinyl Composition Tile (VCT)

Provide VCT product, in compliance with ASTM F1066, Class 2 through pattern, asbestos free, complying with the following requirements:

- a. Size: 12" x 12" x 1/8" gage
- b. Color: As indicated on the drawings
- c. Light Reflectivity: Maximum range as per Manufacturers Light Reflectivity Tables
 - 1) Classrooms 45%
 - 2) Corridors, Cafeterias,
Lunchrooms, Playrooms 35%
- d. Vinyl composition tile shall be manufactured with a minimum of 1% of post consumer content materials.
- e. Tile shall be FloorScore™ certified.

2.03 ACCESSORIES**A. Resilient Base**

1. Resilient base shall be in compliance with ASTM F1861. Standard solid colors as selected:
2. 4" high, 1/8" thick (tolerance $\pm .005$ "), compression type.
3. Top corner rounded, bottom coved, arranged for above floor application. Provide straight base for carpeting.
4. Provide job formed inside and outside corners.
5. Colors as selected by Architect/Matte finish.
6. Base shall be FloorScore™ certified.

D. Adhesives

1. Type as recommended by manufacturer for particular resilient flooring and base.
2. Adhesive suitable for adhesion to plaster, concrete, masonry, metal or wood, waterproof after drying to resist action of water.
3. All adhesives used shall comply with V.O.C. requirements as stated in Specification Section G01600.

G. Concrete Slab Primer

Resilient flooring adhesive manufacturer's recommended primer for preparation of porous or dusty concrete, non-staining type.

I. Flash Patching Compound

Hydraulic-cement-based, polymer-modified product that can be trowel-applied from 1/4" to a feather-edge to match adjacent floor elevations.

1. Gypsum-based compounds are not permitted

J. Floor Polish

As recommended by flooring manufacturer. VOC contents of floor polish must be CARB compliant.

PART 3 - EXECUTION**3.01 EXAMINATION**

A. General

1. Installer shall inspect subfloor surfaces to determine that they are satisfactory. A satisfactory subfloor surface is one that is clean, dry, flat, smooth, level and free from cracks, holes, ridges, or coatings preventing adhesion, and other defects impairing performance or appearance. Notify the Authority of conditions, which will adversely affect flooring installation. Do not proceed with installation until conditions have been corrected.
2. Installation of the resilient flooring (or any component thereof) shall indicate the Contractor's acceptance of the subfloor as a satisfactory substrate to its work.
3. Do not allow resilient flooring work to proceed until subfloor surfaces are satisfactory.

B. Concrete Subfloor

1. Perform bond and moisture tests on concrete subfloors to determine if surfaces are sufficiently cured and dry as well as to ascertain presence of curing, sealing, hardening or any other compounds.
 - a. Bond Tests shall be in accordance with resilient flooring Manufacturer's Installation Manual.
 - b. Moisture vapor transmission shall not exceed 5 pounds per 1,000 square feet in 24 hours. Tests shall be in accordance with ASTM F1869.
 - c. Installer shall provide certification that the concrete substrate surfaces have been examined and are acceptable in accordance with this Article.

3.02 SURFACE PREPARATION

- A. Unless otherwise specified, follow the materials manufacturers' written instructions.
- B. Remove dirt, grease, oil, paint, varnish, wax, sealers, curing or hardening compounds and contaminants which may impair the full bonding of the materials to the substrate. Avoid organic solvents. Remove residual adhesives as recommended by the flooring manufacturer.
- C. Concrete Subfloor

Prepare concrete slabs in accordance with ASTM F710.

- 1. Remove trowel marks or other projections by grinding or sanding.
- 2. Level uneven surfaces with smooth troweling of mastic underlayment. Follow underlayment manufacturer's application and curing instructions.
- 3. Provide a substrate surface with not more than 1/8" in 10'-0" variation from level or plane of required slope.
- 4. Treat porous and dusty concrete with primer after vacuum cleaning the surface. Apply primer at the rate recommended by the primer manufacturer.
- 5. Broom or vacuum clean subfloor prior to installation of flooring.

3.03 INSTALLATION - GENERAL

- A. Install resilient flooring materials in compliance with manufacturer's latest printed instructions.
- B. Scribe cut and fit resilient flooring to permanent fixtures, pipe trench covers, built-in cabinets, pipes, outlets columns, walls and partitions.
- C. Tightly cement resilient flooring to sub base without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks or other surface imperfections.

- D. Hand roll flooring at perimeter of each covered area to assure adhesion.
- E. Spaces and areas where flooring is being installed shall be closed to traffic and other trades until flooring has set.
- F. Protect finished installation at all times. Contractor will be held responsible for all damage to flooring until Final Acceptance.

3.04 INSTALLATION OF TILE FLOORS

- A. Lay tile from center marks established with principal walls, discounting minor offsets, so that tile at opposite edges of room area are of equal width. Adjust as necessary to avoid use of cut widths less than 1/2 tile at room perimeters. Lay tile square to room axis.
- B. Match tiles for color and pattern by using tile from cartons in same sequence as manufactured and packaged if so numbered. Cut tile neatly around all fixtures. Broken, cracked, chipped, or deformed tiles are not acceptable.
 - 1. Lay tile in patterns indicated and as directed by the Project Architect.
 - 2. Lay adjacent tile with direction of texture opposite adjoining tiles.
- C. Adhere tile flooring to substrates using full spread of adhesive to edge of covered area, applied as directed by tile manufacturer.
- D. Cut tiles using equipment and methods recommended by respective tile manufacturer. Provide smooth cut edges tightly fit to adjacent work.

3.07 INSTALLATION OF ACCESSORIES

- A. Apply wall base to walls, columns, pilasters, casework and other permanent fixtures in rooms or areas where base is required. Install base in lengths as long as practicable, with inside and outside corners job formed from base materials. Corner returns shall be not less than 6" in length and corners shall be formed

without producing discoloration at bends. Tightly bond base to substrate throughout length of each piece, with continuous contact at horizontal and vertical surfaces. Do not stretch base during installation.

1. On masonry surfaces, or other similar irregular substrates, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material. Color to match base material.
- B. Place resilient edge strips tightly butted to flooring and secure with adhesive. Install edging strips at edges of flooring which would otherwise be exposed. Locate strips under doors.
- C. Where color of flooring changes between spaces, install feature strip between the two colors. Feature strip shall be centered under the door when it is in a closed position.
- D. Apply resilient accessories to areas as indicated and in strict accordance with manufacturer's installation instructions

3.09 CLEANING AND PROTECTION

- A. Perform the following operations immediately after completing resilient product 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.
 - a. Do not wash surfaces until after time period recommended by manufacturer.
- B. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by manufacturer.
 1. Apply protective floor polish to horizontal surfaces of vinyl composition tile that are free

from soil, visible adhesive, and surface blemishes if recommended in writing by manufacturer.

- a. Use commercially available polish acceptable to manufacturer for vinyl composition tile.
2. Floor polish is not required for Solid Vinyl and Slip-retardant Vinyl Tile. Apply protective floor polish to horizontal surfaces of Slip-retardant vinyl tile only if recommended in writing by tile manufacturer.

END OF SECTION

LIST OF SUBMITTALS

<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>

Product Data:	_____	_____

1. Manufacturer's specifications, installation instructions, surface preparation requirements and maintenance manuals for each material

Samples:	_____	_____

1. Initial Selection: samples of actual sections of resilient flooring and accessories. Include manufacturers full range of color and patterns.
2. Verification Prior to Installation:

Resilient tile: Full size, each type, size and color for each type specified. Sample tiles submitted must have light reflective values of each tile noted

Base: 12" long sections, each type and color specified.

Quality Assurance:	_____	_____

1. Certification that installer has at least 5 years of experience with the installation of specified materials.
2. Manufacturer's certification from an independent testing laboratory that resilient flooring and base comply with fire test performance requirements.
3. Certification from flooring installer that the substrate

surfaces have been examined
and are acceptable for
installation.

Project Closeout:

1. Extra Materials: Furnish flooring materials at the rate of one (1) carton for each 1000-1500 sq. ft of material installed.

FloorScore™ Certification:

1. Documentation of FloorScore™ Certification for each flooring material

Low Emitting Materials:

1. Documentation of VOC content for each sealant and adhesive, body coat and top coat to be used inside the building to show compliance with Section G01600.
2. Documentation for floor polish to show compliance with CARB requirements or 0% VOC.

Sustainability:

1. Mfr's printed literature or statement on recycled material content.
2. Contractor's Sustainable Materials Form (see Section S01352).

* * *

SECTION 09900
PAINTING

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. This Section includes surface preparation and field painting of the following:
1. Exposed exterior items and surfaces.
 2. Exposed interior items and surfaces.
 3. Surface preparation, priming and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.
- B. Paint exposed surfaces, except where the paint schedules indicate that a surface or material is not to be painted or is to remain natural. If the paint schedules do not specifically mention an item or a surface, paint the item or surface as directed by the Architect. If the schedules do not indicate color or finish, the Architect will select from standard colors and finishes available.
1. Painting includes field painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron work, and primed metal surfaces of mechanical and electrical equipment.
- C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels as described in Article 2.05A.
- D. When removing or disturbing existing paint on surfaces that have not been tested by the Authority for lead content, assume that the existing paint contains lead. Take necessary precautions to protect workers. Provide measures to separate paint removal work areas from occupied areas, and clean-up and disposal as specified in Specifications Section S01900 - Existing Premises Work.

1.02 SUSTAINABILITY REQUIREMENTS

A. Not Used.

1.03 REFERENCES

A. References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by governing codes or regulations, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

1. Federal Specifications (FS)
2. ASTM International (ASTM)
3. N.Y.S. Department of Environmental Conservation
4. U.S. Department of Labor
5. Occupational Safety and Health Administration (OSHA)
6. Steel Structures Painting Council (SSPC)
7. Green Guard
8. California Air Resources Board (CARB) 2007
9. Master Painter Institute (MPI)
10. Green Seal
11. International Organization for Standardization (ISO)
12. European Standards (EN)

1.04 DEFINITIONS

A. The term "Painting" as used in this Section, means the application of all coatings such as paint, primer, enamel, varnish, shellac, oil, etc. as listed in the Painting Schedules.

- B. The term "Painting" also includes preparation of surfaces for such applications, and the clean-up as hereinafter specified.
- C. The term "Walls" means all surfaces from floor, or top of base, or top of wainscot, to ceiling or hung ceiling.
 - 1. Include pilasters, breaks, jambs, reveals, returns, arches.
 - 2. Include hardboards, pegboards.
 - 3. Include free standing columns, low partitions.
 - 4. Include masonry, plaster or gypsum board interiors of wardrobes or closets, cupboards and other enclosed spaces.
- D. The term "Ceilings" means the general overhead horizontal surfaces.
 - 1. Include cornices, arches, soffits, stair soffits.
 - 2. Include beam and girder haunches.
 - 3. Include primed metal cover and border strips.
 - 4. Include metal frame of ceiling lights and ceiling equipment.
 - 5. Include side faces of hung or furred ceiling.
- E. Touching-up bare spots specified for previously primed or painted surfaces is in addition to the coats specified for the paint system.
- F. Finishes:
 - 1. Flat refers to a lusterless or matte - finish with a gloss range below 10 when measured at an 85-degree gloss meter and a gloss range of maximum 5 when measured at a 60-degree meter.
 - 2. Eggshell refers to low-sheen finish with a gloss range of 10 to 35 when measured at an 85-degree gloss meter and a gloss range between 15 and 25 when measured at a 60-degree meter.

3. Satin refers to low-sheen finish with a gloss range between 20 and 35 when measured at a 60-degree meter.
 4. Semigloss refers to medium-sheen finish with a gloss range between 35 and 70 when measured at a 60-degree meter.
 5. Gloss refers to high-sheen finish with a gloss range more than 65 when measured at a 60-degree meter.
 6. High Gloss refers to high-sheen finish with a gloss range more than 85 when measured at a 60-degree meter.
- G. Concealed: The term "concealed" refers to surfaces, piping, ducts or conduit which cannot be accessed without moving a building element such as within a chase, wall or ceiling.
1. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:
 - a. Furred areas.
 - b. Ceiling plenums.
 - c. Duct shafts.
 - d. Elevator shafts.
- H. The term "exposed" refers to any item which is not concealed.
1. The term "exposed to public view" means situated so that it can be seen from eye level from a public location. A public location is that which is accessible to persons not responsible for operation or maintenance of the building.

1.05 SUBMITTALS

A. Product Data

Provide manufacturers' product literature for all materials specified and material manufacturer's printed directions and recommendations for environmental conditions, surface preparation, priming, mixing, reduction, spreading rate, application, storage and VOC

content, as applicable for each of the materials specified.

B. Samples

1. Initial Selection

Submit manufacturer's color charts for each type of finish for approval by the Project Architect. Verify colors specified with manufacturers' color charts for availability and notify the Project Architect if any discrepancies should occur.

2. Verification prior to installation

- a. Contractor shall furnish color chips for surfaces to be painted.
- b. Submit two samples of each color and finish selected on 12" x 12" hardboard.
- c. Two samples of finish on concrete masonry and metal surfaces.

3. Submit samples of stained and varnished wood in triplicate for approval. Samples shall be 4" x 8" samples of the species of wood specified, stained and varnished as required and clearly labeled with type of coating, number of coats applied, etc.

4. All samples/Product data sheets shall be labeled; and include the following information:

- a. Manufacturer's name
- b. Type of paint/stain/hardener
- c. Manufacturer's stock number
- d. Color: name and number
- e. Coverage per gallon at recommended film thickness
- f. Gloss/Sheen level measured at 60 or 85 Degree meter
- g. Recommended Film Thickness - Dry
- h. VOC content

i. MPI Number

5. Schedule of uses: By paint type and location

C. Quality Assurance

1. Certification that materials for each system are obtained from a single manufacturer.
2. Certification that Work shall be performed by personnel with a minimum of three years experience who meet the qualifications set forth in OSHA, 29 CFR 1926.62 (Lead In Construction Standard).
3. Certification that material meets or exceeds the performance requirements of Federal Specifications.
4. Certification that materials comply with N.Y.S. regulations for Volatile Organic Compounds and CARB 2007 requirements.

D. Testing

Toxicity Characteristic Leaching Procedure (TCLP) testing per Article in Part 3 titled "Disposal of Painted Waste and Debris from Existing Buildings".

E. Guarantee

Provide Guarantee per Article 1.09

F. Low Emitting Materials Compliance Submittals:

1. Provide documentation for each coating to be used on the building interior and exterior indicating that the coatings comply with low V.O.C. requirements as stated in para 2.03 and Specification Section G01600.

1.06 QUALITY ASSURANCE

A. General

1. All painting materials shall arrive at the job ready-mixed.

2. Varnish containers shall not exceed 5 gallon capacity.
3. Remove all rejected materials from the premises immediately.
4. All thinning and tinting materials shall be as recommended by the manufacturer. Generally, all paints shall not require additional thinning.
5. Verify that the specified shop prime paint for each applicable item in this Project is compatible with the total coating system, prior to application.
6. Materials selected for each system type shall be products of a single manufacturer.
7. All paint products except Photoluminescent paint must be MPI approved, unless listed otherwise.

B. Qualifications

1. Work of this Section shall be performed by personnel with a minimum of three years experience in performing this type of Work.
2. The Contractor shall ensure that all employees meet the qualifications set forth in OSHA, 29 CFR 1926.62 (Lead In Construction Standard).

C. Source Limitations: Obtain block fillers, primers, and undercoat materials for each coating system from the same manufacturer as the finish coats.

D. Regulatory Requirements

1. N.Y.C. Building Code, latest edition
2. N.Y.S. Department of Environmental Conservation - Part 205 on "Architectural Surface Coatings" - for (VOC) Volatile Organic Compounds.
3. The Society for Protective Coatings (SSPC).
4. U.S. Department of Labor, Occupational Safety and Health Administration, Construction Industry Standards (29 CFR 1926/1910) 2018 edition, Washington, D.C.

5. Occupational Safety and Health Administration (OSHA) 29 CFR 1926.62 (Lead In Construction Standard).
6. New York State Department of Environmental Conservation regulations, 6 NYCRR part 364.
7. New York City Department of Environmental Protection Waste water disposal permitting requirements.

E. Certifications

1. CARB 2007 Requirements
All paint and coatings wet-applied on site must comply with CARB 2007 Standards for VOC requirements. Product literature must indicate paint category and VOC contents or compliance with CARB 2007 or include the Green Seal or GreenGuard logo on product literature or container label.
2. Federal Specifications
Indicate that material complies with Federal Specifications by including the Federal Specifications number on the container label or on the product literature.

F. Field Samples

1. Provide samples of each color and finish, under natural lighting conditions, in a location where each finish is to be applied.
2. Authority will request review of first completed room, space or item of each color scheme required by the Project Architect for color, texture and workmanship.
3. First acceptable room, space or item will be used as project standard for each color scheme, or finish.
4. Primer coat is to be inspected and approved in all locations before any subsequent finish coats are applied.

1.07 DELIVERY, STORAGE, AND HANDLING**A. Delivery**

Deliver materials to the site in original, unopened containers bearing manufacturers name and label containing the following information:

1. Product name or title of material
2. Manufacturer's stock number, batch number, VOC content in grams per liter and date of manufacture.
3. Manufacturer's name
4. Federal Specification number, if applicable.
5. Federal regulations for amount of lead in paint (less the 0.009% lead in non-volatile ingredients)
6. Contents by volume for major pigment and vehicle constitutions
7. Thinning instructions
8. Application instructions
9. Color name and number
10. Green Seal or GreenGuard Logo, if applicable

B. Storage

1. Authority's Representative will designate space on premises for storage of materials. Contractor shall restrict storage in this area to paint materials and related equipment, and provide the following:
 - a. Provide one (1) approved chemical dry fire extinguisher equal to 20 lb. CO₂ rating in all assigned rooms or locations where painting materials are stored. Fire extinguisher shall bear the UL Listing Mark for type, rating, and classification of extinguisher indicated.

- b. Provide three (3) standard size red fire pails with clean sand in above locations. At the completion of project, fire extinguishers and pails shall become property of Contractor.
2. Maintain storage area in clean condition, store materials not in use in tightly covered containers. Remove oily rags, waste and empty containers from site each night.
3. Provide Authority's Representative with one key for each space if spaces are to be kept locked when not in use.
4. Protect all materials from freezing.

1.08 PROJECT CONDITIONS

A. Environmental Requirements

1. Comply with manufacturer's recommendations as to environmental conditions under which coatings and coating systems can be applied.
2. Do not apply finish in areas where dust is being generated or will be generated while the material is drying.
3. Provide paint and coating products to comply with applicable environmental regulations, VOC requirements and local authorities.
4. In all areas, spaces and rooms being painted, the Contractor shall ensure that there is adequate ventilation to ensure proper paint drying, along with minimizing paint odors. See Section S01900 also for requirements regarding fumes, ventilation and Material Safety Data Sheets.
5. The Contractor shall ensure that all requirements of OSHA 29 CFR 1926.62 (Lead in Construction Standard) are adhered to during the project. In addition, the Contractor shall ensure that proper work area protection and clean-up procedures (as described in this Section) are strictly adhered to during all phases on the project.

1.09 GUARANTEES

- A. Adherence of workmanship and materials to Specifications requirements shall be maintained for the one year Contract guarantee period. These requirements shall include the following:
1. There shall be no evidence of blistering, peeling, crazing, alligatoring, streaking, staining, or chalking.
 2. Dirt shall be removed without blemishing the finish by washing with mild soap and water.
 3. Colors of surfaces shall remain free from serious fading; the variation, if any, shall be uniform.
- B. Correct all defects, appearing within the guarantee period, by removal of the defective work and replacement as directed.
- C. All corrective measures shall be the Contractor's responsibility, and shall be made at no extra cost to the Authority. The requirements set forth in Part 3 of these Specifications shall be strictly adhered to.

PART 2 - PRODUCTS**2.01 MANUFACTURERS**

- A. Subject to compliance with specified requirements, provide "First Line" or "Top Quality" products of one of the following manufacturers:
1. Benjamin Moore and Co.
 2. PPG Paints Inc.
 3. Pratt and Lambert
 4. The Sherwin-Williams Co.
 5. Tnemec Company, Inc.
 6. Carboline
 7. BEHR

2.02 MATERIALS

- A. Provide products which meet all N.Y.S. Part 205-VOC requirements for applications outlined herein and comply with low V.O.C. requirements as stated in Specification Section G01600.
- B. Provide products which meet all Federal regulations for amount of lead in paint (less than 0.009% lead in non-volatile ingredients).
- C. Use only thinners approved by paint manufacturers for applications intended and use only within recommended limits.

2.03 REFERENCE STANDARDS

- A. Carb 2007 VOC limits: Paints and Coatings shall meet the following VOC limits to comply with CARB 2007 requirements and as listed in Section S01600.

Coating Category	VOC maximum limit
Flats	50 g/L
Non-Flats	100 g/L
Primers Sealers and Undercoats	100 g/L
Floor Coatings	100 g/L
Concrete/masonry Sealer	100 g/L
Rust Preventative Coatings	250 g/L
Industrial Maintenance Coatings	250 g/L
Stains, Exterior	250 g/L
Wood Coating/Varnish/stain	275 g/L
Zinc Rich Primers	340 g/L

- B. Paint materials shall meet the following MPI standards or Federal specifications:

- 1. Primers, sealers, undercoats
 - a. Acrylic Primer, Primer/Sealer MPI 3, 50,
Latex base 149
 - b. Primer for galvanized surfaces, MPI 107,
Aluminum, Ferrous metal or 134
Steel surfaces
 - c. Corrosion Inhibiting(Rust
Preventative) Primers
Epoxy Primer MPI 101,

		108,177
	Acrylic Primer	MPI
		107,134
d	Alkyd Primer	MPI 79
g.	Wood Primer, Exterior	MPI 6
h.	Concrete Floor sealer	MPI 99
i.	Zinc Rich Primer-Epoxy	MPI 20
j	Latex Block Filler	MPI 4
2.	Finish Paints	
a.	Exterior Alkyd	MPI 81
b	Exterior Epoxy	MPI 98
c	Exterior Polyurethane	MPI 72, 83
d.	Interior Gloss Acrylic Latex:	MPI 114
e.	Interior Flat Vinyl Acrylic Latex	MPI 53,143
f.	Interior Semi-Gloss Vinyl Acrylic Latex	MPI 54
g.	Aluminum Paint (Ready Mixed)	MPI 1
h.	Heat Resistant Semi-Gloss Enamel (400°F max. surface temperature)	MPI 2
i.	Asphalt Varnish	FS TT-V-51
j.	Smokestack Black Paint	MPI 2
3.	Transparent and Semi Transparent Finishing Systems	
a.	Spar Varnish: Semi-gloss	MPI 128,129
b.	Stain; Interior Oil Type	MPI 90
c.	Polyurethane Coating (Satin Finish)	MPI 83
d.	Gloss Varnish	MPI 130
4.	Floor Finishing Systems	
a.	Rubber Base Paint For use over concrete and masonry	FS A-A 3121
b.	Concrete Floor Paint	MPI 60
5.	Fire Retardant Paint: Latex Fire Retardant Paint: Rated Class A NFPA 101.	MPI 64
6.	Miscellaneous Materials:	
a.	Mineral Spirits (Petroleum Paint Thinner)	ASTM D268
b.	Color Pigments: Pure, non-	FS-A-A

- fading, finely ground 3108
 pigments, at least 99 percent
 passing a 325 mesh sieve.
- c. Shellac: Two pound cut shellac FS TT-S-300
 - d. Paste Wood Filler FS TT-F-336E
 - e. Putty/Plastic Wood Filler FS TT-F-340C
 - f. Linseed Oil ASTM D260
 - g. Lacquer Spraying Clear and FS A-A-3003
 Pigmented for Exterior Use
 only

C. Miscellaneous Standards and Requirements

1. Turpentine: ASTM D13.
2. Cold Galvanizing Compound: Single component material conforming to ASTM A780 giving 96% pure zinc in the dried film.
3. Cleaning Solvents: Low toxicity; flash point in excess of 100°F.
4. Spackling Compound: ASTM C475.
5. Polyester Filler: Polyester resin base autobody filler standard weight or finishing grade as required to fill in small dents and similar conditions; 3M "White Lightnin".

2.04 COLORS

A. Selection

1. Paint colors, surface treatments and finishes will be selected by the Project Architect.
2. Color Schedule will be issued to the Contractor after award of the Contract.
 - a. Final acceptance of colors will be from actual job applications.

2.05 PAINTING SCHEDULE

- A. Surfaces not to be painted, unless specifically indicated otherwise on drawings:
1. Polished or bright metals: Aluminum, bronze, brass, chrome, nickel, stainless steel, copper.
 2. Exterior: Brick, Stone, Masonry, Concrete
 3. Glass
 4. New galvanized Chain Link Fence Work
 5. Galvanized members not exposed to public view
 6. Ceramic Materials
 7. Factory Pre-Finished Masonry Block.
 8. Resilient Flooring Materials; Wood Floors.
 9. Terrazzo; Marble; Bluestone
 10. Acoustical Tile
 11. Chalk Boards; Marker boards, Cork Boards; Bulletin Boards; Plastic Laminate
 12. Mechanical Equipment, Steel Shelving, and Cabinets, which are factory finished.
 13. General Construction Items with factory applied final finish.
 14. Factory finished Wood Doors.
 15. Acoustic Tile & Metal Pan Ceiling
 16. Pipe and duct Spaces and utility tunnels, including items within the space such as pipes, ducts and conduits.
 17. Oil Tank Enclosure including items within the space such as pipes, ducts and conduits.
 18. Meter Room including items within the space such as pipes, ducts and conduits.
 19. Concealed Ducts, Pipes, and Conduit.
 20. Metal Lockers

21. Toilet Compartments
22. Light Fixtures
23. Electrical Distribution Cabinets
24. Foundation Spaces
25. Furred Areas
26. Ceiling Plenums
27. Valve and Damper Operators
28. Mechanical Linkages
29. Sensing Devices
30. Motor and Fan Shafts
31. Light Switch and Electrical Outlet Covers
32. Labels: Do not paint over Underwriters Laboratories (UL), Factory Mutual (FM), or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

B. Interior Finish Schedule - Standard

1. All new and previously unpainted, surfaces shall receive one (1) prime coat and two (2) finish coats unless otherwise specified.
2. All previously painted surfaces shall be spot primed as needed and receive (2) finish coats unless otherwise specified.
3. First or Prime coats shall vary with substrates and are outlined in Article 2.06 - Interior Paint Systems.

Finish coats in areas indicated shall have the sheen and gloss levels specified below

<u>Location</u>	<u>Type</u>
a. Class Rooms, Rooms of Instruction (except as otherwise specified), Stair Enclosures, Vestibules,	

Offices and Office Closets,
Library, Teachers Rooms (Semi Gloss)

- b. Entrance Hall/Lobby, Corridors,
Lunch Playrooms, Cafeteria,
Gymnasium, Auditorium,
Kindergartens and Kindergarten
Store Rooms, Shops, Photocopy
Room, Toilets, Telephone Closet,
Locker Rooms, Medical Suite,
Guidance Suite, Laboratories,
Preparation Rooms, Apparatus
Rooms, Acid Rooms, Dark Room,
Emergency Room, Laundry..... (Semi Gloss)
- c. Shower Room and Dressing Rooms,
Home Economics, Kitchen Store
Rooms, Can Washing Room,
Janitor's Sink
Closets,..... (Gloss)
- d. All plaster and gypsum board
ceilings shall be off white (Flat)
- e. All interior plaster, gypsum
board, concrete, brick or block
surfaces of walls throughout the
building not otherwise specified
..... (Semi-Gloss)

2.06 INTERIOR PAINT SYSTEMS

Paint shall be applied to achieve minimum Dry film thickness (DFT) as recommended by manufacturer or to achieve the minimum thickness for paint systems as listed below.

- A. Concrete (except concrete flooring)
 - 1. Semi-Gloss Finish:
 - 1st Coat
 - Vinyl Acrylic Latex Primer 1.2 Mils DFT
 - Sealer (Flat)
 - 2nd & 3rd Coats-
 - Semi-Gloss Vinyl Acrylic 1.5 Mils DFT
 - Latex Enamel
- B. Concrete Floor Sealer (except painted concrete floor)
 - 1. Semi-gloss or gloss
Finish/sealer:
 - 1st Coat - waterborne Epoxy 2.0 Mils DFT

	or Acrylic	
	2nd Coat - waterborne Epoxy	2.0 Mils DFT
	or Acrylic	
C.	Painted Concrete flooring	
	2 coats acrylic latex - semi-gloss	1.5 Mils DFT each coat
D.	Concrete Masonry Units	
	1. Semi-Gloss Finish:	
	New or unpainted CMU	
	*1st Coat - Acrylic Latex	8.0 Mils DFT
	Block Filler, or 100% latex	
	block filler/surfacer as	
	recommended by manufacturer	
	of succeeding coats	
	Previously painted CMU	
	**1st Coat - Vinyl Acrylic	1.2 Mils DFT
	Latex Primer-Sealer (Flat)	
	2nd & 3rd Coats - Semi-Gloss	1.5 Mils DFT
	Vinyl Acrylic Latex	each coat
	2. Gloss Finish:	
	New or unpainted CMU	
	*1st Coat - Acrylic Latex	8.0 Mils DFT
	Block Filler, or 100% latex	
	block filler/surfacer as	
	recommended by manufacturer	
	of succeeding coats	
	Previously painted CMU	
	**1st Coat - Vinyl Acrylic	1.2 Mils DFT
	Latex Primer-Sealer (Flat)	
	2nd & 3rd Coats - Gloss	1.4 Mils DFT
	Acrylic Latex	each coat
	*Apply filler coat on new and previously	
	unpainted concrete masonry units at a rate to	
	ensure complete coverage with all pores	
	filled. If required, provide in two (2) or	
	more coats.	
	** Spot prime previously painted concrete	
	masonry unit surfaces as needed.	
E.	Gypsum Drywall and Plaster:	
	1. Flat Finish (ceilings only):	
	1st Coat - Vinyl Acrylic	1.2 Mils DFT
	Latex Primer Sealer	
	(Flat)	
	2nd & 3rd Coats - Flat Vinyl	1.4 Mils DFT
	Acrylic Latex	each coat
	2. Semi-Gloss Finish:	

1st Coat - Vinyl Acrylic Latex Primer Sealer	1.2 Mils DFT
2nd & 3rd Coats - Semi-Gloss Vinyl Acrylic Latex	1.3 Mils DFT each coat
3. Gloss Finish:	
1st Coat - Vinyl Acrylic Latex Primer Sealer	1.2 Mils DFT
2nd & 3rd Coats - Gloss Acrylic Latex	1.4 Mils DFT each coat
F. Gypsum Drywall and Plaster:	
For use over existing oil based paints	
1st Coat - 100% Acrylic Primer	1.2 mils DFT
2nd & 3rd Coats - Semi-Gloss Vinyl Acrylic Latex	1.3 Mils DFT each coat
OR	
2nd & 3rd Coats - Gloss Acrylic Latex	1.4 Mils DFT each coat
G. Ferrous Metal:	
1. Flat Finish:	
Metal ceilings, jamb and head sections, coat and hat rack, metal shelves.	
*1st Coat - Modified Acrylic Rust Preventive Latex Primer	2.2 Mils DFT
2nd & 3rd Coats - Flat Vinyl Acrylic Latex	1.4 Mils DFT each coat
2. Semi-Gloss Finish:	
Convactor enclosures, grilles, access doors, frames, Steel Doors and Frames, Trim, Partitions, Screens, Demountable Office Partitions, Office Railings, Wire mesh work	
*1st Coat - Modified Acrylic Rust Preventive Latex Primer	2.2 Mils DFT
2nd & 3rd Coats - Semi-Gloss Vinyl Acrylic Latex	1.5 Mils DFT each coat
3. Gloss Finish:	
*1st Coat - Modified Acrylic Rust Preventive Latex Primer	2.2 Mils DFT
2nd & 3rd Coats - Gloss Acrylic Latex	1.4 Mils DFT each coat
* Provide full prime coat on new and previously unpainted surfaces. Spot prime previously painted surfaces, including shop-primed items, as needed. Items shop primed with modified alkyd equal to Tnemec 10-99 primer shall be	

touched up with same primer. See related specification sections.

H. Zinc-Coated Metal

1. Flat Finish:

1st Coat (New) - Modified Vinyl Acrylic Latex Primer	2.2 Mils DFT
*1st Coat (Repaint) - Modified Acrylic Rust Preventive Latex Primer	2.2 Mils DFT
2nd & 3rd Coats - Flat Vinyl Acrylic Latex	1.4 Mils DFT each coat

2. Semi-Gloss Finish:

Railings, wire-mesh work	
1st Coat (New) - Modified Vinyl Acrylic Latex Primer	2.2 Mils DFT
*1st Coat (Repaint) - Modified Acrylic Rust Preventive Latex Primer	2.2 Mils DFT
2nd & 3rd Coats - Semi-Gloss Vinyl Acrylic Latex	1.5 Mils DFT each coat

3. Gloss Finish:

1st Coat (New) - Modified Vinyl Acrylic Latex Primer	2.2 Mils DFT
*1st Coat (Repaint) - Modified Acrylic Rust Preventive Latex Primer	2.2 Mils DFT
2nd & 3rd Coats - Gloss Acrylic Latex	1.4 Mils DFT each coat
* Spot prime as needed.	

I. Painted Woodwork and Hardboard

1. Semi-Gloss Enamel Finish:

Wood window trim, Wood sill, chair rails, wood door frames and trim, painted red or white birch, unless otherwise specified to be stained.	
1st Coat - Vinyl Acrylic Latex Enamel Underbody	1.2 Mils DFT
2nd & 3rd Coats - Semi-Gloss Vinyl Acrylic Latex	1.5 Mils DFT each coat

2. Flat Finish:

Pegboard, library display units, kindergarten Furniture	
1st Coat - Vinyl Acrylic Latex Enamel Underbody	1.2 Mils DFT
2nd & 3rd Coats - Flat Vinyl Acrylic Latex	1.3 Mils DFT each coat

- J. Stained Woodwork
(semi-transparent finish to match
Project Architect's sample)
1. Stained-Varnish Rubbed Finish:
- | | |
|--|---------------------------|
| Stain Coat - Oil Type | 0.9 Mils DFT |
| 1st Coat - Cut Shellac | |
| Filler Coat - Paste wood filler
(for open grain wood) | |
| 2nd & 3rd Coats - Varnish | 0.6 Mils DFT
each coat |
- K. Interior Oak Woodwork
(except wood flooring and doors)
- | | |
|-----------------------------------|---------------------------|
| 1. Varnish prime coat | 0.6 Mils DFT |
| 2. Varnish finish coats - 2 coats | 0.6 Mils DFT
each coat |
- L. Interior Woodwork
White birch in Kindergartens,
front of Auditorium platform and
stage
- | | |
|---|--------------|
| 1 Coat Polyurethane clear
coating (Satin Finish) | 1.2 Mils DFT |
|---|--------------|
- M. Interior Woodwork
Wood stairs for Auditorium
platform stage (treads, risers,
and trim-moldings) Provide
detectable strips at treads to
comply with ADA requirements.
- | | |
|--------------------------------|---------------------------|
| 2 Coats interior gloss varnish | 0.6 Mils DFT
each coat |
|--------------------------------|---------------------------|
- N. MEP Equipment and Piping
See Sections 15501, 15502, 15431
and 16010 for MEP Equipment and
Piping painting requirements.

2.07 EXTERIOR PAINT SYSTEMS

- A. New Ferrous Metal
Structural steel, all ferrous metals,
Steel Doors and frames, and steel
window trim.
- | | |
|----------|---------------------|
| 1st Coat | Touch up with epoxy |
|----------|---------------------|

	Polyamide Paint	
2nd Coat	Polyamide Epoxy Paint	4.0 to 6.0 Mils
	per SSPC-PS Guide 13.01	DFT
3rd Coat	Acrylic Aliphatic	1.5 to 2.0 Mils
(Top Coat)	Polyurethane	DFT
- B. Zinc Coated Metal
Provide for all galvanized surfaces exposed to public view including Exterior basketball backstops, scoreboard mounting posts, bleachers etc. except chain link fences:
- | | | |
|----------|---------------------------------------|--------------|
| 1st Coat | Epoxy polyamide | 4.0 Mils DFT |
| 2nd Coat | Exterior Aliphatic polyurethane-gloss | 3.0 Mils DFT |
- C. Existing steel members embedded in masonry or concrete.
- | | | |
|----------|--|-----------------|
| 1st Coat | Epoxy polyamide (capable of painting on an SSPC-SP3 surface prep | 7 to 9 Mils DFT |
|----------|--|-----------------|
- D. Existing steel members exposed to view or the elements.
- | | | |
|------------|--|-----------------|
| 1st Coat | Epoxy polyamide (capable of painting on an SSPC-SP3 surface prep | 7 to 9 Mils DFT |
| 2nd Coat | Polyamide Epoxy Paint | 4.0 to 6.0 Mils |
| | SSPC-PS Guide 13.01 | DFT |
| 3rd Coat | Aliphatic Polyurethane | 4.0 Mils DFT |
| (Top Coat) | | |
- E. Epoxy Coat System
- | | | |
|------------|-------------------------|-----------------|
| 1st Coat | Epoxy organic zinc rich | 4.0 Mils DFT |
| (Primer) | Primer | |
| 2nd Coat | Polyamide Epoxy Paint | 4.0 to 6.0 Mils |
| | SSPC-PS Guide 13.01 | DFT |
| 3rd Coat | Acrylic Aliphatic | 3.0 Mils DFT. |
| (Top Coat) | Polyurethane | |
- For factory painted items, Manufacturer/Fabricator shall provide touch-up paint in sufficient amount for Project.
- F. Aluminum - Mill Finished
- | | | |
|-------------------|---------------------------|------------------------|
| 1st Coat | Aluminum metal primer | 2.2 Mils DFT |
| 2nd and 3rd coats | Gloss acrylic latex paint | 2.0 Mils DFT/each Coat |

- G. Copper, Exposed
Except roof and flashing
1st Coat 1 coat linseed oil rubbed
dry
- H. Copper, exposed
(where indicated to be painted)
1st Coat Modified Alkyd Primer 2.0 Mils DFT
2nd and Exterior Alkyd Gloss 2.0 Mils DFT
3rd Coats each Coat
- I. Cast Iron Chimney Cap
1st and Smokestack black paint 1.5 Mils DFT
2nd Coats each Coat
- J. Exterior Woodwork
1st Coat One coat exterior Wood 1.5 Mils DFT
Primer
2nd and Alkyd Semi-gloss Exterior 2.0 Mils DFT
3rd Coats Paint each Coat
For factory painted items, Manufacturer/Fabricator
shall provide touch-up paint in sufficient amount for
Project.

2.08 **LETTERING** (Inscriptions)

- A. Use "Normal Block" letters on all inscriptions.
- B. Stencil Number and Letter Work
1. Provide black stenciled numbers at all coat and hat hooks in gymnasiums, dressing rooms, wardrobes or closets, as directed.
 2. Squad markings of numerals and letters shall be painted on walls of Girls' and Boys' Gymnasiums in Intermediate Schools and High Schools. Numerals and letters shall be black, 6" high, spaced 3'-0" apart, 7'-0" above floors. Where gym bleachers are higher than 7'-0", markings shall be 12" above bleachers; where sill height is less than 7'-0" markings shall be immediately below sill. Numerals, beginning with "1" located 3'-0" from side wall, and running consecutively as far as length of wall permits, shall be painted on front wall; letters beginning with "A" located 3'-0" from front wall, running alphabetically as far as length of wall permits, shall be painted on the

two (2) side walls. No markings required on folding partition.

3. Shuffleboard: Numbers stenciled, 1" wide lines.

C. Music Room, Instrument Classrooms (Staves & Clefs)

1. Paint two music staves with treble and base clefs on chalkboard/markerboard where indicated on Drawings.
2. Each staff entire length of board or max 10 ft. long; in center of panel
3. Top line 4" from top of board; lines $1\frac{3}{4}$ " apart; 4" space between staves.
4. Paint white on Black background or black on light background, with heavy distinct lines of uniform width.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verification of Conditions

1. The application of painter's finish to any surface shall be taken to indicate that the Contractor considers such surfaces suitable for a first-class finish.
2. Do not apply painter's finish in any locations until the Work of other Contractors that might damage the new finish is completed.
3. Notify the Authority in writing regarding Work by others that does not provide a suitable surface for the new finish.
4. In case of dispute regarding the suitability of any surface, the Authority's decision shall be final and conclusive upon all concerned.
5. Contractor shall check the compatibility of previously painted surface with the new coating by applying a test panel 4 foot wide x wall height. Allow test panel to dry thoroughly; verify proper adhesion before proceeding with painting Work.

3.02 PREPARATION AND APPLICATION - EXISTING BUILDING**A. Protection**

1. In cases where the painting of surfaces involves removal or disturbance of existing paint and the paint is known or assumed to be lead-based paint, the following protection requirements shall apply:
 - a. All objects near or adjacent to the surface(s) to be painted shall be moved a minimum of three feet away from that surface(s). Any immovable object, and the floor, within the three foot "work area" shall be covered with one layer of 6-mil polyethylene, sealed on all edges to prevent the penetration of dust and debris. If the ceiling is to be painted, all objects in the room and the floor of the room shall be covered in this manner.
 - b. All objects bordering the three-foot work area shall be completely covered with clean cloths, heavy building paper or clean plastic covering.
 - c. If, during the removal of existing paint, the Contractor notices paint chips or other debris related to the ongoing work on objects beyond the border of the three foot work area, these objects shall be cleaned by HEPA vacuuming and wet-wiping and then covered as described in (b) above.
 - d. For exterior metal surfaces on the building or site the ground beneath the work area shall be surrounded on all sides by a washable construction tarp or 10-mil polyethylene. The covering need not be airtight; however, it must be of adequate size and durability to completely enclose the work area and prevent the dispersal of any paint chips or dust during paint removal activities. Any dust and debris shall be contained in the work area and shall be removed immediately upon generation. Protect from damage landscaping, paving, and other improvements near the building. Protect and seal all windows and openings within the work

area with a minimum of 1 layer of 6-mil polyethylene sheeting.

- e. The protection shall remain in place during all paint removal activities.
 - f. All protection is to be carefully removed, cleaned or discarded after painting is complete.
2. In cases where the painting of surfaces does not involve the removal or disturbance of existing paint or the paint is not lead-based as determined by testing by the Authority, the following protection requirements shall apply:
- a. In each area to be painted, cover and protect furniture, equipment and floors from damage with clean cloths, heavy building paper or clean plastic covering secured in place. All protection is to be carefully removed, cleaned or discarded after painting is complete.

B. Removal of Existing Work

- 1. Remove wire guards, screens, grilles and similar items as necessary to paint properly all surfaces, windows and doors, behind these items.
 - a. These items shall be HEPA vacuumed and wet-cleaned once removed. Once cleaned, the items shall be placed on 6-mil polyethylene sheeting (or equivalent) and covered with a second layer of 6-mil polyethylene sheeting.
 - b. If paint is to be removed from these items, the contractor shall ensure that the items are taken to a separate, non-occupied space prior to scraping and repainting.
- 2. Remove and paint behind pictures, signs, shades, drapes, furniture, cabinets, lockers and similar items that are not secured to walls.
- 3. Unless otherwise specified, radiators, convectors, univents need not be removed providing all visible surfaces of these items and visible surfaces behind them are properly painted.

4. Carefully mark removed work for identification and replace in the original location unless otherwise directed.

C. Surface Preparation

1. Gently wet mist the surface to be scraped with water, then remove all loose paint with scraper and putty knife.
2. Sand existing surfaces to dull sheen and gloss. Before sanding, wet mist the area to be sanded. (Power sanding without a HEPA-filtered vacuum recovery system is not allowed).
3. Remove dust by washing with water, using damp sponge or cloth.
4. After washing, spot prime grease and water stains; magic markers marks, crayon marks, lipstick marks, etc.; with a quick-drying alcohol base primer sealer to prevent bleeding.
5. Fill all cracks and holes with appropriate filler material, wet mist and sand flush with adjacent surfaces and spot prime. (Power sanding without a HEPA-filtered vacuum recovery system is not allowed).
6. Existing paint that was not removed with scraper and which appears to be sound shall receive spackling compound around perimeter high spots and feathered out so that surface is smooth. Repair gouges created by the scraping process and other imperfections in the existing surface with spackling compound to provide a smooth, even finished surface.
7. Apply number of finish coats specified herein or as many as may be necessary to obtain the proper finish and completely cover the substrate.
8. Cement Plaster: Coat surfaces to be patched with an approved bonding agent. Patch with an approved mortar patching mix and finish to match texture of adjacent surfaces.

9. Existing Woodwork:

- a. Prepare surfaces as indicated in paragraph 3.02.C, subparagraphs 1, 2, 3, 4, above.
- b. Puttying: Fill cracks, open joints, nail holes and similar defects in existing woodwork specified to be painted or varnished with plastic wood filler. Putty stop nail holes in all new woodwork specified to be painted or stained and varnished. Prime or seal all surfaces in contact with new putty. Color interior putty to match the finish.
- c. Touch-Up
 1. Spot prime defects in existing Work and Work primed under other Paragraphs of Work as necessary to produce an even plane in the new finish.
 2. All worn, scaled, blistered, crackled and discolored places in the existing stained and varnished work specified to be revarnished shall be wet-misted prior to being scraped or sanded, then filled and touched up with stain as required to equalize the color. (Power sanding without a HEPA-filtered vacuum recovery system is not allowed).
 3. Touch-up and equalize the color of new woodwork specified to be stained and varnished where damaged, due to job fitting and trimming.
 4. Touch-up all pitch streaks and knots in woodwork with shellac.

10. Existing Metal

- a. Prepare surfaces as indicated in paragraph 3.02.C, subparagraphs 1, 2, 3, 4, above.
- b. Machine tool clean exposed steel to an SSPC-SP3 surface preparation.
- b. For steel surfaces exposed to view, repair defects in surfaces to provide for an even

plane in the new finish. Use auto-body filler to even out surface and sand smooth.

11. Wood Sash: Clean and oil pulley stiles of wood sash with one coat of stained, boiled linseed oil at completion of painting of sash.
12. Glazing Repairs
 - a. Cut out loose and cracked putty on doors and windows. Replace cut out and missing putty with elastic glazing compound. If the putty contains asbestos, the Contractor shall abate the putty in accordance with the procedures specified in Section 02081 - Asbestos Abatement.
 - b. Prime Surfaces before applying glazing compound.

3.03 APPLICATION

A. General

1. No Work shall be performed where cement or plaster is being applied or is in the process of drying.
2. No Work shall be performed in spaces that are not broom clean and free of dust and waste.
3. Apply paint materials to produce smooth finished surfaces, free of brush or roller marks, drops, runs, or sags.
4. Paint materials shall be kept at a proper and uniform consistency. Paint shall be applied to achieve Dry film thickness (DFT) as recommended by manufacturer or to achieve the minimum thickness for paint systems as listed in Articles 2.06 and 2.07.
5. Thin only when necessary to achieve best results.
6. Thinners shall be material recommended by manufacturer of paint, and in quantity as recommended.
7. Excessive use of thinner as indicated by variation in absorption, lack of "hide", thickness of dry

film, mottled or streaky coat, shall be cause for rejection. Correct as directed.

8. Thinning of varnish or aluminum paint prohibited.
9. Apply all coats with brush or roller, varying slightly the color of succeeding coats.
 - a. If approved by the paint manufacturer, it is acceptable to spray and back roll two coats over primer on new walls. Spray and back rolling in the same application does not constitute two coats.
10. Brush out or roll on first or prime coat; work well into surface.
11. Each coat shall be inspected, approved and dry before proceeding with additional coats.
12. Allow at least 48 hrs for enamels and exterior paint to dry.
13. The surfaces of interior woods and metals shall be sanded or rubbed between coats to assure smooth finish and proper adhesion of subsequent coats.
14. Avoid lapping of paint on glass, hardware, or other adjoining surfaces.
15. Apply no paint to operating units where sliding contact of metals is necessary for proper functioning of unit.
16. Painting is not required on walls or ceilings in concealed and inaccessible areas.
17. Moving parts of operating units will not require finish painting unless otherwise required.
18. Do not paint over any code-required labels, such as Underwriter's Laboratories and Factory Mutual, or any equipment identification, performance rating, name or nomenclature plate.
19. Finish doors on tops, bottoms and side edges same as exterior faces.

20. For painting over existing oil based paint:
Prepare surface by lightly sanding the surface to be painted.

3.04 FIELD QUALITY CONTROL

- A. The Authority reserves the right to require the following material testing procedures at any time, and any number of times during period of field painting:
 1. Measurement of dry film thickness (DFT) by use of a dry film thickness gauge in accordance with use and calibration requirements of Structural Steel Painting Council [SSPC], "Method of Measurement of Dry Paint Thickness with Magnetic Gauges".
 2. Engage services of an independent testing laboratory, recommended by the Authority, to sample paint being used. Samples of materials delivered to construction site will be taken, identified and sealed, and certified in presence of Contractor
 3. Testing laboratory will perform appropriate tests for any or all of the following characteristics: Abrasion resistance, apparent reflectivity, flexibility, washability, absorption, accelerated weathering, dry opacity, accelerated yellowness, recoating, skinning, color retention, alkali resistance and quantitative materials analysis.
 4. If test results show that material being used does not comply with specified requirements, Contractor shall be directed to stop painting Work, and remove non-complying paint; repaint surfaces coated with rejected paint; remove rejected paint from previously painted surfaces if, upon repainting with specified paint, the two coatings are non-compatible.
 - a. If the samples do not comply with requirements of the Specifications, costs of

testing and remediation of rejected work shall be borne by Contractor.

- b. If the tests find that the samples do comply with the requirements of the Specifications, the cost of the testing will be borne by the Authority.

B. The Authority will engage the services of a Special Inspection agency to inspect the installation of the photoluminescent stair markings.

3.05 CLEANING

A. General

Contractor shall clean-up behind each paint crew such that painting and clean-up will be a continuous uninterrupted operation. The practice of one general clean-up after completion of all painting will be strictly prohibited. This clean-up will include, but not be limited to the following:

1. Remove spots or defacement resulting from Work of this Section.
2. Retouch all damaged surfaces to leave Work in perfect finished condition.
3. If spots or defacement cannot be satisfactorily removed and retouched, re-finish the surfaces as directed.
4. Within the three foot work area created for removal and painting where existing paint is known or assumed to be lead-based all objects and surfaces shall be thoroughly HEPA vacuumed, wet-cleaned and HEPA vacuumed again. In rooms where the ceiling has been painted all surfaces and objects in the room shall be cleaned in this manner.
5. The contractor shall ensure that the objects and surfaces under protective covering are free of any dust or debris created during painting activities. If necessary, these objects and surfaces shall be wet cleaned and HEPA vacuumed.

6. The contractor shall conduct any cleaning deemed necessary by the independent environmental consultant.
7. Free all operating units of painted materials and leave them clean and in proper working order.
8. Remove from premises all surplus paint materials, debris and any other rubbish resulting from the Work.
9. Leave storage space clean and in condition required for equivalent spaces in project.

3.06 PROTECTION

- A. Provide caution tape and/or locked entryways during paint removal activities in existing buildings to prevent access to the work area from unauthorized personnel.
- B. Provide "Wet Paint" signs to protect newly-painted finishes. Remove temporary protective wrappings provided by others for protection of their Work after completion of painting operations.
- C. At the completion of Work of other trades, touch-up and restore all damaged or defaced painted surfaces as directed by the Authority.

3.07 DISPOSAL OF PAINTED WASTE AND DEBRIS FROM EXISTING BUILDINGS

A. Testing

Perform Toxicity Characteristic Leaching Procedure (TCLP) testing of all painted waste and debris generated from existing painted objects and surfaces.

B. Storage and Disposal

Storage and disposal shall be in accordance with Specifications Section S01900 - Existing Premises Work, Article titled "Disposal of Painted Waste and Debris".

END OF SECTION

* * *

LIST OF SUBMITTALS

<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>
Product Data:	_____	_____
1. Manufacturer's product literature for all materials with directions and recommendations for environmental conditions, surface preparation, priming, mixing, reduction, spreading rate, application, storage, MPI number and VOC content.		
Samples:	_____	_____
1. Initial selection: manufacturer's color charts for each type of finish.		
2. Verification prior to installation: color chips for surfaces to be painted.		
3. Verification prior to installation: two samples of each color and material on 12" x 12" hard-board.		
4. Verification prior to installation: Two samples of finish on concrete masonry and metal surfaces.		
5. Samples of stained and varnished wood in triplicate on 4" x 8" samples of the species of wood specified, and clearly labeled.		
Quality Assurance:	_____	_____
1. Certification that materials for each system are obtained from a single manufacturer.		
2. Certification that Work shall be performed by personnel with a minimum of three years experience who meet the qualifications set forth in OSHA, 29 CFR 1926.62 (Lead		

- In Construction Standard.
3. Certification that material meets or exceeds the performance requirements of Federal Specifications.
 4. Certification that materials comply with N.Y.S. and CARB 2007 regulations for Volatile Organic Compounds.

Field samples:

1. Samples of each color and Finish.
2. Corridor wall sample.

Testing:

1. Toxicity Characteristic Leaching Procedure (TCLP) test results.

Guarantees

Low Emitting Materials Submittals:

1. Documentation of VOC content for each coating to be used for the building to show compliance with CARB 2007 and Section G01600.

* * *

SECTION 10400
IDENTIFYING DEVICES

PART 1 -GENERAL

1.01 DESCRIPTION OF WORK

- A. Provide identifying device Work as indicated on the Drawings and as specified herein, including but not limited to cast metal letters and etched zinc signs.
- B. Locations of identifying devices shall be as indicated on Drawings and as specified herein. The terms "signs" and "plates" are used interchangeably.

1.02 REFERENCES

- A. References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by governing codes or regulations, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.
- B. International Code Council, ICC A117.1-2009, Accessible and Usable Buildings and Facilities
- C. Copper Development Association (CDA)
- D. National Association of Architectural Metal Manufacturers (NAAMM)
- E. Americans with Disabilities Act (ADA), Accessibility Guidelines,
- F. New York City Building Code (2022), Section BC 1031 - Signage.

1.03 SUBMITTALS

- A. Schedule and layouts for all signs, indicating sign type, material, location, text, text letter style, inserts, dimensions, color, Braille transcriptions, and other pertinent information. Submit a photocopy proof of each zinc sign, complete with Braille.

All Braille transcriptions shall be reviewed for accuracy by a Braille transcriber or proofreader holding a certificate issued by the Braille Development Section, National Library Service for the Blind and Physically Handicapped, Library of Congress. Submit proof of

Library of Congress certification together with the reviewed Braille transcriptions.

B. Project Closeout Submittals

1. Floor Diagram Signs: Submit 2 extra reproducible graphic copies of each floor diagram.
2. Compact disk containing all signs and inserts, other than cast letters, tablets and seals, in Adobe Illustrator, EPS format.
3. Touch-up coating kit for zinc signs, to match the original "Brushed Aluminum" color coating; each container labeled by coating manufacturer. Kit shall consist of 3 quarts paint, 1 quart catalyst, 1 quart additive for brush application, 1 five-ounce clear graduated mixing container, 2 touch-up brushes, 1 pint brush cleaning solvent, 4 sheets of abrasive paper for removing scratches, and complete instructions for use of the kit.

In addition, provide one pint of touch-up paint of each color used for text and background, other than the "Brushed Aluminum" color.

4. Provide four Torx Pin-Head drivers for each size required.

C. Low Emitting Materials Compliance Submittals

1. Provide documentation for each adhesive to be used on the building interior, indicating that the adhesives comply with low V.O.C. requirements as stated in Specification Section 01600.

1.04 QUALITY ASSURANCE

- A. Work of this Section shall be performed by firms experienced in metal casting, signage manufacture and installation of these items.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store and handle products of this Section as recommended by manufacturer or fabricator to protect from damage.

PART 2 - PRODUCTS

2.01 CAST ALUMINUM LETTERS - Not Used

2.02 CAST BRONZE LETTERS - Not Used

2.03 SCHOOL DEDICATION PLAQUE - CAST BRONZE - Not Used**2.04 CAST ALUMINUM SEAL - - Not Used****2.05 ETCHED ZINC SIGNS, GENERAL**

Provide room signs, stair signs, Tactile exit signs, live load signs, standpipe signage, elevator signage, elevator landing signs, and other etched zinc signs as specified herein.

- A. Signs and plates specified herein as zinc shall be chemically etched zinc with raised lettering and pictograms as indicated on the Drawings and as specified. Background area shall be etched to a depth of .032" to .040", to produce raised tactile text, pictograms, and Braille. Signs shall be one-piece solid zinc plate .125" thick prior to etching, unless specified otherwise. For 2"x4" room number plates to be installed on door frame heads the zinc plate shall be .064" thick prior to etching. For signs with changeable inserts, the tactile text portion of the sign shall be a .064" thick zinc plate, permanently laminated to an aluminum extrusion or precision routered aluminum plate for a total thickness of .375" as indicated on the Drawings. Surfaces, edges and corners shall be eased and polished as necessary to eliminate all roughness and sharpness.
- B. Unless indicated otherwise, zinc and aluminum surfaces, including the sign face, edges, area behind inserts, and exposed screw heads, shall receive spray painted Matthews acrylic polyurethane enamel, for a uniform eggshell-matte finish; Matthews Paint Company color name "Brushed Aluminum", color number 41342SP. Raised letters, numerals, and pictograms shall receive black acrylic polyurethane enamel unless indicated otherwise. Prepare and prime metal surfaces prior to finish paint coating as recommended by the paint manufacturer. All finishes shall be baked on as recommended by the coating manufacturer. Exposed screw heads shall be painted without clogging drive sockets.
- C. Where finish is specified as red letters on white background, or other multi-color combination, surfaces shall be painted with polyurethane acrylic enamel paint. If the sign is exposed to the outdoors the paint shall be exterior rated, containing UV inhibitor.
- D. Provide Grade II Braille for all signs unless indicated otherwise, accurately transcribed from letter and numeral characters.

- E. Drilled and countersunk mounting holes, unless indicated otherwise.
- F. Fabricate signs to comply with requirements of Americans with Disabilities Act (ADA) and ICC A117.1.
- G. Manufacturers
 - 1. American Legacy signage/Dutton Architectural, Soddy Daisy, TN 37379 Phone 423-332-5233.
 - 2. Advance Corp., Braille-Tac Div., St. Paul, MN 55101. Phone 651 771-9297.
 - 3. Signs and Decal Corp., Brooklyn, NY 11211. Phone 718 486-6400.

2.06 ROOM NUMBER SIGNS, ROOM NUMBER AND NAME SIGNS, ACCESSIBLE TOILET SIGNS, ACCESSIBLE LOCKER ROOM SIGNS - Not Used

2.07 ROOM IDENTIFICATION SIGNS WITH CHANGEABLE INSERTS - Not Used

2.08 STAIR IDENTIFICATION SIGNS, STAIR FLOOR IDENTIFICATION SIGNS, STAIR ACCESSIBLE FLOOR LEVEL IDENTIFICATION SIGNS - Not Used

2.09 ELEVATOR FLOOR DESIGNATION SIGNS - Not Used

2.10 ELEVATOR EMERGENCY SIGNS WITH INSERTS - Not Used

2.11 SIGNS FOR SYMBOLS OF ACCESSIBILITY - Not Used

2.12 VIDEO SURVEILLANCE SIGNS - Not Used

2.13 FIRE RESCUE AREA SIGNS - Not Used

2.14 AREA OF RESCUE ASSISTANCE SIGNS - Not Used

2.15 HOLDING AREA SIGNS - Not Used

2.16 FIRE DEPARTMENT ACCESS SIGNS FOR BREAKABLE GLAZING WINDOWS - Not Used

2.17 DIRECTIONAL SIGNS TO ACCESSIBLE BUILDING ELEMENTS - Not Used

2.18 PLACES OF ASSEMBLY OCCUPANCY SIGNS - Not Used

2.19 BICYCLE PARKING DISCLAIMER SIGNS - Not Used**2.20 FRAME FOR CERTIFICATE OF OCCUPANCY - Not Used****2.21 SIGNS FOR SYMBOL OF ACCESS FOR HEARING LOSS, SIGNS FOR ASSISTIVE LISTENING DEVICES, SIGNS FOR AREA WITH AUDIO INDUCTION LOOP SYSTEM - Not Used****2.22 OTHER AGENCY PLAQUES - CAST BRONZE - Not Used****2.23 NYC GREEN SCHOOLS CERTIFICATION PLAQUE - CAST BRONZE - Not Used****2.24 LUMINOUS EXIT PATH SIGNS AND MARKINGS - Not Used****2.25 DOOR SIGNS FOR EXIT STAIRS - Not Used****2.26 ELEVATOR SIGNAGE - Not Used****2.27 RAISED CHARACTER AND BRAILLE EXIT SIGN - Not Used****2.28 CAUTION/SAFETY SIGNAGE - Not Used****2.29 STANDPIPE SIGNAGE - Not Used****2.30 "TAKE THE STAIRS" SIGN - Not Used****2.31 PAINTED ALUMINUM SIGNS, GENERAL - Not Used****2.32 CERTIFICATE OF OCCUPANCY PLANS - - Not Used****2.33 EXTERIOR SCHOOL ORGANIZATION SIGNAGE - Not Used****2.34 MISCELLANEOUS MATERIALS****A. Construction Adhesive**

All adhesives to be used on the building interior shall be low V.O.C. in accordance with the requirements of Section G01600.

1. Henkel Loctite "PL" Premium Advanced Polyurethane Construction Adhesive
2. Liquid Nails "LN-950" Polyurethane Construction Adhesive.

- B. Double face acrylic foam tape: 3M VHB Tape 4950, 1/2" wide.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Install no Work until surfaces on which Signage, Seals, Tablets, and other Work for this Section are to be placed and attached are completed and free of defects.

3.02 PREPARATION

- A. Surfaces to receive placement of Work of this Section shall be clean and dry.

3.03 INSTALLATION

- A. Install signage, seals, tablets, plaques, and other Work of this Section level and plumb, secured to substrate as detailed on Drawings, as specified, and as recommended by manufacturer. Use concealed attachments where possible for cast letters and plaques, and tamper-resistant fasteners and adhesive for other signs.

- B. Mounting Locations

Mount all signs, seals, tablets, plaques, and other Work of this Section as indicated on Drawings and as specified herein.

- C. Mounting

1. The Contractor shall be responsible for the following:
 - a. Coordinating the location and size of metal grounds concealed behind wallboard, to receive the fasteners for the signs.
 - b. Marking the location of all sign fasteners on the wall.
 - c. Drilling the pilot holes.
 - d. Supplying the specified fasteners, masonry anchors and drivers.
 - e. Installing the signs.
2. Zinc signs shall be secured to masonry walls with construction adhesive in addition to tamper-resistant Torx Pin-Head, diameter #10, x 2" long,

flat head countersunk masonry anchors. Sand and roughen substrate to receive adhesive as per manufacturer's instructions. Interior anchors to be zinc plated, exterior anchors to be hot dip galvanized.

3. Zinc signs shall be secured to partitions constructed of wallboard, metal studs, and metal grounds, with construction adhesive, in addition to tamper-resistant Torx Pin-Head, diameter #10, flat head countersunk zinc plated sheet metal screws. Drill pilot holes if required. Provide screw length sufficient to penetrate at least 1/2" past wall finish materials, wallboard, and metal grounds. Prepare substrate to receive adhesive and apply as per manufacturer's instructions.

Signs less than 75 in² in area that are located on ceramic tile wall finish shall be mounted with double face acrylic foam tape and construction adhesive, and shall be fabricated without screw holes. These signs shall be mounted with double face acrylic foam tape and construction adhesive. Apply tape around perimeter of the back of sign, leaving 1" open on each side, and adhesive covering the remainder of the back. Brace sign until securely adhered.

4. Furnish and install fasteners in such manner that there are no exposed sharp edges in the completed installation. Exposed screw heads shall be painted to match sign, without clogging drive sockets.
5. Door mounted aluminum signs shall be secured to substrates with very high bond double-sided tape or structural adhesive as recommended by the marking manufacturer to prevent unauthorized loosening or removal.

3.04 FIELD QUALITY CONTROL - Not Used

3.05 CLEAN-UP AND PROTECTION

- A. Clean surfaces of Work of this Section.
- B. Remove debris resulting from Work of this Section from Work Area.
- C. Remove protection covers and protect Work until Project Completion.

PART 4 - SCHEDULE OF SIGNAGE - Not Used

END OF SECTION

* * *

LIST OF SUBMITTALS

<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>
Schedule and layouts:	_____	_____
Sign type, material, location, text, text letter style, inserts, color, dimensions, Braille transcriptions, photocopy proofs, etc.		
Certification:	_____	_____
Library of Congress cert. for Braille transcriber/proofreader		
1. Name of Supplier 2. 3 Photographs (8" x 10") Closeout:	_____	_____
1. Floor diagram sign graphics. 2. Compact disc, Adobe Illustrator EPS format. 3. Insert paper. 4. Acrylic lenses. 5. Set screws and allen wrenches. 6. Touch-up coatings kit. 7. Graffiti cleaning solvent. 8. Torx Pin-Head screwdrivers. 9. Extra Torx Pin-Head screws. 10. Double stick document tape.		
Low Emitting Materials:	_____	_____
1. Documentation of VOC content for each adhesive to be used inside the building to show compliance with Section G01600		

* * *

SECTION 15401
GENERAL PROVISIONS FOR PLUMBING AND DRAINAGE WORK

1.01 SCOPE AND INTERPRETATION

- A. These Specifications and accompanying Drawings provide for the furnishing, setting, connection and installation of sanitary and storm drainage supply systems.
- B. The specifications and Drawings require the Contractor to provide all labor, materials, equipment and appliances to perform of all Work pertaining or incidental thereto, which is needed to complete the Work shown on the Drawings and called for in the Specifications.
- C. The complete systems and the Work shall be so installed as to give proper and continuous service under all conditions, and shall be in accordance with the requirements of all public authorities having jurisdiction and to the complete satisfaction of the Authority. Any Work shown on the Drawings and not particularly described in the specifications, or vice versa or any Work which may be deemed necessary to complete the Contract shall be provided by the Contractor as part of its Contract.
- D. For purposes of clearness and legibility, plumbing Drawings are essentially diagrammatic and size and location of equipment are drawn to scale wherever possible. The Drawings indicate size, connection points and routes of pipe. It is not intended, however, that all offsets, rises and drops are shown. Provide piping as required to fit structure, avoid obstruction, and retain clearances, headroom openings and passageways. Piping installed over any means of egress and access passageways must be 7'-6" clear inclusive of insulation.
 - 1. Piping at equipment must be done in a manner such that access around equipment is not impeded, such as at equipment platforms.
- E. Scope of Work: The plumbing and drainage work of this contract shall include but shall not be limited to the following systems, equipment and services:
 - 1. Sanitary Drainage/Vent piping: Demolish and remove existing section of back-pitched piping within the cafeteria. Reroute existing sanitary piping as required to bypass the existing back-pitched piping and connect to the existing outfall. Provide new sewage ejector.

2. Storm Water Drainage Piping: Disconnect existing storm piping from sanitary piping and pipe to new storm pit for connection to existing outfall. Provide storm trap within concrete pit. Provide new backwater valve within pit downstream of the new storm trap.
3. Piping, and Equipment Supports: To comprise all restraints, hangers, pipe guides, rods, beam clamps, brackets, pipe anchors, other attachments, floor flanges, masonry anchors, bolts, nuts, washers, and other items as required to fully support all piping, and equipment installed under this contract. Use of irregular shaped units such as strut channels is not permitted.
4. Piping - General: Piping, piping installation or hook-up shall mean a complete installation in all respects including pipe, fittings, valves, unions, traps, strainers, specialties and other miscellaneous items to make piping systems and equipment operational.
5. Insulation, Painting and Identification: As specified in their respective sections of this Contract.
6. Tests: The Contractor shall perform pressure, performance and operating tests and other tests as hereinafter specified, as directed by the Authority and as required by agencies having jurisdiction as specified in Section 15414 "TESTS".
7. Sealing of Openings: Openings left in walls, floors, ceilings or partitions shall be sealed. Finish shall match existing adjoining finish in all respects.
8. Pre-installation Conferences
 - a. Before the P&D Work is scheduled to commence, a conference will be called by the Authority's Representative at the site for the purpose of reviewing the Drawings and the Specifications and discussing requirements for the Work. The conference shall include, at a minimum, the Contractor, the P&D Contractor, the Architect and the Authority's Construction Inspection Division (CID) Inspector. Contractors/installers of other trades may also be required to attend to discuss coordination with their work. The Contractor

shall send a conference agenda to all attendees prior to the scheduled date of the conference.

b. The P&D Contractor shall attend pre-installation conferences of other trades for coordination of the work.

9. All penetrations made into other trades work are to be sealed to air tight/watertight condition. Penetrations through insulated systems, such as refrigerated rooms/equipment, etc, shall be insulated and sealed on both sides of penetration. Sealant on interior side of such insulated spaces/equipment shall be silicone recommended by manufacturer.

10. Project Record Documents: For the requirements under this provision, refer to Section G01720.

1.02 CODES AND STANDARDS

A. It shall be unlawful for any person to perform the work referred to under this Plumbing and Drainage Specifications and/or shown on the Plumbing and Drainage Contract Drawings unless such person is a licensed master plumber, partnership, corporation or other business association as permitted by the NYC Building Code and unless such work is performed under the direct and continuing supervision of a licensed master plumber.

B. Where requirements for products, materials, systems, equipment, methods and other portion of the work specified herein exceed minimum requirements of regulatory agencies having jurisdiction over the construction work, contractor shall comply with such requirements specified herein, unless specifically approved otherwise by the Authority.

1.03 TORCH BURNING OPERATION - N/A

1.04 PROTECTION OF MATERIALS AND WORK

1. New Work

1. Open ends of piping shall be temporarily closed by a proper fitting, until piping is approved and ready for service. The use of water closets and other plumbing fixtures during the progress of the Work is strictly prohibited.

2. Plumbing fixtures and other items shall be protected during the progress of the Work. When the work is practically all other items shall be cleaned and all metal work polished and the entire installation put in perfect working order.

1.05 GUARANTEES AND WARRANTIES

- A. The Requirements of Section G01740 and this Article shall apply to Guarantees and Warranties.
- B. Contractor's Guarantees: The Contractor guarantees that all Work of this Contract is free from all defects, and is as specified, and that should any defects, which cannot be proven to have been caused by improper use, develop within the space of one year from the date of substantial completion of the Work, such defects shall be made good by the Contractor, free of cost to the School Construction Authority.

1.06 GAGES

- A. Wherever thickness of metals are designated on the Drawings or in the Specifications by gage number, and the type of gage, or thickness in decimals of an inch, is not stated, the following gages shall apply.

<u>Material</u>	<u>Gage</u>
Aluminum Sheet	Brown & Sharpe or American Wire
Wire Aluminum, Brass and Copper	Brown & Sharpe or American Wire
Sheet Brass and Copper	Brown & Sharpe or American Wire
Brazed Brass and Copper Tubing	Brown & Sharpe or American Wire
Seamless Brass and Copper Tubing	Birmingham Wire (Stubs Iron)
Seamless Steel Tubing	Birmingham Wire (Stubs Iron)
Stainless Steel Sheets.....	U.S. Standard
Stainless Steel Seamless Tubing	Stubs Iron
Monel Metal Tubing	Birmingham Wire (Stubs Iron)

Monel Metal Sheets	U.S. Standard
Sheet Steel and Iron	U.S. Standard
Steel Wire	American Steel and Wire
Zinc	Zinc

1.07 OPENINGS AND CHASES

- A. In addition to the requirements in the Article entitled Cutting, Patching and Removals of Section S01010, the following shall also apply:

Openings through exterior foundation walls shall be made watertight by the Contractor after pipes, conduits and other items passing through the wall have been installed. This building is planned and detailed, and is the intent of these specifications to provide a structure that will prevent the penetration by rodents and vermin of any vacant space where they might find a harborage. The Contractor will be held responsible for securing this condition by the closing of all points of access to such spaces, including the passage of piping and conduits, through all walls, partitions, ceilings and furred out spaces, the closing of access to voids in hollow tile or cinder blocks. There shall be a special inspection of the building with regard to this matter before final acceptance.

1.08 INSTRUCTION OF CUSTODIAN

- A. After the drainage systems have been tested, and all other items adjusted and operating properly to the satisfaction of the Authority, Contractor shall furnish a competent person to instruct the Custodial staff in the operation and maintenance of the systems. Determination of the date and time of such instruction shall be under the direction of the Authority's Representative.

1.09 TEMPORARY FIELD OFFICE - N/A

1.10 SUBMITTALS

- A. Formal submission for approval of manufacturer is not required if the Contractor provides equipment as per manufacturer/model number or series listed in the specification. Formal submissions are also not required for materials and appurtenances (ex. sheet metal, pipes, etc.) if the Contractor provides items

as defined in the specification. In this case, Contractor must submit affidavit (for record purposes only) stating that listed equipment and/or items as defined in the specification will be provided. Submittals are mandatory for certain critical items and will be so noted in the respective specifications. Submittals are always required to verify capacity. Schedules, installation instructions, startup manuals, operation and maintenance manuals, and shop drawings are always required to be submitted.

1.11 CLEANING AND REPAIR

- A. At the completion of the Work and before the final inspection is made the Contractor shall thoroughly clean the work area and leave the space free from marks, scratches, stains, and other damage. All pumps, filters, heaters, and other equipment shall be cleaned and left in condition to operate, and the work, as a whole, left in perfect working order. Remove all tools, debris and excess materials from the premises.
- B. Contractor shall not leave sharp exposed metal edges (bottom of threaded rods, P&D equipment supports, etc.) that could otherwise present safety hazards to the building's occupants/work staff.

1.12 BMS/DDC COORDINATION - N/A

END OF SECTION

* * *

LIST OF SUBMITTALSSUBMITTALDATE SUBMITTEDDATE APPROVED

Contractor's affidavits
For submission of specified
Materials/or appurtenances

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SECTION 15410
PLUMBING PIPING

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Extent of plumbing piping work is indicated on Drawings and by the requirements of this Section including but is not limited to the following:

1. Pipe
2. Fittings
3. Piping Joints
4. Sleeves for Pipes
5. Cleanouts and Cleaning Screw Plugs
6. Traps

1.02 RELATED SECTIONS

A. Firestopping.....	Section 07270
B. Painting.....	Section 09900
C. Drainage.....	Section 15415

1.03 CODES AND STANDARDS

A. Comply with applicable portions of the Building Code of the City of New York. Where requirements for products, materials, equipment, methods and other portion of the work specified herein exceed minimum requirements of NYC Building Code, contractor shall comply with such requirements specified herein, unless specifically approved otherwise by the Authority.

B. Standards listed below are referenced in this section.

1. American Society for Testing and Materials (ASTM)
2. American Standards Association (ASA)
3. American National Standards Institute (ANSI)

4. United States of America Standards Institute (USASI)
 5. Cast Iron Soil Pipe Institute (CISPI)
 6. American Water Works Association (AWWA)
 7. NSF International
- C. Approved Agency Certification: Certification and listing by an Approved Agency in accordance with NYC Dept. of Buildings rules, indicating that the materials and assemblies as regulated by the NYC Building Code are acceptable for the intended use. When test methods are stipulated in the NYC Building Code, the tests utilized shall be stated in the Certification. Prior MEA approvals are acceptable for materials and assemblies conforming to current Code requirements

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pipe materials properly protected, and undamaged.
- B. Properly protect all piping so as to prevent damage to the pipe or the introduction of foreign material into the pipe. For the purpose of protecting piping from pre-installation contamination, all piping shall be shipped to job site with suitable caps, sheet metal covers or plugs. Pipe caps shall not be removed until just before installation.
- C. Examine all pipe and fittings before laying. Do not install any piece that is found to be defective.

1.05 SUBMITTALS

- A. Product Data
 1. Clean-outs
 2. Pipes & fittings
- B. Submit Shop Drawings for all piping installations.
- C. Pipe Schedule: Itemize pipe and fitting materials for each specified application.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Piping shall conform to the following:

1. Cast-iron Pipe

a. Bell and Spigot ends:

Evenly coated, cylindrical, smooth, free from all defects, of uniform thickness and of the weights required by the New York City rules governing Plumbing and Drainage, and shall be of the grade known in commerce as "service weight". Each length of pipe and each fitting shall be plainly marked with the manufacturer's name or registered trademark and with the letters "SV" to indicate "Service weight". The marking may be cast, stenciled, or otherwise applied on the pipe so as to be clear and legible at the time of installation. The marking shall be cast on fittings and shall be located away from the spigot end so as not to interfere with proper joining upon installation. Cast-iron soil pipe and fittings shall comply with ASTM A74;

b. No-Hub:

Evenly coated, cylindrical, smooth, free from all defects, of uniform thickness and of the weights required by the New York City rules governing Plumbing and Drainage. Each length of pipe and each fitting shall be plainly marked with the manufacturer's name or registered trademark. The marking may be cast, stenciled, or otherwise applied on the pipe, and cast on fittings so as to be clear and legible at the time of installation. Cast-iron soil pipe and fittings for hubless cast iron sanitary system shall comply with CISPI Standard 301, and ASTM A888, latest edition.

B. Fittings and Joints

1. Cast-iron Hub and Spigot Piping:

- a. Fitting shall be service weight pattern, evenly coated, manufactured in accordance with the current ASTM A74 and shall correspond with the pipe in all particulars.

- b. Material used for Hub and Spigot caulked joints shall be molten lead and packed oakum.

2. Cast-iron No-Hub Piping (Hubless Coupling)

- a. Cast iron No-Hub pipe fittings shall be made up to comply with CISPI Standard 301 and ASTM A888. No-Hub coupling gaskets shall conform to ASTM C564. Each approved coupling shall be permanently marked on its external surface with: manufacturer's name or trade mark, nominal pipe size, and shall meet pressure testing standards set in ASTM C1540.
- b. Stainless steel couplings shall be heavy duty with shield of 28 gauge 304, 18-8 chromium nickel stainless steel, neoprene gasket and stainless steel bolts and bands and shall conform to ASTM C1540.

Couplings shall be HI-Torque 80 by Clamp-All Corp., with two (2) clamps for pipe sizes up to and including 4" and four (4) clamps for pipe 5" to 10"; or Husky HD-2000 by Husky Technologies Division of ANACO with four (4) clamps for pipe sizes up to and including 4" and six (6) clamps for sizes 5" to 10" or Mission HW Series by Mission Rubber Company, with four (4) clamps for pipes up to and including 4" and six (6) clamps for pipes 5" to 10"; or POC coupling by Thermafit Industries.

C. Cleanouts and Cleaning Screw Plugs

- 1. Cleanouts shall conform to the features of the cleanouts contained in the schedule below. The manufacturer's numbers are for the purpose of type only. The contractor shall submit manufacturer product technical data for each type required before installation for approval.
 - a. Gasket seal plugs will not be accepted in place of taper thread plugs.
- 2. Cleanout plugs shall be bronze and countersunk type with taper screw threads.

3. Cleanouts for cast iron pipe in exposed horizontal runs and accessible hung ceilings shall be as follows:
 - a. Cleanouts for membrane waterproof floors shall be provided with an integrally cast flashing flange with flashing clamp.
 - b. Cleanouts in unfinished areas shall have cast iron tops and covers and in finished areas shall have nickel bronze tops and covers.

Cleanout Schedule:

<u>Location</u>	<u>Piping</u>	<u>Figure Number</u>
Wall	Exposed Cast Iron	Smith 4420 Wade W-8550E w/8480R MIFAB C1450 Zurn Z1440-BP w/ZS-1469 WATTS CO-380-RD
Cleanout: Cast iron spigot ferrule with cast bronze taper thread plug and S/S cover.		
Wall	Concealed Cast Iron Wade	Smith 4532-U W-8560E w/8480R-75 MIFAB C1460-RD-6 Zurn Z1446-BP-VP WATTS CO-460-RD
Cleanout: Cast iron cleanout tee, taper thread, bronze plug with stainless steel round cover and vandal-proof screw.		
Floor-Concrete	Steel or Cast Iron	Smith 4248-U Wade W-6000Z,75 MIFAB C1100-XR Zurn ZN1400-BP-VP WATTS CO-200-RX-4
Cleanout: Cast iron floor level cleanout assembly with heavy duty, round, adjustable, scoriated cast iron top, non-tilt tractor cover, and an inside caulk outlet; taper thread, bronze plug and vandal-proof screw.		
Floor-Terrazzo	Cast Iron	Smith 4188-U Wade W-6000U,75 MIFAB C1100-UR Zurn ZN1400-Z-BP-VP

WATTS CO-200-U

Cleanout: Cast iron floor level cleanout assembly with round adjustable nickel bronze top recessed for terrazzo and an inside caulk outlet; taper thread, bronze plug vandal-proof screw.

Floor-General Cast Iron
Finished Area

Smith 4028-U
Wade W-6000-1,75
MIFAB C1100
Zurn ZN1400-BP-VP
WATTS CO-200-R

Cleanout: Cast iron floor level cleanout assembly with round, adjustable, scoriated, nickel bronze top, and no-hub outlet; taper thread, bronze plug and vandal-proof screw.

- D. Pipe Sleeves: Provide pipe sleeves of one of the following. Pipe sleeve must be appropriate type and thickness for the UL firestopping assembly selected:
1. Sleeves and materials for sealing sleeves for gas piping through exterior walls and floor slabs on earth shall be as specified and approved by the Gas Company.
 2. Sheet-Metal: Fabricate from galvanized sheet metal; round tube closed with snaplock joint, welded spiral seams, or welded longitudinal joint. Fabricate from the following gauges: 3" and smaller, 20 gauge minimum; 4" to 6", 16 gauge minimum; over 6", 14 gauge minimum.
 3. Steel-Pipe: Fabricate from Schedule 40 galvanized steel pipe; remove burrs.
 4. Iron-Pipe: Fabricate from cast-iron or ductile-iron pipe; remove burrs.
 5. Firestop penetration materials for sealing sleeves shall be listed by Underwriters Laboratories and if not listed have MEA or OTCR approval. The materials shall be as specified in Section 07270. For pipes passing through fire-rated floor, cast-in place firestop device with Underwriters Laboratories listing, and if not listed have MEA or OTCR approval, is permitted as an acceptable sleeve alternative to a metallic sleeve with firestopping material. The cast-in place device is a one-step firestopping process that does not require additional firestop penetration materials for

sealing the sleeves. The device shall be installed where required for sleeving purposes. The cast-in place firestop device shall not be used for wall applications.

6. Materials for sealing space between each pipe and sleeve through non-fire rated exterior walls above grade shall be Non-shrinking cement. Materials for sealing space between each pipe and sleeve through non-rated interior walls shall consist of mineral wool and sealant.

E. Traps

1. Cast-iron and silicon iron traps shall be extra heavy pattern, manufactured in accordance with the current ASTM Standard Specifications.

PART 3 - EXECUTION

3.01 PIPE AND FITTING SCHEDULE

A. Storm Piping: Above Ground - Interior

1. Hubless Service Weight Cast Iron (SVCI) with mechanical stainless steel couplings.

B. Storm Piping: Underground - Interior

Service Weight Cast Iron bell and spigot with lead and oakum joints.

C. Sanitary Piping, Waste & Vent: Underground - Interior

Service Weight Cast Iron bell and spigot with lead and oakum joints.

3.02 INSTALLATION

A. Piping (General)

1. The run and arrangements of all pipes shall be approximately as shown on drawings or specified and as directed during installation, and shall be as straight and direct as possible, forming right angles or parallel lines with building walls and other pipes, and neatly spaced. No pipe shall be installed where the headroom will be interfered with unless the conditions are such that it is unavoidable and permission is obtained from the

Authority. Offsets will be permitted where walls reduce in thickness or beams interfere with direct runs; offsets shall be made at an angle of 45° to the vertical; in no case shall the space between the pipes, partitions, walls, etc., exceed 5". All exposed risers shall be erected plumb, standing free, close to and parallel with walls and other pipes and be uniformly spaced. All horizontal runs of piping hung from structural floor, slab or floor beams shall be erected as closely as possible to bottom of floor slabs, ceilings, or I-beams as the case may be. In no case shall the headroom, beneath the pipe, be less than (7'-0") where the pipe is installed more than (1'-0") from wall, partition, etc., except where piping is required to be installed in Boiler Room and Mechanical spaces above floor. Horizontal piping shall be so graded as to drain to the low points and water lines to drain bibbs. All piping installed in floor shall be painted with a heavy coat of asphaltum. All piping shall be installed with ample space for pipe covering. All exposed plumbing piping in the Kitchen Areas shall be chrome plated brass pipe except for gas line. Provide threaded fittings. Chrome (silver) paints will not be accepted.

2. Roughing under ground or concealed in the floor or wall construction shall be properly installed, tested and inspected before any of the roughing is covered up. Should any work be covered up before being inspected and tested, it shall be uncovered and recovered at the expense of the Contractor. Plugged fittings shall be installed when called for. Reducer fittings shall be used in making reductions in sizes of pipes; bushings will not be allowed. Suitable air chambers or Water Hammers Arresters shall be provided as called for in other sections.
3. All lines of piping and branches for fixtures passing through or in connection with waterproofing shall be brought to the proper locations and levels so that fixtures and piping may be installed without disturbing the waterproofing.
4. For work in existing buildings the following addition requirements shall be adhered to:
 - a. Piping shall run as straight as possible with the fewest number of changes in direction,

with such variations from the layout shown on the Drawings as conditions at the premises may require, as approved by the Authority at no extra cost to the Authority. Provide piping without sharp bends, quick changes of sections, pockets or bushings.

- b. The locations of all existing piping which are indicated on the Drawings are approximate. The Contractor shall investigate and ascertain the exact locations of such piping and make whatever minor variations in runs of new piping that may be required at no extra cost to the Authority.
- c. Contractor shall consider the location of all equipment, ductwork, piping, electric conduits, supports, steel work, etc., and all new piping shall be installed without interference therewith.
- d. Wherever existing branch piping interfere with installation of new branch piping, the existing branch piping shall be removed and re-routed to accommodate the new work. The rerouted work shall be of new material.
- e. All new extensions and relocations of existing piping systems shall be concealed in existing or new walls, floors, ceilings, pipe chases or as otherwise specified.
- f. Unused dead ended soil, waste and vent piping shall be removed as far as each branch, main, stack, etc., and capped or plugged concealed in hung ceilings, below floors or behind walls.

B. Piping Joints

1. Cast iron bell and Spigot Type

- a. Joints in cast-iron bell and spigot piping shall be caulked joints made with packed oakum and molten lead, 12 ounces of which must be used for each inch in diameter of the pipes at each joint and must be poured in at one time. The lead to be used for this purpose shall be soft "Pig" or "Bar." After cooling and shrinking, the lead shall be thoroughly

caulked and the joints made impermeable to gases and liquids, and also be capable of withstanding the tests applied. The face of the lead joints shall finish flush with the face of the hub and be left without putty, paints or cement. Whenever joints are made on the floor or surface they shall be re-caulked after being placed in position.

2. Joints in cast iron No-Hub pipe shall be heavy-duty type couplings. No-Hub cast iron pipe shall be cut square.
 - a. The use of No-Hub pipe and fittings for soil, waste, vent and storm piping is PERMITTED when installed above ground within buildings.
 - b. The use of No-Hub pipe and fittings is NOT PERMITTED for underground applications or when embedded in concrete.
3. Unions shall be used to connect equipment (pumps, circulators, tanks, meters, etc.) to water lines. The union shall be installed as close to the equipment as practical. Where valves are adjacent to equipment, union shall be on down stream side of valves.

C. Cleanouts and Cleaning Screw Plugs

1. Install cleanouts in the following locations: on all traps (except traps integral with floor drains), at the end of and at all points in change of direction of all drain pipes and branch drains, at all offsets, at the ends of all branch soil and waste pipes, and located in runs not more than fifty (50'-0") feet on center, and at all points to make accessible all parts of the drainage system. In underground lines the cleanouts for drains, traps, or branches shall extend up to and finish flush with finished level or made accessible with brick pits with cast iron frame and covers. Cleanouts in connection with vertical cast iron pipe above the cellar, except the traps and fittings on horizontal branches, shall have tapped tee fittings, same size as pipe, closed with bronze screw plugs. All other cleanouts in connection with cast iron pipes, traps and fittings shall have heavy full size cast iron ferrules, same size as pipes or fitting, caulked into hub and closed with

bronze screw plug. All cleanouts in connection with galvanized steel pipe, traps and fittings shall consist of drainage fittings closed with bronze screw plugs of heavy pattern. All cleanouts for silicon iron pipe shall be silicon iron, with silicon iron bolted covers, except cleanouts flush with floor, which shall be of the type as indicated on drawings.

2. Plugs used for cleanouts shall be same size as the fittings up to and including 4 inches. Sizes above 4" shall be reduced to allow for 4" cleanouts. For house traps 8" and larger plugs allowing for 6" cleanouts shall be used.
3. Cleanouts occurring in membrane waterproof floors shall be provided with a flashing clamp device secured with brass bolts. Cleanouts in unfinished areas shall have brass or bronze tops and cover. Cleanouts in finished areas shall have polished nickel bronze tops and cover. Provide cleanouts with spanner type vandal proof screws.
4. Provide cleanouts at the base of all soil, waste and storm water leaders, and at all changes in direction on horizontal piping.
5. Cleanouts on 3" and larger pipes shall be installed so as to allow clearance of at least 18". Cleanouts on pipes less than 3" shall be installed so as to allow at least 12" of clearance.

D. Sleeves for Pipes

1. General: All plumbing pipes passing through floors, roofs, walls, partitions, furring, beams, trenches, and wherever else indicated on drawings shall be provided with sleeves installed and maintained by the Contractor. Core drilled holes shall be provided with sleeves. Where plumbing pipes pass through potentially wet floors that do not have membrane waterproofing such as toilet rooms, cafeteria kitchens, serving areas, dish washing room, janitor's sink closet, mechanical equipment rooms, pipe chases and areas that are provided with fire protection sprinkler systems, the Contractor shall install sleeves of galvanized steel pipe with welded clips or equivalent at bottom ends for securing sleeves to form work and shall project one

inch above finished floors, and shall be caulked watertight.

2. Sleeves for gas service piping through exterior walls below grade and floor slabs on earth shall be installed and sealed in accordance with the latest regulations of the Administrative Code of the City of New York. Sleeves for gas piping and gas vents through exterior walls shall be installed and sealed in accordance with the requirements of the serving utility. The space between each pipe and its sleeve through floor slabs on earth and exterior walls above grade for all other piping shall be sealed tightly with picked oakum and molten lead. The lead caulking shall finish flush with the face of the sleeve. The space between each pipe and its sleeve through exterior walls below grade for all other piping shall be sealed tightly with link seals.
3. For interior walls and floors and for pipes through roof, the space between each installed pipe and its sleeve shall be sealed with a three hour rated fire stop penetration material. Fire stop materials shall be installed in accordance with the instructions of the manufacturer.
For floors and for pipes and for pipes through roof and not in walls: Cast-in fire stop device with Underwriters Laboratories listing and Material and Equipment Acceptance (MEA) approval or Approved Agency Certification listed and/or label is permitted as an acceptable sleeve alternative to a metallic sleeve with fire rated sealing caulk. The cast-in device is a one-step fire stopping process that shall not require additional fire stop penetration materials for sealing the sleeves. The device shall be installed where required for sleeving purposes.
4. Sheet Metal Sleeves
 - a. Sleeves for pipes passing through floors, partitions, hung or furred ceilings, shall be installed with 1/2" maximum clearance all around pipes. Each sleeve for a pipe passing through an interior floor slab shall be fitted with a one-inch flange, or equivalent, at the bottom end for the purpose of securing it to the form work or sheet metal deck.

The sleeve shall finish flush with the top of the finished floor. Sleeves for pipes passing through partitions, hung or furred ceilings shall be of one-piece construction and shall finish flush with the finished surface.

- b. Sleeves installed for pipes passing through vent ducts shall be securely fastened, soldered and made airtight.
- 5. Pipe Sleeve: Install pipe sleeves for pipes passing through roofs, concrete beams, brick walls, foundation walls and floor slabs on earth. Sleeves shall be installed with 1/2" maximum clearance all around pipe and shall finish flush with the surfaces penetrated. Pipe sleeves for pipes through roof shall be made of service weight cast iron only.
- 6. Sleeves through foundation walls below grade shall be provided under General Construction Work.
- E. Traps: Install traps full size of the piping to which it connects as indicated on Drawings or as required. All traps, except integral trap with floor drains, shall have cleanout.

END OF SECTION

* * *

LIST OF SUBMITTALS

<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>
Product Data:		
1. Escutcheons	_____	_____
2. Pipe & fittings	_____	_____
<u>OR</u>		
Contractor's affidavit Stating compliance with Piping materials requirements	_____	_____
Shop Drawings	_____	_____
Schedule:		
1. Pipe & fittings	_____	_____

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SECTION 15411
HANGERS AND SUPPORTS

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. Extent of hangers and support Work is indicated by the requirements of this Section.

1.02 SUBMITTALS

- A. Submit catalog cuts for each different type of hanger and rod, support and accessory.
- B. Submit method of support and hanging for Engineers approval prior to installation.
- C. Submit manufacturer technical data of insert and rod for approval.

1.03 QUALITY ASSURANCE

- A. No-Hub piping shall be installed and supported in full compliance with Local Law 100 of 1989.
- B. Cast-Iron Soil Pipe Institute (CISIP) Designation B10-1985 and Designation 301-1985.
- C. Manufacturers Standardization Society of The Valve and Fittings Industry (MSS) Compliance: Comply with:
MSS SP-58 Pipe Hangers and Supports - Materials, Design and Manufacture.
MSS SP-69 Pipe Hangers and Supports - Selection and Application.
MSS SP-89 Pipe Hangers and Supports - Fabrication and Installation Practices.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Pipe Hangers and Supports
 - 1. Hangers for horizontal piping (insulated and uninsulated) larger than one inch, shall be of carbon steel, adjustable clevis type and shall conform to MSS SP-69 Type 1. Hangers shall be Anvil International Fig. 260, Fig. 260 ISS or the approved equal of Carpenter & Paterson, Inc, Hilti, Inc, or Cooper B-Line, Inc.
 - 2. Trapeze type hangers shall be made of 2"x2"x1/4" carbon steel angle iron with drilled holes and

1/2" hangers rods. In lieu of an angle iron, a strut assembly may also be used for the trapeze kind of hanger support.

3. Bracing for cast iron No-Hub vertical piping (all sizes) and horizontal piping 6" and larger shall be made up of riser clamps, clevis hangers or two four bolt cast iron socket clamps Anvil International Fig. 595 with cast iron socket clamp washers, Anvil International Fig. 594, or the approved equal of Carpenter & Paterson, Inc, Hilti, Inc or Cooper B-Line, Inc.
Refer to "No-Hub Pipe BRACING" Detail
 12. At all points of support, a galvanized steel shield shall be provided between the hanger and pipe insulation complying with MSS SP 69 Type 40. Shields shall be Anvil International Fig. 167, Carpenter & Paterson, Inc. Figure 265P or the approved equal of Hilti, Inc or Cooper B-Line, Inc.
- B. Expansion bolts for use in existing and new reinforced concrete slabs shall be as follows:
1. "Trubolt" as manufactured by ITW Ramset/Red Head
 2. "Kwik Bolts" as manufactured by Hilti, Inc.
 3. "Power Stud" as manufactured by Powers Fasteners, Inc.
- C. Inserts for use in new conventional reinforced poured concrete slabs shall be as follows:
1. Insert No. 650 made by Carpenter & Paterson Inc.
 2. Insert Fig. 281 made by ITT Anvil International.
 3. Insert No. 100 made by C. H. Leibfried Mfg. Corp.
 4. Insert No. 96900 Series made by Hilti, Inc.
 5. Insert No. B2500 and N2500 Series made by Cooper B-Line, Inc.
- D. Fasteners, as required, shall be as follows:
1. Lag screws or Long screws.
 2. Long Expansion bolts
 3. Bolts and nuts

PART 3 - EXECUTION**3.01 INSTALLATION**

- A. Supports shall be adequate to securely support the piping and its contents, to prevent vibration and to provide proper allowance for expansion and contraction of the piping.
- B. All piping running close to or on walls shall be supported by means of hanger suspended from heavy angle iron wall brackets. No wall hooks will be permitted.
- C. Hanger rods shall be of ample size to support the pipe and its contents and shall have machine cut American Standard V-threads. At a minimum hanger rod size shall be the same as that recommended by the hanger manufacturer for each sized hanger. Hangers shall be recessed to approved beam clamps, concrete inserts, steel plates or other approved devices. Expansion shields and bolts shall not be used in the ceilings of cinder concrete, but may be used where the shields and bolts are horizontal.
- D. Where more than two pipes run parallel, the Contractor may install trapeze type hangers, constructed of 2" x 2" x 1/4" angle iron or channel strut " kindorph" and 1/2" hanger rods. Provide holes in the trapeze angle iron as required to accommodate rods for the individual supports. Burning of holes in angle supports is not acceptable. Provide individual supports for piping, where necessary to provide proper pitch. Trapeze type hanger when used with uninsulated copper tubing shall have copper finish. Spacing of trapeze type hangers shall be as required by the smallest size pipe/tube supported by trapeze hanger.
- E. At all points of support of insulated piping and tubing a galvanized metal shield shall be installed between the hanger and pipe insulation. The use of the galvanized metal shield shall be eliminated if the Anvil Fig 260 ISS is utilized. Installation of Anvil Fig 260 ISS: position the pipe on the saddle, notch section of the insulation to fit around the saddle, square cut the adjoining insulation section and butt the mating end to the notched section, finish taping according to standard methods, No galvanized metal shield is required.
- F. No piping shall be supported from other pipes, ductwork, electric conduit, hung ceiling, cinder concrete or work of other trades.

- G. When support method is not shown on Drawings, pipes laid underground shall be firmly bedded on solid ground under the body of the pipe. Where suitable bearing cannot be obtained because the ground has been disturbed by excavating, or for any other reason, the pipe shall be supported by concrete piers or by approved brackets secured to the walls. Piers and/or steel brackets shall be installed at not more than 5'-0" intervals. New piping passing under cinder concrete areas shall be supported by hangers secured by means of beam clamps fastened to existing floor beams. Where pipe support spacing is excessive between existing steel, beam clamps shall be fastened to structural members that are installed by this Contractor and approved by the Authority. Removed fireproofing around beams shall be replaced to original condition.
- H. Overhead horizontal drains, vents, supply or other piping shall be supported by adjustable wrought iron, steel or malleable iron hangers. Double locknuts shall be installed on all hangers. The metal decks shall not be used for support of piping or equipment.
- I. Intervals of supports for horizontal piping shall be as follows:
1. Hub and Spigot Cast iron soil and vent pipe - At 5' intervals and 18" behind each hub or joint.
 2. No-Hub Cast iron soil and vent pipe: - At 5' intervals and within 12" of each joint.
- J. Intervals of supports for vertical piping shall be as follows:
1. All Cast iron soil and vent pipe: At base and at each story height, but in no case at intervals greater than 20'.
- K. Inserts and Expansion Bolts
1. Piping and equipment, hung from ceilings shall be properly supported from the ceiling slabs by means of required number of inserts. Provide inserts before the pouring of the slabs and expansion bolts after concrete is placed and completely cured.
 2. Inserts for new conventional reinforced poured concrete slabs shall be designed for insertion of heavy nuts suitable for screwing up to and including 3/4" rods. Inserts shall not be primed. Install inserts so that hangers will appear true

and uniform. Install inserts before the pouring of the concrete.

3. Expansion bolts shall be installed in snug fitting smoothly drilled holes in accordance with the manufacturer's installation instructions. Expansion bolts shall be installed so that the load acts on the bolts in shear and withdrawal. Expansion bolts shall be carefully located in order to eliminate the risk of damage to concrete, steel reinforcement, and other embedded items. Install in concrete after concrete is placed and completely cured.
- L. Methods of Fastening: The following rule, except where otherwise specified, shall be observed throughout the entire work: Where fastenings are made to wood, use long screws or lag screw; to brickwork, cement, stone and marble, approved long expansion bolts; to fire-proof block work, approved toggle bolts, and to iron work, approved bolts and nuts. The use of wood plugs and nailing will not be permitted. Sundries used in connection with galvanized iron shall be galvanized. Those in connection with brass work shall be of brass, finished to match the connecting work.
- M. Cleaning, painting and installation of hangers and supports shall be done before the application of fireproofing material. All hanger and support assemblies in their entirety shall be rust proofed and painted. For material and method of painting, refer to Section 09900 - Painting.

3.02 NO-HUB PIPING - ADDITIONAL REQUIREMENTS

- A. Sway bracing shall be provided at changes in direction greater than 45° for pipe sizes 4" and larger.
- B. On horizontal piping, additional hangers shall be provided at each horizontal branch connection.
- C. Horizontal piping 6" and larger shall be braced to prevent joint separation.
- D. Vertical piping shall be braced at each joint to assure maintaining alignment.
- E. Vertical piping shall be secured at base of stack to building structure with socket clamp and rods or trapeze hangers.

END OF SECTION

05/09/2023

DESIGN NO. D019998

* * *

LIST OF SUBMITTALS

<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>
Product Data:		
1. Pipe hangers	_____	_____
2. Expansion bolts	_____	_____
3. Inserts	_____	_____
Shop Drawings:	_____	_____
1. Method of Supports		

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SECTION 15413
INSULATION (P&D)

PART 1 - GENERAL**1.01 DESCRIPTION OF WORK**

- A. Provide non-conducting insulation, including accessories, on the following piping and apparatus.
 - 1. All concealed and exposed horizontal runs and off-sets of storm water piping, except when laid in the ground or when located in non-occupied spaces in the basement. All fittings and vertical off-sets associated with the foregoing pipe shall also be insulated.

1.02 SUBMITTALS**A. Product Data**

Submit manufacturer's product data for insulation materials, adhesives, mastics and cements. Include installation details for valves, fittings, pipes and all other item to be insulated. No material shall be delivered to the site prior to being approved.

B. Schedule listing items to be insulated, description of insulation and finishing procedures.**C. Certificates from the manufacturer stating compliance with the following:**

Insulation, finishing facings or jackets, adhesives, mastics and cements are asbestos free and all materials installed have composite fire and smoke hazard ratings, 25 & 50 respectively, to meet the requirements of the Building Code of the City of New York.

D. Contractor Qualifications**1.03 QUALITY ASSURANCE****A. Installer's Qualifications: Firm with at least three years of successful installation experience on projects with the piping and equipment insulation similar to that required for this Project.****B. Regulatory Requirements**

- 1. Comply with the 2014 NYC Plumbing Code, 2020 New York City Energy Conservation Code (NYCECC) and ASHRAE 90.1-2016 as modified by Appendix CA of the 2020 NYCECC for materials and installation.

2. All insulation, vapor barriers, as well as the adhesives and finishing facings or jackets used herewith shall have a flame spread rating not over 25 without evidence of continued progressive combustion, and shall have a smoke developed rating not higher than 50. Flame spread rating and smoke developed rating shall be as defined in the N.Y.C. Building Code. All materials installed shall have composite fire and smoke hazard ratings to meet requirements of that Code. Whenever the NYC Construction Codes or the Rules of the Department of Buildings requires that material be listed or labeled and material proposed to be used is not so listed or labeled, the use of such material shall be subject to prior approval by the Commissioner (Office of Technical Certification and Research OTCR) and such material shall be used only to the extent set forth in such approval. Materials that were previously approved by the Board of Standards and Appeal (BSA) or by the Department (MEA) before the effective date of the NYC Construction Codes may continue to be used, but only to the extent set forth in such approval, and only if such approval is not specifically amended or repealed by the Commissioner.

C. Asbestos Prohibition

All products provided under this Section shall be asbestos, lead and mercury free.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Deliver insulation, coverings, cements, adhesives and coatings to the site in factory-fabricated containers with the manufacturer's stamp, or label, affixed showing fire hazard ratings of the products and brand.
- B. Store insulation in original wrappings and protect from any damage.

1.05 TEMPERATURE REQUIREMENT

- A. Apply adhesive, sealers, coating, and all other items and accessories at the proper temperature as recommended by the manufacturer. If ambient conditions are not acceptable, provide temporary heat as required for proper installation without any delay to the Project completion.

1.06 COORDINATION

- A. Coordinate size and location of supports, hangers, and insulation shields
- B. Coordinate clearance requirements with piping installer for piping insulation application and equipment installer for equipment insulation application. Establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.
- C. Coordinate installation and testing of heat tracing.

PART 2 - PRODUCTS**2.01 MANUFACTURERS**

- A. Insulation, fiberglass fitting cloth, bands and casings (predicated on meeting the specification requirements)
 - 1. Certain-Teed Corp.
 - 2. Johns Manville, Owens-Corning Fiberglass Corp.
 - 3. Knauf Insulation.
 - 4. Armacell LLC; AP Armaflex.
 - 5. Pittsburgh Corning Corp.
- B. Adhesives (predicated on meeting the specification requirements)
 - 1. Benjamin Foster Co.
 - 2. Epolux Manufacturing Corp.
 - 3. Armacell LLC
 - 4. Insul-Coustic (Division of Birma Products Corp.)
- C. Pre-molded fiberglass fittings (predicated on meeting the specification requirements)
 - 1. Hamfab Inc

2.02 MATERIALS

- A. Adhesives and Sealants for Insulation: All adhesives and sealants used on interior building insulation shall comply with the South Coast Air Quality Management District (SCAQMD) Rule #1168; VOC limits shall comply

with the limits indicated in Table 1 of LEED Version 3.0, Indoor Environmental Quality Section, Credit IEQ-4.1. Those limits correspond to an effective date of the SCAQMD Rule #1168 of July 1, 2005, and Rule Amendment date of January 7, 2005.

- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Foam insulation materials shall not use CFC or HCFC agents in the manufacturing process.

D. Piping Insulation

- 1. One-piece molded sectional fiberglass: Nominal 4-pound density with a thermal conductivity in the following ranges per Section C404.4 & Table C403.11.3 of the 2020 NYCECC.

- a. 0.21 - 0.27 per inch/h x ft² x °F for water flowing at temperatures of 40°F-60°F

The required insulation thickness mandated by these specifications shall be provided regardless of the exception granted by section C404.4 & Table C403.11.3 of the 2020 NYCECC for omitting insulation on piping surrounded by building insulation with a thermal resistance (R-value) of not less than R-3. Insulations shall have factory-applied all-service jacket (ASJ) and adhesive used to adhere the jacket to the insulation. It shall be suitable for use on piping up to 200°F.

E. Insulation and accessories

- 1. For valves, fittings, etc. for hot water piping, cold water piping, drainage and vent piping shall include the following:
 - a. One-pound density fiberglass blanket.
 - b. Segments of pipe insulation.
 - c. Pre-molded fiberglass fittings.
 - d. No. 20 gage galvanized steel annealed wire.
 - e. Insulating cement.
 - f. In lieu of the cement coat, and fiberglass blanket material or segment of pipe insulation on valves and fittings; the use of Zeston product, an ultra violet resistant, 20-mil thick, one-piece PVC fitting cover with pre-

cut insulation inserts, HI-Lo-Temp, as manufactured by Manville, shall be accepted.

F. Jacket and accessories

1. Over insulation for drainage and vent piping, install the following:
 - a. White kraft paper outer surface bonded to aluminum foil and reinforced with fiberglass yarn.
 - b. Insulation adhesive.
 - c. Aluminum casing, .016" thick.
 - e. Elastomeric closed cell fiber free foam with no vapor barrier is also acceptable.
 - d. Vapor barrier and weatherproofing jacket shall be a laminated five-ply self-adhesive material; weather resistant, high puncture and tear resistant. The product shall be used both indoors and outdoors, shall have zero permeability, and shall be manufactured with mold inhibitors: VentureClad 1577CW-All Grade or Alumaguard Lite or Alumaguard "All Weather" LT.

G. Special protection: At all points of support the following shall be included:

1. Rigid calcium silicate pipe insulation having a minimum twelve (12) pound density. Blocks shall be 1½" thick.
2. Galvanized metal shields as manufactured by Carpenter & Paterson, Fig. 265 P or Anvil International Fig. 167. Shields shall be 18 gage for pipe sizes up to and including 5" and 16 gage for larger sizes.

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

- A. Insulation shall be installed only after tests of the piping systems as specified in Section 15414 have been successfully completed.
- B. Unions shall not be insulated.

- C. Fire Seal Application: Where pipes pass through fire walls, fire partitions, fire rated pipe chase walls or floors above grade, insulation shall pass through and a UL classified assembly shall be provided. Refer to Section 07270 - Firestopping.
- D. All necessary insulating material not specified shall be as recommended by the manufacturer of the insulation.

3.02 INSTALLATION

A. Thermal Insulation for Piping

- 1. Cold Water Piping
 - a. 1" thick insulation for pipe sizes up to and including 2" in diameter.
 - b. 1½" thick insulation for pipe sizes larger than 2" in diameter.
- 3. Insulation for horizontal runs and off-sets including fittings and vertical off-sets of storm water piping shall be of the thickness specified for cold water piping.
- 4. Valves, fittings, etc. for hot & cold water piping shall be insulated as follows:
 - a. For pipe sizes smaller than 4", wrap firmly under a minimum of a 3:1 compression, with 1-pound density fiberglass blanket, to a thickness equal to adjoining insulation. Secure with No. 20 gage galvanized steel annealed wire. Finish with a smooth coat of insulating cement. In addition, insulating cement (except for cold water) applied in thickness equal to the adjoining pipe insulation material may also be used on valves & fittings.
 - b. For pipe sizes 4" and larger, fit segments of pipe insulation equal in thickness to adjoining insulation and secure with No 20 gage galvanized annealed steel wire. Finish with a smooth coat of insulating cement.
 - c. In lieu of the foregoing methods, the use of pre-molded fiberglass fittings of the same thickness as adjoining pipe insulation will be accepted. Secure with No. 20 gauge galvanized annealed steel wire and finish with a smooth coat of insulating cement.

- d. In lieu of the above a, b and c, the use of pre-formed PVC fitting covers with factory pre-cut Hi-Lo Temp insulation insert of the same thickness as adjoining pipe insulation will be accepted.
Valves, fittings, etc. shall be insulated by applying the PVC fitting covers of the same thickness as adjoining pipe insulation with the proper factory pre-cut Hi-Lo Temp insulation insert to the pipe fitting, valve, etc. The ends of the Hi-Lo Temp insulation insert shall be tucked snugly into the throat of the fitting, valve etc. and the edges adjacent to the pipe covering tufted and tucked in, fully insulating the pipe fitting, valve, etc. The PVC fitting cover [in conjunction with a mastic vapor barrier for cold water only] shall then be applied and shall be secured by tack fastening, and then taping the ends to the adjacent pipe covering. Where the operating temperature exceeds 250°F, 2 or more layers of the Hi-Lo Temp insulation inserts shall be applied prior to the installations of the PVC cover. The first layer shall be applied with a few wrappings of fiberglass yarn to eliminate voids or hot spots.

B. Facing or Jackets

1. Horizontal Drainage Lines

- a. Insulation on horizontal runs and off-sets including fittings, vertical off-sets of storm water piping shall have a vapor barrier jacket as described for cold water piping in subparagraph 2 above. The use of Elastomeric closed cell fiber free foam with no vapor barrier is acceptable.
- b. The ends of drainage pipe insulation shall be sealed off at all fittings and at intervals of 21 feet on continuous run of pipe with Foster fire resistant vapor barrier coating BF 30-80.

C. Insulation and Protection at Points of Support

1. Install inserts made from rigid calcium silicate pipe insulation, in lieu of pipe insulation specified in Paragraph A above, at all points of support. Inserts shall be not less than 12" long and of thickness equal to adjoining insulation. A jacket shall be installed over the insert with longitudinal laps and butt strips for

circumferential joints smoothly secured with insulation adhesive. Jacket shall provide vapor barrier where required.

2. Install galvanized steel shields between supports and inserts. Shields shall be formed to fit the insulation and shall extend up to the center line of the pipe and of the length specified for the inserts. Supports shall not pierce the insulation and all vapor barriers shall be unbroken and continuous.

3.03 PROTECTION AND REPLACEMENT

- A. Replace insulation damaged during construction which cannot be repaired satisfactorily, including units with vapor barrier damage and moisture saturated units.

- B. Protection

Insulation worker shall advise Contractor of required protection for insulation work during remainder of construction period, to avoid damage and deterioration.

3.04 PAINTING

- A. Insulation on all piping and fittings, exposed in finished spaces shall be given two (2) coats of paint, the color of which shall match the adjacent surroundings.

- B. For additional materials and method of painting, refer to Section 09900 - Painting.

3.05 LABELING

- A. After the finished coat of paint has been applied to the insulation, this contractor shall do all pipeline identification labeling as specified in Section 15431 - "Tags, Charts and Identification."

END OF SECTION

LIST OF SUBMITTALS

SUBMITTAL

DATE SUBMITTED

DATE APPROVED

Product Data:

- 1. Materials, adhesives
mastics, cements etc.
- 2. Installation Inst.

Schedule:

- 1. List of items to
be insulated

Quality Control Submittals:

- 1. Manufacturer's certificate
indicating compliance with
fire/smoke rating, asbestos
free products & NYC building
code
- 2. Contractor qualifications

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SECTION 15414
TESTS

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. Every new plumbing system and every part of an existing plumbing system that has been altered or repaired shall be inspected and tested. Inspections and tests shall comply with the requirements of this Section. All testing is to be performed by the Contractor unless specifically indicated otherwise.
- B. Defects disclosed by tests shall be repaired, or, if required by the Authority, defective work shall be replaced with new work. Tests shall be repeated after defects have been repaired or replaced and shall be repeated as often as necessary until all work passes the required tests.
- C. All inactive portions of the potable water system(s) shall be flushed and tested as per Article 3.04 prior to placing in service.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Provide all materials, equipment and other items required for tests, retests, repairs and replacements that are required to complete the Work of this Section.
- B. All gauges, instruments and test devices shall be provided with a certificate of calibration and calibration curve or letter indicating that a minimum of five (5) test points have been calibrated. The certificate and letter must show the date of last calibration. The calibration date must be within a year of the testing date.
- C. If necessary, provide new (factory wrapped) hose for use during disinfection procedures.

PART 3 - EXECUTION**3.01 PIPING SYSTEM TESTS - GENERAL**

- A. All new piping and equipment shall be tested prior to application of insulation, painting, concealing or placing of backfill. Testing as stipulated herein shall be considered minimum, and where tests stipulated by authorities having legal jurisdiction exceed these requirements, such more stringent tests shall be performed.
- B. The work of the Contractor shall include the furnishing of all labor, testing instruments, gauges, pumps, smoke machines, and other equipment required or necessary for tests, required by law, rules, and regulations and as specified.
- C. Provide all other tests required by local inspectors and all other authorities having jurisdiction.
- D. All appurtenances shall be operated after installation to determine whether or not they meet the requirements of the Specifications.
- E. Where controls and accessories are not designed to withstand pipe test pressures, they shall be removed or otherwise properly protected against damage during such test. After approval of such tests, controls and accessories shall be installed and tested with operating medium to operating pressures.
- F. If leaks are observed during any tests the defective work or material shall be replaced. No caulking of screwed joints or holes will be acceptable. Peening of welds is prohibited. Repetition of the entire test will be required as many times as leaks can be observed from the tests, until no leak results in successful completion of the test.
- G. All tests shall be made in the presence and to the satisfaction of a representative of the Authority, or their representatives, and the local authorities having legal jurisdiction over the work to be tested, and as may be directed; and at least 72 hours notice shall be given to all parties in advance of all tests.

- H. All piping which is to be enclosed in partitions or hung ceilings shall be tested and made tight when directed by the Construction Supervisor representative of the Authority and in adequate time to permit the installation of partitions and ceilings. When necessary, the Contractor shall drain the piping and/or take such precautions as required to prevent damage by freezing.

3.02 TESTING OF AUTOMATIC CONTROLS - N/A

3.03 DOMESTIC WATER SYSTEM DISINFECTION - N/A

3.04 INACTIVE POTABLE WATER SYSTEM FLUSHING AND TESTING - N/A

3.05 DRAINAGE AND VENT PIPING INSIDE BUILDING

- A. Rough Plumbing: The piping of plumbing drainage and venting system shall be verified as to material and shall be tested upon completion of the rough piping installation and proven to be watertight. The representative of the local agency having jurisdiction may require the removal of any cleanout plugs to ascertain that the prescribed pressure has been reached in all parts of the system.

1. Water Test

A water test shall be applied to the drainage system which includes soil, waste, leader and vent piping either in its entirety or in sections after rough piping has been installed. If applied to the entire system, all openings in the piping, except the highest opening, shall be tightly closed and the system filled with water to the point of overflow. If the system is tested in section, each opening, except the highest opening of the sections under test, shall be tightly plugged and each section filled with water. No section shall be tested with less than a 10 ft., head of water. In testing successive sections, at least the upper 10 ft., of the following section shall be tested, so that no joint or pipe in the building (except the uppermost 10 ft., of the system) shall have been

submitted to a test of less than 10 ft., head of water. The water shall be kept in the system or in the portion under the test for at least 15 minutes before inspection starts; the system shall then be tight at all points.

- B. Finished Plumbing: After the plumbing works has been completed the system shall be tested proven gas tight by smoke test.

1. Final Drainage and vent test:

A smoke test, if deemed necessary by the Plumbing Inspector, shall be performed when the visual final test of the completed drainage and vent system is not in sufficient detail to determine that testing and inspection are in compliance with the NYC Plumbing Code. When the smoke test is utilized, it shall be made by filling all traps with water and then introducing into the entire system a pungent thick smoke produced by one or more smoke machines. When the smoke appears at stack openings of the roof, these openings shall be closed and a pressure equivalent to a 1" water column shall be maintained for the period of inspection.

3.06 STORM DRAINAGE PIPING - N/A

3.07 POTABLE WATER SUPPLY TEST - N/A

3.08 WATER SERVICE PIPE TEST - N/A

3.09 WATER SUPPLY PIPING FOR ATHLETIC FIELD WASH DOWN SYSTEM - N/A

3.10 ADJUSTMENTS

- A. During the preliminary operation, the manufacturers of the different apparatus installed, including the starting and stopping devices, shall make adjustments as may be necessary.

3.11 FIXTURE TEST

- A. Fixtures shall be tested for soundness, stability of support, and satisfactory operation of all parts. All water-closet floor flanges must be tested.

3.12 PUMP TESTS

- A. All pumps shall be tested by the manufacturers prior to shipment of the pump. The test shall show the characteristic curves, indicating the relations of capacity, head, efficiency and H.P. throughout the pump's entire range. For each pump three certified copies of the tests shall be delivered to the Authority before the pumps are set in position.

3.13 FINAL OPERATING TEST

- A. After the completion of the entire work, the Contractor shall operate the entire installation of plumbing and drainage in the presence of the Authority's Representative and of the representatives of the manufacturers of the different apparatus and appliances installed.

3.14 NOTIFICATION OF OFFICIALS, ETC.

- A. The Contractor shall provide written notification to The Authority and all department agencies and bureaus with jurisdiction required to witness any tests falling within their jurisdiction.

In addition, the manufacturers of the apparatus to be tested must have qualified representation at all tests of apparatus supplied by them.

3.15 FUEL, MATERIAL, AND LABOR FOR TESTS, ETC.

- A. The Contractor shall furnish all fuel, apparatus, material and labor required for preliminary and final operations, cleaning, testing and adjusting, including the necessary oil, electric current and the services of competent mechanics.

3.16 GAS PIPING SYSTEM - N/A

3.17 FINAL TEST OF FIXTURES

A. After all the fixtures are set and connected, Contractor shall turn water on at all fixtures, traps, etc., and the proper working of all shall be demonstrated by him to the satisfaction of the Authority.

3.18 INSPECTION

A. The Authority reserves the right to order the Contractor to disassemble or take apart any or all material and equipment called for in order that it may be inspected to see that it has been constructed in strict accordance with the plans, specifications and details. If after inspection, it is found to fully comply, then the Contractor shall properly reassemble all such material and equipment.

Any material or equipment that does not fully comply with the requirements of the plans, details and specifications will be rejected and shall be at once removed from the premises and shall be replaced with new material and equipment that complies fully with the requirements of the plans, details and specifications.

3.19 PROCEDURE FOR DIRECT REPLACEMENT OF POTABLE WATER SYSTEM FIXTURES, FITTINGS AND APPLIANCES - N/A**3.20 LEAD TESTING OF POTABLE WATER FIXTURES AND FAUCETS FOR CONSTRUCTION QA/QC - N/A**

END OF SECTION

05/09/2023

DESIGN NO. D019998

LIST OF SUBMITTALS

SUBMITTAL

DATE SUBMITTED

DATE APPROVED

Tests:

1. Certified Pump tests

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SECTION 15415
DRAINAGE

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. Extent of Drainage Work is indicated on the Drawings and by the requirements of this Section. Coordinate with Section 15410 for piping and Division 7 for flashing work.

1.02 CODES AND STANDARDS

- A. Comply with applicable portions of the Building Code of the City of New York and with the latest standards and rules of the Department of Environmental Protection, Bureau of Sewers and Division of Drainage Basin Management.
- B. Where requirements for products, materials, systems, equipment, methods and other portion of the work specified herein exceed minimum requirements of regulatory agencies having jurisdiction over the construction work, contractor shall comply with such requirements specified herein, unless specifically approved otherwise by the Authority.

1.03 SUBMITTALS - N/A

1.04 EXTRA MATERIALS

- A. The Contractor shall furnish the School Custodian or a Representative of the Authority with spanner type tools that may be used for removal of clean-out covers, strainers and grates. Two (2) such tools shall be provided for each different type drain and clean-out covers. Tools shall match products installed and shall be packaged with protective covering for storage and identified with labels describing contents.

PART 2 - PRODUCTS

2.01 PIPING

- A. Piping, fittings and piping joints shall be as specified in Section 15410.

2.02 FACE PLATES - N/A

2.03 FLOOR DRAINS - N/A**2.04 FLASHING SLEEVES (CAULKING TYPE ROOFING) - N/A****2.05 VANDAL PROOF HOODED VENT CAPS - N/A****2.06 TEST TEES**

A. Test tees shall be as specified in Section 15410.

2.07 GREASE INTERCEPTORS - N/A**2.08 BACKWATER VALVES**

A. Backwater valves on sanitary drainage lines below floors of basements or cellars shall be open seat backwater valves having cast iron valve housing with hub and spigot connection, threaded brass cleanout access cover, brass top swing revolving disc and brass seat (disc suspended on double fulcrum bearings) equal in all respects to Smith Fig. 7022, Josam 67500-10, Zurn Z1095-77, MIFAB BV1200 or Watts Drainage Products BV200.

When buried below floor or grade, backwater valves shall be provided with extension piece so that cleanout will be flush with finished floor. When valves are located more than 1'- 0" below floor or grade, a valve pit with cover shall be provided as indicated on the Drawings.

2.09 INDIVIDUAL ACID NEUTRALIZING SUMP - N/A**2.10 CENTRALIZED ACID WASTE "pH" NEUTRALIZATION SYSTEM - N/A****2.11 ROOF DRAINS - N/A****2.12 TRAP PRIMER VALVES - N/A****2.13 ACID NEUTRALIZING TUBES - N/A****PART 3 - EXECUTION****3.01 HOUSE SEWERS - N/A****3.02 BUILDING SANITARY HOUSE DRAIN - N/A****3.03 BUILDING STORM HOUSE DRAIN**

A. Each storm house drain shall be fitted with a running trap of material matching the piping having two cleanouts and shall be installed where shown on the Drawings. If

the traps are below the floor, cleanouts shall be installed as described in the article "Building Sanitary House Drain".

3.04 YARD DRAINS - N/A

3.05 BOILER BLOW-OFFS - N/A

3.06 SOIL, WASTE AND VENT LINES

- A. Offsets in the vent portion of soil and waste stacks above the highest fixture drainage connection, and offsets in vent stacks and connections of vent stacks at the bottom to a soil or waste pipe or to the building house drain shall be made at an angle of at least 45 degrees to the horizontal.
- B. At the foot of the soil, waste and vent stacks and at all offsets and at other points indicated on drawings, there shall be installed in accessible location an approved tapped T-fitting of same size and material as the stack to which it connects, and provided with an approved brass screw plug. Plugs shall be the same size as the piping up to size 4".
- C. Install flanges for connections to valves on discharge piping from pumps.
- D. Install test tees in soil, waste and vent piping in order to permit testing in compliance with the rules and regulations of the Department of Buildings.

3.07 ACID WASTE SYSTEM - N/A

3.08 FLOOR DRAIN - N/A

3.09 ROOF DRAINS - N/A

3.10 RAIN LEADERS - N/A

3.11 PROTECTION

- A. All open ends of pipes shall be temporarily capped or closed by a proper fitting, to prevent obstruction and damage, until piping is approved and ready for service.

3.12 PIPING SYSTEM TRANSITIONS

- A. When a transition is required from one piping system to another, an approved transition coupling shall be used.

- B. When connecting No-hub to a bell & spigot fitting of cast iron piping system, an approved transition coupling shall be used. When it is necessary to cut a new fitting into an existing bell & spigot cast iron piping system, a section of the hubed cast iron piping shall be removed to allow a three-piece fold-in installation of new bell & spigot cast iron piping with lead and oakum joints. The use of No-hub shall not be permitted within a bell & spigot cast iron piping system.

3.13 NO-HUB PIPING -ADDITIONAL REQUIREMENTS

- A. No-Hub piping suspended in excess of 18" below structure shall be provided with sway bracing to prevent horizontal movement.
- B. Horizontal piping shall be installed with additional hangers at each horizontal branch connection.
- C. Horizontal piping 6" and larger shall be braced to prevent joint separation.
- D. Vertical piping shall be braced at each joint to assure maintaining alignment.
- E. Vertical piping shall be secured at base of stack to building structure with socket clamp and rods or trapeze hangers.

3.14 KITCHEN DRAINS - N/A

3.15 GREASE INTERCEPTORS - N/A

3.16 INSTALLATION OF TRAP PRIMER VALVES - N/A

3.17 INSTALLATION OF ACID NEUTRALIZING TUBES - N/A

END OF SECTION

* * *

LIST OF SUBMITTALS

<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>
Product Data:		
1. Mfr's product data	_____	_____
2. Installation Inst.		
Shop Drawings:		
1. Backwater Valve	_____	_____

* * *

SECTION 15431
TAGS, CHARTS AND IDENTIFICATION

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Work of this Section includes the following:

1. Pipeline Identification

1.02 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawing:

1. Provide list of identification wording, symbols, letter size, and color coding.
2. Valve numbering scheme; valve Schedules: For each piping system to be included in maintenance manuals.

C. Samples: Submit samples of tags and identification markers for each different type of service. Samples shall be submitted and approved before installation.

PART 2 - PRODUCTS

2.01 TAGS - N/A

2.02 CHARTS AND FRAMES - N/A

2.03 PIPELINE IDENTIFICATION

A. Identification shall be in accordance with "Scheme for Identification of Piping System ANSI A13.1" and OSHA safety color regulation.

B. Markers shall be snap-on type as manufactured by Seton Nameplate Corp., (Setmark System) EMED Co., Inc., Brimar Industries, Inc., Marking Services Inc. Markers shall completely encircle the pipe with a substantial overlap. No adhesive shall be used. They shall be manufactured of UL approved, self-extinguishing plastic. When the pipe including insulation (if any) is 6" diameter and larger, markers shall be strap on type.

C. Provide identification for piping, and equipment.

- D. Pipe shall be lettered in accordance with the schedule below. Lettering shall be located at the supply side of each valve and branch connection and at intervals of not over 20' on straight runs of pipe. Provide flow arrows for all piping at each marker. Adjacent to the legend, stencil the size of the pipe. Background and letter colors are as follows: Yellow with black letters, green with white letters, blue with white letters and red with white letters.

STENCIL SCHEDULE

<u>Service</u>	<u>Stencil Designation</u>	<u>Background Color</u>
Storm Water Piping	St. W.	Green
Soil Piping	Soil	Green
Waste Piping	Waste	Green
Vent Piping	Vent	Green
Pump Discharge	Pump Disch.	Green

- E. The nature of service of all machinery, equipment, tanks, pumps, and other apparatus shall be stenciled in 2" high letters unless otherwise directed.

2.04 ACCESSORIES - N/A

2.05 GAS PIPING IDENTIFICATION - N/A

PART 3 - EXECUTION

3.01 INSTALLATION - N/A

3.02 INSTALLATION OF LABELS ON GAS PIPING - N/A

END OF SECTION

LIST OF SUBMITTALS

<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>
Product Data	_____	_____

1. Each product

Shop Drawings

1. Identification wording,
symbols, letter size,
color coding

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SECTION 15453
PUMPING APPARATUS AND TANKS

PART 1 - GENERAL**1.01 DESCRIPTION OF WORK**

- A. Provide all electrical motor-driven pumps, appurtenances and tanks as indicated on the Drawings and as specified herein.

1.02 SUBMITTALS

- A. Manufacturer's installation and operation instructions, catalog sheets, specifications, and maintenance manuals for each item specified.
- B. Shop Drawings
1. Cuts of each pump, indicating parts and materials, motor data.
 2. Cuts of each control panel and components
 3. Wiring Diagrams
 4. Cuts of each float switch assembly
- C. Quality Control Submittals
1. Submit a compliance affidavit, if all items in subparagraph B match contract documents. Manufacturer's technical product data submission will be required if a substitution is proposed.
 2. Certificates:
 - a. MEA or Approved Agency Certification listed and/or label for tank lining
 - b. Certified pump test curves
 - c. Manufacturer's data report for tank pressure testing
 3. Qualifications
 1. Pump manufacturer
- D. Maintenance data:
1. Spare parts

2. Maintenance manual

E. Warranty

1.03 QUALITY ASSURANCE

- A. Qualifications: Pump manufacturer shall have a minimum of 5 years experience in producing the specified equipment.
- B. Each pump control panel shall have UL label and panel wiring shall comply with the latest New York City Electrical Code.
- C. Tank lining material (cement) shall have MEA approval or Approved Agency Certification listed and/or label.
- D. Tank shall comply with applicable portions of the Building Code of the City of New York, American Society of Mechanical Engineers (ASME), Boiler and Pressure Vessel Code Division-1 as approved by the American National Standard Institute (ANSI).

1.04 WARRANTY

- A. Pump packages, including any control panel and alarm accessories parts shall be warranted for 2 years. All warranties shall start on the date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MOTORS - N/A

2.02 PUMPS-GENERAL

- A. The casing for pumps shall be of close-grained cast iron for bronze fitted pumps or bronze on all bronze pumps. The waterways shall have large cross-section areas with smooth turns so that the water will pass through at a low velocity without shock. Suitable openings shall be provided for the suction gauge, discharge gauge, air vent and cock. Openings shall be tapped and plugged.
- B. Unless otherwise specified, the shaft shall be of the best grade of 18-8 stainless steel and of ample size to transmit safely the maximum amount of power required. Shaft shall be provided with ample keyway and key to accurately hold the impeller in place. The impeller shall be secured to the shaft using a nut and locking washer. The impeller shall be hydraulically balanced for all pressures and shall be of bronze, hand finished on the inside, machine turned and

polished on the outside, dynamically balanced at all speeds, and with liberal keyway to fasten to shaft. Coupling shall be flanged and of the flexible type with pin and rubber bushing construction. That portion of the shaft passing through the pump casing and stuffing boxes shall be encased in a bronze sleeve, securely fastened to the shaft.

- C. A nameplate showing the serial number, discharge GPM and Head of each pump shall be attached to the respective pump. The necessary wiring and controlling devices will be furnished and installed complete under the Electrical Division, unless otherwise specified.
- D. Certified test curves of the pumps to be installed shall be provided for all pumps in accordance with Section 15414.

2.03 TANKS - GENERAL - N/A

2.04 WATER PRESSURE BOOSTER SYSTEM - N/A

2.05 HEAVY DUTY DUPLEX SUMP PUMP - N/A

2.05A FULLY SUBMERSIBLE HEAVY DUTY SUMP PUMP - N/A

2.06 SUBMERSIBLE SUMP PUMP - N/A

2.07 SUBMERSIBLE SEWAGE CUTTING OR GRINDING PUMP

- A. Provide submersible sewage cutting pump similar to Tsurumi Pump C-Series, Weil Pump, model #2613 with grinder, Federal Pump, model #VSS-C4A or Flygt Series 3000 in a fiberglass basin where shown on the Drawings. A guide rail system, including quick-disconnect, controls, and associated piping, shall also be provided for pump removal. Each unit shall be capable of delivering GPM at feet TDH indicated on the Drawings. Power cables shall be waterproofed.
- B. Pump body shall be constructed of cast iron ASTM A48 Class 35. Motor shall be rated NEMA MG-1, type B.
- C. Hermetically sealed motor with moisture-sensing probes shall be rated for no less than 20 starts per hour and have a minimum Class E insulation for temperatures of 120°F. Provide motor overload protection.
- D. Pump shaft shall be constructed of 420 stainless steel.
- E. Pump seals shall be double-faced silicon carbide and be housed in a self containing oil chamber. Seals should be housed in such a way that it is never in contact with sewage.

- F. Cutting type impeller shall have a tungsten carbide blade and have a high chrome cast iron sheer plate for cutting foreign objects. Pump shall be able to allow passage of solids not less than 3" in dia. Pump shall be able to handle foreign objects without clogging.
- G. Control Panel shall be UL listed, factory wired for remote wall mounting and shall be provided in a NEMA-4 enclosure. Panel shall be suitable for operation with pedestal type float switches and other level controllers.
 - 1. Control panel shall be provided with: Two magnetic across the line starters with overload protection and single phase protection. Pilot run lights, fusible disconnects, with Hand-Off-Auto switches and fused disconnect switches accessible through the panels exterior door, reset button, overload reset and numbered terminal strip.
 - 2. Provide NEMA-4 Pedestal mounted float switch with built in mechanical alternator, Square D model #9038AW-1. Float switch shall be equipped with a minimum 7" stainless steel float ball, a stainless steel rod and rod guide.
- H. Provide a high water alarm consisting of an auxiliary pedestal mounted single pole switch equipped with pedestal guide, stainless steel rod and stainless steel float ball. Provide dry contact so that when activated, the high water alarm shall send a signal to the Indicator panel that is provided under the Auxiliary Signal System. Refer to Section 16701. Also provide liquid level sensors for signaling "high water level alarm" via dry relay contact output connected to the Building Management System (BMS).
- I. Sewage Basin shall be constructed of fiberglass. Tank shall be equipped with anti-floatation and a guide rail adopter plate on the bottom of the tank. Basin shall have a hinged duplex steel cover with access ports for the pumps, two access ports for the auxiliary high water alarm and mechanical. The steel cover will have duplex 3" or 4" discharge holes, two 2" vent lines and two cord grip holes for pump wires.
- J. Provide stainless steel screws for all anchoring and nailing of pit cover, basin, and angle frame.

2.08 HYDRAULIC ELEVATOR SUMP PUMP - N/A

2.09 AUTOMATIC SEWAGE EJECTOR - N/A

2.10 CIRCULATING PUMP (DOMESTIC HOT WATER) - N/A**2.11 LIQUID LEVEL SENSORS - DRY CONTACTS FOR ALARMING AND NOTIFICATION - N/A****PART 3 - EXECUTION****3.01 INSTALLATION****A. Pumps**

1. Install all pumping apparatus as detailed on the Drawings, or as specified herein, or as recommended by the respective Manufacturer, to be completely operable for its intended use.

3.02 DEMONSTRATION

- A. The service of a factory trained representative shall be made available on the job site for start-up and for instructing the Custodian (or building manager) and staff in the operation and maintenance of each system installation. A minimum of two visits is required

3.03 COMMISSIONING OF PUMPING APPARATUS AND TANKS

- A. The Plumbing Contractor or a factory authorized service technician shall demonstrate the functional performance testing of the sewage ejector to the Commissioning Authority (CxA). Prior to functional testing, the Contractor shall provide written confirmation that the system is ready for functional testing verification. As applicable, the functional performance test includes the following:

<u>Sewage Ejector Pumps</u>	<u>Pass/Fail/NA</u>	<u>Test Date</u>
Test the primary level control system. Pump fresh water into the pit to raise the water level until the pumps float is raised. Confirm pump activates and the water level decreases		
After the water level has decreased, confirm pump deactivates when required		
At the local pump control panel, turn off pumps through the H-O-A switch and pump fresh water into the pit to raise the high-water level float. Confirm local audible and visual pump failure alarm registers at pump control panel and auxiliary system indicator panel in the Custodian's office		
Confirm local H-O-A and disconnect switches activate and deactivate the pumps as expected		

Confirm indicating lights at pump control panel operate as expected		
No unusual noise or vibration with equipment operation		

END OF SECTION

* * *

LIST OF SUBMITTALS

<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>
Product Data:	_____	_____
1. Mfr's product data		
2. Installation instructions		
3. Capacities		
Shop Drawings:	_____	_____
1. Pumps		
2. Control panels		
3. Wiring Diagrams		
4. Float switch assembly		
Compliance Affidavit:	_____	_____
Certifications:	_____	_____
1. MEA or Approved Agency Certification listed and/or label for tank lining		
2. Certified pump test curves		
3. Manufacturer's data report for tank pressure testing		
Qualifications:	_____	_____
1. Pump manufacturer		
Maintenance Data:	_____	_____
1. Spare Parts lists		
2. Maintenance Manual		
Warranty:	_____	_____
1. Pumps/Tanks/Controls		

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SECTION 16010
GENERAL PROVISIONS FOR ELECTRICAL WORK

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. Provide labor, materials, tools, machinery, equipment, and services necessary to complete the Electrical Work under this Contract. All systems and equipment shall be complete in every aspect and all items of material, equipment and labor shall be provided for a fully operational system and ready for use. Coordinate the work with the work of the other trades in order to resolve all conflicts without impeding the job progress.
- B. When an item of equipment is indicated on a floor plan and not shown on associated riser diagram or vice-versa, the Contractor shall provide said item and all required conduit and wiring connections for a complete system as part of the Contract.
- C. All penetrations made into other trades work (e.g. wires, electrical boxes penetrating ductwork, etc) are to be sealed to air tight/watertight condition. Penetrations through insulated systems, such as refrigerated rooms/equipment, etc, shall be insulated and sealed on both sides of penetration. Sealant on interior side of such insulated spaces/equipment shall be silicone recommended by manufacturer.

1.02 EXAMINATION OF SITE

- A. The Contractor shall be held to have examined the site and to have compared it with the Drawings and Specifications, and deemed to have been satisfied as to the conditions existing at the site, as relating to the actual conditions of the site at the time estimating the Work, the storage and handling of materials, and all other matters as may be incidental to the Work under the Contract, before bidding, and no allowance will subsequently be made to the Contractor by reason of any error due to the Contractor's neglect to comply with the requirements of this clause.

1.03 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract.
- B. Division 1 - General and Supplementary Requirements.

1.04 ELECTRICAL EQUIPMENT AND INSTALLATIONS

- A. All electrical equipment shall be the latest of the current year in design, material and workmanship, and shall be the type or model called for in these Specifications.
- B. If the type or model specified has been superseded by a later type or model, the latest shall be submitted for approval and shall be provided as part of the Contract.
- C. Coordinate the installation of HVAC materials and equipment above ceilings with suspension system, light fixtures, and all other installations and accessories.
- D. Provide all rigging, disassembly and reassembly of equipment including the furnishing and installation of dunnage and all other required and necessary accessories. Supports for conduit runs/etc. supported by the roof deck shall utilize manufactured supports or pipes that will permit effective roofing. Use of irregular shaped units such as strut channels is not permitted.
- E. For purposes of clearness and legibility, electrical Drawings are essentially diagrammatic and size and location of equipment are drawn to scale wherever possible. The Drawings indicate size, connection points and routes of conduit. It is not intended, however, that all offsets, rises and drops are shown. Provide conduit runs as required to fit structure, avoid obstruction, and retain clearances, headroom openings and passageways. Conduits installed over any means of egress and access passageways must be 7'-6" clear inclusive of insulation.
 - 1. Location of items passing through roofing/waterproofing membranes shall be in strict accordance with recommendations of the NRCA (National Roof Contractors Association) Manual to allow for proper flashing of items, including, but not limited to, the following:
 - a. No penetrations shall be made within 12" of any walls, parapets, roof curbs, expansion joints or any other projections (clear distance between penetration or equipment curb face shall be 12" minimum).
 - b. Provide manufactured curb chases where multiple conduits enter at one location.

- c. Conduit/equipment supports that penetrate membranes shall be round or square/rectangular to allow proper flashing. Use of "kindorf" type supports is not permitted to penetrate membranes.
- 2. Conduits at equipment must be done in a manner such that access around equipment is not impeded, such as at equipment platforms.
- F. Refer to Section 11600 for miscellaneous kitchen equipment connections and wiring required to be made by the Electrical Contractor. Coordinate work with other trades.

1.05 SUBMITTALS

Provide as outlined in each individual section of these Specifications, including but not limited to:

- A. Product Data: Submit manufacturer's product data for equipment including capacity, performance charts, test data, materials, dimensions, weights, and installation instructions.
- B. Shop Drawings: Submit manufacture's shop drawings indicating dimensions, weight loading, required clearances, location, and method of assembly of components.
Submittals are mandatory as noted in the respective specifications. Schedules, installation instructions, startup manuals, operation and maintenance manuals, and shop drawings are always required to be submitted.
- C. Samples
- D. Special Warranty
- E. Quality Assurance submittals
- F. Operation and Maintenance Manuals
- G. Test results and certificates
- H. Manuals
- I. Overcurrent Protective Device Coordination Study

1.06 PRE-INSTALLATION CONFERENCE

- A. Before the Electrical Work is scheduled to commence, a conference will be called by the Authority's Representative at the site for the purpose of reviewing

the Drawings and the Specifications and discussing requirements for the Work. The conference shall include, at a minimum, the Contractor, the Electrical Contractor, the Architect and the Authority's Construction Inspection Division (CID) Inspector. Contractors/installers of other trades may also be required to attend to discuss coordination with their work. The Contractor shall send a conference agenda to all attendees prior to the scheduled date of the conference.

- B. The Electrical Contractor shall attend pre-installation conferences of other trades for coordination of the work.

1.07 COORDINATION DRAWINGS

- A. Coordination Drawings: The Electrical Contractor shall cooperate with the HVAC, P&D, and Fire Protection Systems contractors in the development of the coordination drawings. The drawings, indicating ductwork, steam, hydronic & fuel piping, etc. shall be generated by the HVAC contractor, who in turn is to provide them to the Electrical contractor for the inclusion of electrical work in this coordination set. This is after the P&D and Fire Protection Systems contractors have entered their information in the set. The specified order in which the trade contractors impose their work on the coordination drawings is not intended to grant priority to any one trade contractor in the allocation of space. At the completion of this phase, hold a coordination meeting to eliminate any interference among the trades that the drawings indicate and to avoid any conflicts in installing the Work.

1.08 NYC DEPARTMENT OF BUILDINGS ELECTRICAL DIVISION

- A. Drawings and Specifications
 - 1. The Contract Drawings and Specifications shall be submitted by the Contractor to the Department of Building's Electrical Division to facilitate any inspections that may be made by that agency.
 - 2. It is the intent of these Specifications that all electric work shall be done in strict accordance with the rules of the Electrical Division and with the 2011 NYC Electrical Code (NYC amendments to the 2008 National Electrical Code - NFPA 70-08). Where the requirement of the Drawings or Specifications exceeds the requirements of the Electrical Code, the requirements of the Drawings

and Specifications shall be binding upon the Contractor.

3. Should the Electrical Division inspect the work and issue a violation, the Contractor shall correct the Work and eliminate the violation as part of the Contract.

B. Interpretation

1. The electric work detailed in these Specifications and shown on Drawings shall be under the jurisdiction of the Authority, subject to the approval of the Electrical Division.
2. The Authority shall be the sole source for interpretation of the Contract Documents. Any discrepancies or conflicts shall be brought to the attention of the Authority for clarification.

- C. Materials and Appliance: All materials and appliance shall be approved by the Authority's Representative and installed in accordance with the rules and regulations of the Building Department, Electrical Division; certificates of approval including the temporary light and power wiring, shall be obtained by the Contractor and delivered to the Authority's Representative before the Work is finally accepted.

1.09 WORK IN EXISTING BUILDINGS

- A. The Contractor is referred to Section 01900 on General Requirements of Work in Existing Structures which shall apply to the Work of this Contract.
- B. Refer to Section S01900 on the "Ownership of Removed Materials." Generally, that article shall apply except for those items which are listed here in for delivery to the Bureau of Shops at 44-36 Vernon Boulevard, Long Island City, New York 11101. All other existing material, fixtures, and equipment that have been removed shall not be used again unless specifically required by the Drawings or Specifications.
- C. Removals, Replacements, Adjustments
1. The Contractor shall remove, relocate, replace, adjust or adapt, all existing conduit, wiring and other electric equipment or apparatus, as required, to provide a complete installation.
 2. The Work shall include, providing all materials, all necessary extensions, connections, cuttings, repairing, adapting and other Work incidental

thereto, together with such temporary connections as may be required to maintain service pending the completion of the permanent Work. All Work shall be left in good working order and in a condition equal to the adjacent new or existing Work.

D. Care in Removing Existing Conductors

1. The Contractor shall use due care and diligence in removing existing conductors from existing conduits in order to prevent conductors from breaking and becoming an irretrievable obstruction within the conduits.

E. Cutting and Repairing

1. Whenever the cutting, or drilling, or removal of any part of the structure (ceilings, walls, floors, shelving, bookcases, partitions, etc.), is required in order to remove, relocate, alter or install any article of electrical equipment (including conduits, boxes, fittings, etc.), the Contractor shall perform all cutting, drilling, etc., and remove the section of structure required. After removal and installation of the electric equipment, the Contractor shall repair the section of structure, as directed by the Authority's Representative, with new materials, equal to that of adjacent structure of the same type.

Note that in general, all holes through existing structures for conduit installation shall be core drilled, unless prior written approval is provided by the Authority.

Contractor shall use extreme care when core drilling to avoid damaging the existing infrastructure.

2. Whenever holes are cut in fire-rated walls or floor slabs in order to permit the installation of conduit or electrical equipment, these holes shall be repaired with material that will restore the fire rating of the wall or floor slab to its original condition.
3. The Contractor shall paint all repaired areas of the building. The paint shall match the paint of adjacent surface areas, or extend to the nearest architectural break-line, as directed.

4. Wherever any part of the structure is marred or damaged, the Contractor shall repair the damaged or marred areas of the structure.
 5. Where a piece of electrical equipment is removed, the Contractor shall finish that part of the surface to match surroundings.
- F. Damaged Apparatus: Should any damage, due to the execution of this Contract, occur to the furniture, fixtures, or any equipment or apparatus, such damage shall be properly repaired and/or replaced by the Contractor without charge.
- G. Non-Interruption of Services
1. It is imperative that all existing services (electric, light, power, fire alarm, telecommunications, etc.) be kept in operation at all times, unless prior written approval is received from the Authority.
 2. Provide fire watch services, as necessary, during disruption of fire alarm system.

1.10 TESTS

- A. The Contractor shall demonstrate to the Authority operation of all equipment and systems. All tests shall be completed to the satisfaction of the Authority. Each test shall be performed as indicated in the individual specification section.

1.11 GUARANTEES, WARRANTIES, BONDS, AND MAINTENANCE CONTROL

- A. Refer to Section G01740 for procedures and submittal requirements for warranties. Refer to individual equipment specifications for warranty requirements.
1. Compile and assemble the warranties specified for Electrical work into a separated set of documents, tabulated and indexed for easy reference.
 2. Provide complete warranty information for each item to include product or equipment including duration of warranty or bond; and names, addresses, and telephone numbers and procedures for filing a claim and obtaining warranty services.
 3. Warranties for the equipment, workmanship and materials should be provided for the period of one year with the exception of the warranty on the refrigeration compressors. Five (5) years

warranty shall be provided for the refrigeration compressors.

4. Manufacturers', in addition to Contractors' warranties, shall be provided for all Electrical equipment and accessories.
5. All warranties are to start from the date of Substantial Completion.

1.12 OPERATIONS, TRAINING, AND MAINTENANCE MANUALS

A. General

1. Refer to Section S01730, Systems Operation and Maintenance Manual, for procedures and requirements for preparation and submittal of operation and maintenance manuals for each piece of equipment. Refer to individual equipment specifications for maintenance manual additional requirements. In addition, include the following information:
2. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of all replaceable parts.
3. Manufacturer's printed operating procedures to include start-up, break-in, routine and normal operating instructions; regulation, control, stopping, shut-down, and emergency instructions; and summer and winter operating instructions.
4. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassemble; aligning and adjusting instructions.
5. Servicing instructions and lubrication charts and schedules.

- B. Bind all the other Sections maintenance manuals in a single final Operating and Maintenance Manual with the requirements of Section S01730, Systems Operation and Maintenance Manual.

- C. Refer to Section S01650, Facility Start-Up, Demonstration and Training, for procedures and requirements for training on each piece of equipment. Refer to individual equipment specifications for the additional training requirements.

1.13 CLEANING AND REPAIR

- A. On completion of installation, inspect interior and exterior of installed equipment. Remove paint splatters and other spots. Vacuum dirt and debris; do not use compressed air to assist in cleaning. Repair exposed surfaces to match original finish.
- B. Contractor shall not leave sharp exposed metal edges (bottom of threaded rods, electrical equipment supports, etc.) that could otherwise present safety hazards to the building's occupants/work staff.

1.14 SEISMIC RESTRAINT - Not Used**1.15 BMS/DDC COORDINATION - Not Used****1.16 INSPECTIONS**

- A. Refer to Section S01400 for requirements.
- B. The following Special Inspections are required by the 2014 NYC Building Code for the Electrical Trade:

Item	Code Section
Emergency and Standby Power Systems (Generators)	BC 1704.31, BC 2702
Seismic Requirements of Emergency Power Systems	BC 1707.7

- C. The following progress inspection is required by the NYC Administrative Code for the Electrical Trade:

Item	Code Section
Public Assembly Emergency Lighting	§28-116.2.2

- D. The Contractor is responsible for the following inspections and tests to be performed in the presence of the NYC Fire Department.

Item	Code Section
Fire Alarm Test, including Record of Completion	BC 907.7

END OF SECTION

LIST OF SUBMITTALS

<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>
Product Data:	_____	_____
Shop Drawings:	_____	_____
Samples:	_____	_____
Special Warranty:	_____	_____
Quality Assurance submittals:	_____	_____
Test results and certificates:	_____	_____
Operation and Maintenance Manuals:	_____	_____

* * *

SECTION 16120
WIRING SYSTEMS

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. Install all conductors as required for the proper operation of the various systems specified. All connections shall be made complete, and all systems shall be energized and tested for proper operation.

1.02 QUALITY ASSURANCE

- A. Wire manufactured over one year prior to delivery to the site will not be accepted.
- B. Tapes for splices or termination shall be dated by the tape manufacturer to indicate that they have been manufactured no longer than six months prior to use in the Work of this Section.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. Conductors shall be delivered at the building in original packages or on reels, and shall have the tag of the manufacturer attached thereto indicating: Contractor's name, Project title and number, Date of manufacturing.
- B. Store material in a clean, dry space and protect from weather.

1.04 SUPPLEMENTAL SUBMITTALS

- A. Submit a Product Schedule indicating the item description and manufacturer name. The Schedule will be accepted by the Authority for record purposes only, provided that the items are in full compliance with the Specifications.
- B. Certificates

Provide affidavit stating that all items used are UL listed and meet the specifications.

- C. Submit field test results for wires and cables, including "Megger" readings with the method used.

PART 2 - PRODUCTS

2.01 WIRES AND CABLES

A. General

1. Conductors shall conform to A.S.T.M. and I.P.C.E.A. standards, and be UL listed and labeled.
2. Conductors shall have 600 volt **rated** insulation and shall be of soft-annealed-uncoated copper of 98% conductivity. Copper clad conductors are not acceptable.
3. All conductors shall have identifiable lettering on the insulator jacket as to voltage rating, wire type, A.W.G. size, insulation, and manufacturer I.D.

B. Wire Description

1. Type USE/RHW: 600V, 75°C. Cable shall be capable of operating continuously at a temperature of 75°C, in both wet and dry locations, with RHW insulation.
2. Type THHN/THWN: 75°C, THHN: 90°C shall have a thermo-plastic polyvinyl chloride insulation with nylon jacket for 600 volts, and shall comply with ASTM, IPCEA S-61-402 (latest edition) and NEMA WC5 (latest edition).
3. TFFN (stranded) shall be thermoplastic insulated, jacketed by abrasion and oil resistant nylon, rated at 105°C.
4. Metal Clad Cable (Type MC) shall be a factory assembly of conductors, each insulated and enclosed in a metallic flexible interlocking metal tape armor of galvanized steel or aluminum. A bare internal grounding conductor shall be included and insulated from the outer metal armor. All conductors, including grounding

conductor, shall be a minimum of #12 AWG. The assembly shall be UL listed and rated **at** 600V, 90°C.

2.02 SPLICES AND TERMINATIONS

A. General

1. All materials for making splices and terminations shall be specifically designed for use with the type of wire, the cable insulation, the installation and the operating conditions of the specific application and be UL listed.
2. Grounding conductors and bonding jumpers shall be connected by exothermic welding, listed pressure connectors, listed clamps, or other listed means.

2.03 MISCELLANEOUS EQUIPMENT

A. Microswitch for elevator battery back-up

1. Switch shall be capable of transferring power to the battery back-up to the elevator recall system.
2. Switch shall be rated for 120VAC and have one normally open (n/o) contact and one normally closed (n/c) contact.

PART 3 - EXECUTION

3.01 PREPARATION

- ### **A. General**
1. Prior to pulling wires and cable, clean raceway systems of all foreign matter and perform all operations necessary so as not to cause damage to wires and cables while pulling.

3.02 INSTALLATION

A. General

1. At least 6 inches of free conductor, measured from the point in the box where it emerges from its raceway or cable sheath, shall be left at each outlet, junction and switch point for

splices or the connection of luminaries or devices. Where the opening of an outlet, junction or switch point is less than 8 inches in any dimension, each conductor shall be long enough to extend at least 3 inches outside the opening

2. Use approved lubrication when installing cables in conduits and raceways. Any pulling compounds shall be compatible with the finish of the wires and cables furnished.

B. Type USE/RHW wire

1. Install for service entrance conductors.

C. Type THHN/THWN wire

1. Feeder and Branch Circuits
2. Remote-Control Signaling and Power-Limited Circuits: - Circuit Classes 1, 2 or 3, unless otherwise indicated.

D. Type MC Cable - Use in concealed installation of hung ceiling and gypsum board for:

1. Lighting Branch circuit.
2. Power branch circuit.

E. Lighting Fixture Wires

1. For wiring within lighting fixtures only, where sizes #14 AWG or smaller is required, use Type TFFN.

F. Identifications of Wires and Cables

1. Each wire and cable shall be identified by its circuit in all cabinets, boxes, manholes, handholes, wire ways and other enclosures and access locations, and at all terminal points.

G. Terminations

1. For Conductor Sizes Larger Than Terminal Capacity On Equipment: Reduce the larger conductor to the maximum conductor size that terminal can accommodate (reduce section no longer than 1 ft.). Cutting of cable strands to fit terminal is not acceptable.

3.03 COMMON NEUTRAL CONDUCTOR

- A. A common neutral may be used for 2 or 3 branch circuits where the circuits are indicated on the Drawings to be enclosed within the same raceway, provided each branch circuit is connected to different phase busses in the panelboard.
- B. Exceptions - The following circuits shall have a separate neutral:
 1. Circuits containing ground fault circuit interrupter devices.
 - a. Circuits containing solid state dimmers.
 - b. Circuits for computers, peripherals and related equipment.
 - c. Circuits recommended by equipment manufacturers to have separate neutrals.

3.04 EQUIPMENT GROUNDING CONDUCTOR

Note that equipment-grounding conductors are not shown on the Contract Drawings but it shall be provided when and as required by code.

3.05 ELEVATOR WIRING - Not Used

3.06 BRANCH CIRCUIT WIRING

- A. Multiwire Branch Circuits:
 1. Disconnect Means: Each multiwire branch circuit shall be provided with a means that will simultaneously disconnect all ungrounded conductors at the point where the branch circuit originates

2. Grouping: The grounded and ungrounded conductors of each multiwire branch circuit shall be grouped by wire ties or similar means in at least one location within the panelboard or other point of origination as per NEC 2008, Article 210.4.

3.07 HOSPITAL GRADE WIRING - Not Used

3.08 FIELD TESTS

- A. Test all feeder cables installed under this Contract with a 1000-volt Megohmmeter. Furnish the Authority's Representative with a copy of the "Megger" test report, together with an outline of the method used. Any cable not attaining the minimum reading established in the code shall be replaced.

END OF SECTION

LIST OF SUBMITTALS

<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>
Product Schedule	_____	_____
Certificates	_____	_____
Field test report	_____	_____

* * *

SECTION 16130
RACEWAYS, FITTINGS, SUPPORTING DEVICES, BOXES AND ACCESSORIES

PART 1 - GENERAL**1.01 DESCRIPTION OF WORK**

- A. Provide raceways, fittings, supporting devices, boxes and accessories required for a complete system and its proper operation.
- B. Coordinate layout and installation of raceways, boxes, enclosures, cabinets, and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.
- C. Raceways, fittings, etc. to be used in the Fire Alarm System are described in Section 16720, 16722, 16723 as applicable to project along with requirements specific to such systems. Installation is as described in Article 3.02 of this section.

1.02 RELATED SECTIONS

- A. Firestopping..... Section 07270
- B. Painting..... Section 09900

1.03 SUPPLEMENTAL SUBMITTALS

- A. Submit a Product Schedule indicating the item description and manufacturer name. The Schedule will be accepted by the Authority for record purposes only, provided that the items are in full compliance with the Specifications.
- B. Certificates

Provide affidavit stating that all items used are UL listed and meet the specifications.
- C. Coordination drawings for conduit buried in concrete slabs, conduit in the ground and service entrance conduit.
Provide conduit routing plan, drawn to scale, showing structural members, architectural features, HVAC and P&D items.

PART 2 - PRODUCTS**2.01 RACEWAYS**

- A. Rigid Galvanized Conduit (RGC)

Steel conduit, Schedule 40, hot dipped galvanized, with Underwriters Laboratories label stamped on each length.
- B. Electric Metallic Tubing (EMT)

Industry standard conduit with Underwriters Laboratories label stamped on each length.
- C. Flexible Metal Conduit (FMC)

Galvanized steel conduit, Underwriter Laboratories listed.
- D. Liquid-tight Flexible Metal Conduit (LTFMC)

Industry standard conduit, Underwriter Laboratories listed.
- E. Rigid Nonmetallic Conduit (RNMCM)
 - 1. Polyvinyl Chloride conduit (PVC), Schedule 40, Underwriter Laboratories listed.
 - 2. Fiberglass conduit, Schedule 40, Underwriter Laboratories listed.
- F. Surface Metal Raceway
 - 1. Metal raceway shall be of a two-piece design with a base and snap-on cover.
 - 2. Raceway and all components shall be listed by Underwriters Laboratories
 - 3. Manufacturers
 - a. Mono-Systems, Hubbell Inc., Wire Mold Co or Panduit
 - b. Single Channel: Wire Mold V700, Hubbell Inc. 750 Series, Mono-Systems SMS700, or Panduit PMR5/PMR7
 - c. Dual Channel: Wiremold V4000, Wiremold DS4000 Series, Hubbell Inc. 4000 Series or Mono-Systems SMS4200 or Panduit PMR40.

d. Surface mounted Raceway V2000BC

2.02 SUPPORTING DEVICES

A. Hangers

1. Separate hangers shall be installed for supporting conduits. Wherever possible, hangers shall be supported from concrete slab by inserts.
2. Hangers and piping installed by other trades shall not be used for supporting electric conduits.

B. Individual and multiple pipe hangers and riser clamps including all parts and hardware shall be hot-dipped galvanized throughout. All U-bolts, clamps, attachments and hardware for hanger assembly and conduits shall be provided. Each multiple hanger shall be designed to support a load equal to or greater than the sum of the weights of the conduits, wires and hanger itself, plus 200 pounds.

C. Use pipe straps and specified method of attachment where conduit is installed proximate to surface of steel stud or masonry construction.

1. Use hangers secured to surface with specified method of attachment where conduit is suspended from the surfaces.

D. Use "C" beam clamps and hangers where conduit is supported from steel beams.

E. Use deck clamps and hangers to support conduits from steel decking having hanger tabs. One conduit per tab is permitted.

1. Where conduit is supported from steel decking which does not have hanger tabs, use clamps and hangers secured to decking, utilizing specified method of attachment.

F. Use channel support system supported from structural steel for multiple parallel conduit runs.

G. Where conduits are installed above ceiling, do not rest conduit directly on runners bars, T-Bars, etc.

1. Conduit Sizes 2½" and Smaller: Support conduit from non-lightweight ceiling supports or from construction above ceiling such as beams, joists, slabs, or trusses.

2. Conduit Sizes Over 2½" and where ceiling system is of lightweight construction (e.g. GAT system): Support conduit from beams, joist, or trusses above ceiling.
- H. Conduits shall be supported within three (3) feet of any kind of fitting and at every outlet or junction box, panel, etc. This shall apply to both horizontal and vertical runs.

2.03 BOXES AND ENCLOSURES

- A. The Contractor shall provide outlet boxes and enclosures appropriate for the purpose at all locations where the Drawings require the installation of electrical devices or electrical equipment. For exposed conduit systems, the contractor shall use cast outlet boxes in all locations below 8'-0" with number of threaded hubs equal to the number of conduits, except when installing surface metal raceway contractor shall provide boxes from the same manufacturer of the surface metal raceway.
- B. Where the Contractor selects and installs an item of equipment that requires additional boxes, fittings, etc., or a modification of the conduit system indicated on the Drawings, such additional boxes, fittings, etc. shall be furnished and installed and such modifications shall be performed by the Contractor as part of this Contract, without extra compensation from the Authority.

2.04 FITTINGS AND ACCESSORIES

- A. All fittings and accessories must be UL listed and compatible with selected raceways and suitable for use location. Compression fittings shall be provided with the installation of EMT.

2.05 CONDUIT SIZES

- A. Where conduit is required to be installed, its nominal diameter shall be not less than 3/4 inch.
- B. For conduit placed in metal deck slabs, the maximum size is 1".
- C. For conduit placed in formed slabs, the maximum size is 3/4" for 4" slabs and 1" for slabs greater than 4".

2.06 SLEEVES FOR CONDUIT

- A. Provide sleeves, Schedule 40, galvanized steel, for all electrical conduits and wiring passing through foundation walls.
- B. Provide sleeves, Schedule 10, galvanized steel, for all electrical conduits and wiring passing through partitions and slabs. Proprietary sleeves that are part of an NYC approved fire stopping assembly are also acceptable.

PART 3 - EXECUTION**3.01 RACEWAY SCHEDULE**

- A. Rigid Galvanized Steel Conduit (RGC)

Provide RGC as follows:

- 1. All conduits buried in concrete slabs or in the ground. Where conduit is in contact with gravel or earth, conduit shall have a bitumastic coating.
- 2. **All** Electric Service entrance conductors.
- 3. Elbows and stub ups through floor slabs from underground raceways.
- 4. All outdoor raceway.
- 5. Concrete encased and exposed for normal and emergency power to the fire pump.
- 6. Fire Rescue area intercom system.

- B. Electrical Metallic Tubing (EMT)

Provide EMT for feeders and branch circuits for power, lighting and low voltage systems.

- C. Rigid Nonmetallic Conduit (RNMC)

Provide RNMC encased in concrete outside the building footprint for underground service entrance conductors for the City Fire Alarm System, Cable Television System and Telecommunications System. Install in accordance with the utility company requirements. Provide adapter fittings to convert from RNMC to RGC before entering the building.

D. Metal Clad Cable (MC)

Provide MC for branch circuit in concealed installation of hung ceiling and gypsum board partitions.

E. Flexible Metal Conduit (FMC)

1. Concealed above hung ceiling for low voltage systems
2. Provide FMC for final conduit connection to:
 - a. Recessed lighting fixtures in suspended ceilings.
 - b. Emergency lighting battery units.
 - c. Motors
 - d. Equipment subject to vibration (dry locations).
 - e. Equipment requiring flexible connections for adjustment or alignment (dry locations).
3. In all cases, install equipment-grounding conductor in the flexible raceway and bond at each box or equipment to which flex is connected.
4. Grounding conductors are not shown on the Drawings.

F. Liquid-tight Flexible Metal Conduit (LFMC)

Provide LFMC for final conduit connection to:

1. Motors and Equipment subject to vibration in damp and wet locations and for Kitchen appliances.
2. Equipment requiring flexible connection for adjustment or alignment in damp and wet locations.

G. Surface Metal Raceway

Provide surface metal raceway in finished spaces.

1. Secure raceway of one-piece type every 36" alternately with one-hole straps, and support clips (strap, support clip, strap, etc.). Secure raceway of two-piece type every 36" alternately with straps and fasteners through back of raceway (strap, fastener through back, strap, etc.).

2. Install separate grounding conductor. Grounding conductors for surface metal raceways are not shown on the Drawings.

3.02 RACEWAY INSTALLATION

A. General

1. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
2. All conduit systems shall be mechanically and electrically continuous.
3. The ends of all conduit shall be square, carefully reamed out to full size, shouldered in the fittings, and bushed or capped wherever stubbed clear of the building.
4. Not more than four (4) 90 degree ells or bends or the equivalent shall be used in any single run of conduit. Conduits for telephone, television, video surveillance or data cable shall not have more than three (3) 90 degree bends or the equivalent. Where more bends are necessary, provide suitable code size pull boxes or fittings. All conduits for telephone, television, video surveillance or data systems cable shall have large radius bends. Pull boxes shall be installed in accessible locations.
5. Conduit installed on equipment shall not obstruct any removable panel, access door, or control. Control apparatus, outlet, junction, and pull boxes shall be installed so as not to interfere with any piping, fixtures, or equipment.
6. Complete raceway installation before starting conductor installation.
7. Conceal conduit and EMT within new finished walls, ceilings, and floors, unless otherwise indicated. Use of exposed raceways attached to new finished walls, ceilings, or slabs is not permitted.
 - a. Install concealed raceways with a minimum of bends in the shortest practical distance, considering type of building construction and obstructions, unless otherwise indicated.

8. Conduits installed across seismic separations (expansion joints) shall include, but not limited to, the following:
 - a. The conduit (rigid steel or EMT) shall be securely anchored on each side of the seismic separation with a pipe hanger per SMACNA details.
 - b. The spacing between conduit ends shall be 36" minimum.
 - c. A liquid-tight flexible metal conduit of the same size shall be installed between the conduit ends spanning the seismic separation.
 - d. The liquid-tight flexible metal conduit shall be of sufficient length to provide for a longitudinal and axial deflection of two (2)-inches minimum in all directions.
9. Terminations:
 - a. Where raceways are terminated with locknuts and bushings, align raceways to enter squarely and install locknuts with dished part against box. Use two locknuts, one inside and one outside box.
 - b. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into hub so end bears against wire protection shoulder. Where chase nipples are used, align raceways so coupling is square to box tighten chase nipple so no threads are exposed.
10. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire.
11. Rooftop conduits (rigid steel) shall be neatly grouped and installed parallel to the building lines. Support conduits on minimum 4 inches x 6 inches on pressure treated lumber sleepers at minimum 5 feet spacing or Metallic Caddy Pyramid 50 from Erico (Polyethylene closed-cell foam and 16-gauge steel construction) or approved equal
12. Do not place conduit runs where electronic equipment, such as Interactive White Boards, are to be installed to avoid possible electromagnetic

interference. Individual conduits associated with such equipment only may be in the vicinity of the equipment.

B. Exposed conduits

Exposed conduits shall be rigidly fastened to structure, or to rigid hangers or angle irons connected to structure at intervals not exceeding eight feet. Where the conduits or surface metal raceways are installed exposed, they shall follow the architectural lines of the enclosure and shall be run as to be as inconspicuous as possible. Conduits or surface metal raceways shall not be installed diagonally on ceilings, walls or columns.

C. Conduit Installed Concealed in Existing Building

Where new partition walls and new hung or furred ceilings are being erected or where existing walls are to have a new tile finish, the conduits and related equipment shall be installed concealed in walls and in hung or furred ceilings.

D. Conduit Installed Concealed in New Construction

Install conduits concealed in the ceilings, walls, and partitions.

E. Conduit Installed in Concrete Floor Slabs

1. General

- a. Where conduits cross expansion joints in floor slabs, special conduit expansion fittings shall be installed.
- b. Conduits shall clear all concealed-in-floor door closers by 3".
- c. Conduits installed in the fill (or slab if no fill is being used) of an auditorium floor shall be run in the aisle spaces only.
- d. The Contractor shall not cut any hole larger than six (6) inches except where otherwise directed in the Contract. Where the opening (single or combined) is larger than six inches, the Contractor shall request and obtain approval before execution of work.

2. Conduit Run in Metal-deck Slab

- a. Conduit perpendicular to metal deck: Provide a minimum of 18" clearance between conduits. Additional wire mesh shall be placed over conduits and project 12" beyond the conduit.
- b. Conduits parallel to metal deck: Maximum number of conduits placed in each rib shall be one for 1" in-diameter and two for 3/4" in-diameter. For rib widths less than 6", only one conduit per rib is allowed. Place conduit in the rib but provide chair or tie to perpendicular conduits in order to provide a 1" minimum clearance between deck and conduits.
- c. Junction boxes placed in the concrete shall be minimum 18" apart.
- d. Where these clearance requirements cannot be met, conduit shall be run under the deck. At penetrations where large groupings of conduit penetrate, slab shall be reinforced as if it is an opening.

3. Conduit Run under Slab on Grade:

Install conduit below the vapor barrier. The vapor barrier must be sealed in locations where stub ups penetrate the barrier.

- 4. Conduit Run in Slab on Grade and Formed Slab (non-metal deck system)
 - a. Only run conduit in the slab where placement of reinforcement and slab thickness is sufficient to allow minimum of 1¹/₂" of concrete cover over conduit. Otherwise, run conduit under slab. Separate parallel conduits a minimum of 3" so that each conduit will be enveloped in concrete.
 - b. Demonstrate to the Authority's Representative that conduit has been properly placed to allow a minimum of 1¹/₂" of concrete cover and a minimum of 3" of separation.
 - c. Provide chairs under conduit to avoid movement during placement of concrete.
 - d. Conduits shall be placed above bottom reinforcement and below top reinforcement so as not to disturb proper installation of wire mesh or reinforcing bars. Conduits shall not

cross each other, especially at beams, unless the above requirements can be met.

- e. Conduits shall generally be run parallel to the main reinforcing rods. Where conduits must cross the main reinforcing rods at or near right angles, place wire mesh (6x6-w1.4xw1.4 WWF) over the conduits for their full length with an overlap of not less than 6" on both sides.
 - f. Conduits shall not be installed in haunches of concrete beams, except where the Drawings indicate lighting fixtures are mounted on concrete beams. In this case, only the conduit connected to the lighting fixtures may be run in the haunch of the beam.
 - g. Conduits shall not be run through any part of a concrete column except where the Drawings indicate a lighting fixture, switch or receptacle mounted on the column. In this case, only the conduits connected to fixture, switch or receptacle shall be run through the column.
 - h. Where these clearance requirements cannot be met, conduit shall be run under the slab. At penetrations where large groupings of conduit penetrate, slab shall be reinforced as if it is an opening.
- F. Low voltage systems (except for the fire alarm, refer to specification section 16720) shall be installed as follows:

New Buildings:

1. Vertical (Riser) Raceways:

EMT

Exception: When telecommunication closets are stacked up, Telephone, TV or LAN cables may run exposed between floors. Openings between floors have to be firestopped.

2. Horizontal Raceways:

Cable tray, EMT from the outlet box up into hung ceiling, (cables shall run exposed above ceiling). Use sleeves to cross through gypsum walls.

Existing Buildings:

1. Vertical (Riser) Raceways:

EMT

2. Horizontal Raceways:

EMT or surface metal raceway up to the outlet. Concealed flexible metal conduit may be used for low voltage systems above suspended ceiling.

- G. Raceways passing through walls, floors, roofs, ceilings, and other areas where indicated: the space between sleeve and pipe/conduit shall be fire stopped in accordance with Section 07270 to comply with fire-rating of assembly through which it passes.
- H. Raceways passing through foundation walls shall be of watertight utilizing "Link-Seal" type gasketing. If a non-rigid penetration is required for seismic requirements above the water table design elevation, another means of watertight protection shall be provided.

3.03 CONDUIT TO MOTORS, TABLES, ETC. IN SHOPS AND OTHER ROOMS

- A. Stub-up Connections: Extend conduits through concrete floor for connection to freestanding equipment. Install with an adjustable top or coupling threaded inside for plugs set flush with finished floor. Extend conductors to equipment with rigid steel conduit; FMC may be used 6 inches (150mm) above the floor. Install screwdriver-operated, threaded plugs flush with floor for future equipment connections.
- B. Flexible Connections: Use maximum of 72 inches (1830 mm) of flexible conduit for recessed and semi recessed lighting fixtures; for equipment subject to vibration, noise transmission, or movement; and for all motors. Use LFMC in damp or wet locations. Install separate ground conductor across flexible connections.

3.04 MOUNTING DEVICES**A. Height of Wall Outlets**

Unless otherwise indicated, locate outlet boxes with their center lines at the following elevations above finished floor:

Alarm Indicating Devices	8'-0" to center where ceiling height allows a minimum of 2" clearance between ceiling and top otherwise mount so that its top is 2" below finished ceiling.
Clock	2" below finished ceiling to a maximum elevation of 10'-0".
Exit Lights	8'-0" where ceiling height allows a minimum of 6" clearance between ceilings and top light, otherwise mount exit light so that its top is 6" below finished ceiling. Adjust height and clearances as required to suit installation over doors.
Indicators	8'-0" AFF.
Fire Alarm Strobe Lights	8'-0" A.F.F. or 6" below the ceiling whichever is lower
Manual Fire Alarm Boxes	4'-0"
Single & Duplex Receptacles	1'-6"
Special Purpose Receptacles	As indicated on the Drawings.
Switches	4'-0"
Telephone	1'-6"
Telephone Marked "W"	Install outlet so that the highest operable part of the telephone will not be more than 4'-0" AFF.
Television outlet	1'-6"

3.05 PAINTING

- A. All exposed raceways and boxes in finished parts of the building shall be painted. Painting shall consist of a prime coat and a finished coat, color as selected by project architect. Factory painting will be accepted as a prime coat.

END OF SECTION**LIST OF SUBMITTALS**

<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>
Product Schedule	_____	_____
Certificates	_____	_____
Coordination/Routing Drawings	_____	_____

SECTION 16140
WIRING DEVICES

PART 1 - GENERAL**1.01 DESCRIPTION OF WORK**

- A. Provide receptacles and switches.

1.02 SUPPLEMENTAL SUBMITTALS

- A. Field test report.

PART 2 - PRODUCTS**2.01 MANUFACTURERS**

- A. Hubbell Incorporated
- B. Leviton Mfg. Company Inc.
- C. Bryant Electric, Inc. (a Hubbell Inc. subsidiary)
- D. Pass & Seymour/Legrand
- E. Lutron

2.02 AC SWITCH

Commercial specification grade, UL listed; compliance with UL 20 and NEMA standard WD-1, "General Purpose Wiring Devices".

- A. Toggle Single Pole:
 - 1. 15A, 120/277V AC;
CS115 from Hubbell Inc.; CS115-2 from Leviton Mfg.;
 - 2. 20A, 120/277 VAC;
CS120 from Hubbell Inc.; CS120-2 from Leviton Mfg.;
- B. Three-way Toggle:
 - 1. 15A, 120/277 VAC;
CS315 from Hubbell Inc.; CS315-2 from Leviton Mfg.;
 - 2. 20A, 120/277 VAC;
CS320 from Hubbell Inc.; CS320-2 from Leviton Mfg.;
- C. Locking type (Key-Operated) Single-pole
Industrial specification grade for this device.
 - 1. 15A, 120/277V AC;

HBL 1201-L from Hubbell Inc.; 1101-2L from Leviton Mfg.;

2. 20A, 120/277 VAC;
HBL 1221-L from Hubbell Inc.; CS1121-2L from Leviton Mfg.;
3. Low voltage switches for occupant sensors, vacancy mode (Manual 'On'), DCC2 Wattstopper and LVSM1NP Hubble.
4. For line voltage wall-mounted occupant sensors (Vacancy Mode/Manual ON) in small offices, Watt Stopper DW100.
5. For line-voltage occupant Sensor in occupancy Mode/Auto ON) wall-mounted sensors, Leviton Part # OSSMD-MDW or approved equal.
6. Three-button Switch (For use with daylight Harvesting): Wall-mounted three-button switch with setting at Off/50%/100%. The switch shall be Pass & Seymour/Legrand Model #LMSW-100 Series digital wall switches, Lutron PX-3B-GXX*-I01 or approved equal.
7. Dimmer Switch (For use with daylight Harvesting): Wall-mounted switch with On/Of button with slider for dimming. The switch shall be Leviton IP710-LFZ Illumatech Slide Dimmer or approved equal.
8. Multi-button Switch (For use with daylight Harvesting): Wall-mounted Five-button switch with Off/50%/On w/Raise/Lower. The switch shall be Lutron PX-3BRL-GXX*-I01 or approved equal.

2.03 RECEPTACLES

A. Straight-blade-type; Commercial Specification Grade minimum; compliance with NEMA WD 1; DSCC WC 596, AND UL 498 and UL 943 2006 Codes.

1. Single receptacle, NEMA 5-20R (20A, 125V, 2P, 3W); Leviton 5891 or Pass & Seymour/Legrand PS5351
2. Duplex receptacle, NEMA 5-20R (20A, 125V, 2P, 3W); Hubbell Inc. HBL5362, Leviton BR20, Pass & Seymour/Legrand PS5362

3. Ground-Fault Circuit Interrupter GFCI; duplex (20A, 125V, 2P, 3W)
Hubbell Inc GF5352SL, Leviton 6899, Pass & Seymour/Legrand PS2095
4. Transient Voltage Surge Suppression Receptacle TVSS; duplex (20A, 125V, 2P, 3W);
Hubbell Inc HBL5360SA, Leviton 5380, Pass & Seymour/Legrand PS5362-ISP
5. Tamper-Resistant Commercial/Hospital Grade receptacle - Safety duplex receptacle for use in Pre-Kindergarten and Kindergarten rooms - NEMA 5-20R (20A, 125V, 2P, 3W): Hubbell Inc. HBL 8300 SG00SGA, Leviton TBR 20, Pass & Seymour/Legrand TR 63H (Hospital Grade)
6. Twisted Lock receptacles Commercial Grade For use in the Telecommunication Rooms
 - a. Single receptacle (30A, 125V, 2P 3W) (NEMA L530R):
Leviton part# 2660 or Hubbell Part # HBLL530R
 - b. Single receptacle (20A, 220V, 2P 3W) (NEMA L620R):
Leviton Part# 2320 or Hubbell Part # HBLL530R
 - c. For the Mobile Hot Food Server:
Hubbell Receptacle Part # HBL9430A 30A, 3 Pole, 4 Wire Grounding
7. Controlled Receptacles:
 - a. Shall comply with UL 498 and shall use silk screened lettering with the word "CONTROLLED".
 - b. Shall be Pass & Seymour #5362 Series or approved equal

2.04 WEATHERPROOF RECEPTACLE ENCLOSURE

- A. For use in wet location equal to Pass & Seymour/Legrand WIUC10-G.

2.05 WALL PLATE

- A. Provide wall plate for wiring devices. Material shall be 0.035-inch thick, satin-finished stainless steel. Metal screw heads to match plate finish.

PART 3 - EXECUTION**3.01 INSTALLATION**

- A. Install wiring devices in outlet boxes.
- B. Install devices and assemblies level, plumb and square.
- C. Where more than one switch occurs at the same location, arrange switches in gangs and cover with a single faceplate.
- D. Install switches so that handle is up when switch is in the "On" position.
- E. Install receptacles with ground pole in up position.
- F. Install wall plates on all wiring devices.
- G. Install blank wall plates on outlet boxes which are for future equipment except telephone outlets.
- H. Remove wall plates protecting devices and assemblies during painting.
- I. Install weatherproof covers on wiring devices in damp and wet locations.
- J. Where flush plates are required over outlet boxes that cannot be set deep enough for the plates to fit closely over the finished wall surfaces, provide extension collar to fill the space between the finished wall surface and the plate.
- K. Switches that are part of an occupant sensor system (both manual and automatic on) are to be installed with power disconnected.
- L. Provide switched (Controlled) receptacles where shown on drawings. Switched receptacles are to be wired to the appropriate panel that allows them to be turned off by the timer.
- M. Switches that are connected to daylight harvesting sensors shall be the three button dimmer type.

3.02 FIELD TESTS

- A. Ensure that proper polarity of connections is maintained. Subsequent to energization, test wiring devices to demonstrate compliance with requirements of these Specifications.

END OF SECTION

LIST OF SUBMITTALS

<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>
Product Data	_____	_____
Field test report	_____	_____

* * *

SECTION 16475
OVERCURRENT PROTECTIVE DEVICES,
CIRCUIT BREAKERS AND FUSES

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. Provide circuit breakers and fuses for use in panelboards, switchboards, and fuses for use in switches, controllers, motor-control centers and spare fuse cabinets.

1.02 SUPPLEMENTAL SUBMITTALS

- A. Product Data: Include the following for each fuse type indicated:
1. Dimensions and manufacturer's technical data on features, performance, electrical characteristics, and ratings.
 2. Let-through current curves for fuses with current-limiting characteristics.
 3. Time-current curves, coordination charts and tables, and related data.
 4. Fuse size for elevator feeders and elevator disconnect switches.
- B. Close-out Submittals
1. Spare parts

1.03 SPARES

- A. Provide and deliver the following spare fuses:
1. Three (3) fuses of each type and size for all fuses.

1.04 ELECTRICAL SYSTEM COORDINATION

- A. Rating and arrangement of fuses, or overcurrent devices on service switches, which have a rating above 601 amperes, shall be selectively coordinated.

PART 2 - PRODUCTS**2.01 CIRCUIT BREAKERS**

A. General

Circuit breakers shall be thermal-magnetic type, conforming to the following Specifications:

1. Connection to bus shall be by "bolt-on". Plug-in type circuit breakers are not acceptable.
2. Multi-pole breakers shall have barriers between poles
3. Multi-pole breakers shall have separate tripping element for each pole with a common internal trip. Each tripping element shall open all poles. Multi-pole breakers shall have one handle controlling all poles. Handle ties shall not be used as the means of tripping multiple poles.
4. Breakers of 225-ampere trip rating or less shall have non-tamperable, permanently set trip elements enclosed and sealed in molded composition housing.
5. Single pole breakers shall be rated for not less than 120 volts, A.C., multi-pole breakers shall be rated for not less than 250 volts A.C.
6. Where spaces for future breakers are required, copper connections for mounting of future breakers shall be provided.
7. Circuit breakers shall be mounted in standard panel boards as indicated on the drawings. Frame and sizes of circuit breakers shall conform to the following:
 - a. Use standard molded-case type.
 - b. For lighting circuits controlled at the panel, provide circuit breakers rated and labeled for switching duty.
 - c. For circuit breaker serving heat tracing, snow melting or similar heating devices

- provide GFI feature (30-milliamp sensitivity) as shown on the drawings.
- d. For circuit breakers serving convenience receptacles in bathrooms, kitchens and other such code-mandated locations provide GFI feature (5 milliamps sensitivity) as shown on the drawings.

Table with Frame Size, Trip Rating, Short Circuit Interrupting Capacity and **Basis of Design** Manufacturers:

Trip Ratings-Amps	No. of Poles	Frame Size
15-30 15-20 15-125	1	<u>100 AMP - Frame</u> 120/240V: Square D, Type QOB-VH (22,000 I.C.) 120/240V: Square D, Type QOB-VH (65,000 I.C.) 120-240V: Cutler-Hammer, Type GHBS (65,000 I.C.)* 480/277V: EHB (14,000 I.C.) <u>125 AMP - Frame</u> 120V: SIEMENS, Type BLH (22,000 I.C.)
15-100 15-30 15-30	2&3 2&3 2&3	<u>100 AMP - Frame</u> 120/240V: Square D, Type QOB-VH (22,000 I.C.) 120/240V: Square D, Type QOB-VH (65,000 I.C.) 240V: Cutler-Hammer, Type GB (65,000 I.C.)*
15-125 101-225 125-225 125-225	2&3 2&3 2&3	<u>125 AMP - Frame</u> 240V: SIEMENS, Type ED4 (65,000 I.C.) <u>225 AMP - Frame</u> 240V: Square D, Type KA (42,000 I.C.) 240V: Cutler-Hammer, Type HCA (42,000 I.C.)*

	2&3	240V: SIEMENS, Type QJH2 (22,000 I.C.)
226-400	3	<u>400 AMP - Frame</u> 240V: Square D, type LA (42,000 I.C.) 480V: Type LA (30,000 I.C.) 240V: SIEMENS, Type JXD2 (65,000 I.C.) 480V: SIEMENS, Type JXD6 (35,000 I.C.)

2.02 FUSES

A. Fuses of type and voltage required, shall have a minimum interrupting rating of 200,000 R.M.S. amperes and be the equal of Bussmann or Gould Shawmut.

1. 600 Amp and Below:

- a. UL listed as class RK-1 and RK-5, similar to Bussmann type Low Peak LPN-RK, 250 volt or Low Peak LPS-RK, 600-volt. Where intended for use in motor starters fuses shall be of the dual element, time-delay type.
Provide with kit for rejecting all but class R fuses.
- b. UL listed as class J, similar to Bussmann time delay, type Low Peak LPJ, or quick acting Limitron JKS, 600 volt,

2. 601 to 6000 Amp:

- a. UL listed as class L, time delay, current limiting type similar to Low-Peak KRP-C, 600Volt.

B. All fuses shall be the product of the same manufacturer. All devices shall have the same fuse type of the same manufacturer.

2.03 SPARE FUSE CABINET

- A. Cabinet: Wall-mounted, 0.05-inch- (1.27-mm-) thick steel unit with full-length, recessed piano-hinged door and key-coded cam lock and pull. Shall be installed in the Main Service Room.
1. Size: Adequate for storage of spare fuses specified with 15 percent spare capacity minimum.
 2. Finish: Gray, baked enamel.
 3. Identification: "SPARE FUSES" in 1½" (40 mm) high letters on exterior of door.
 4. Fuse Pullers: For each size fuse.

PART 3 - EXECUTION**3.01 INSTALLATION**

- A. Examine utilization equipment nameplates and installation instructions. Install fuses of sizes and with characteristics appropriate for each piece of equipment.

END OF SECTION

LIST OF SUBMITTALS

<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>
Product Data:	_____	_____
1. Technical data, performance characteristics		
2. Let-through current curves		
3. Time-current curves		
4. Elevator fuse size		
Close-out Submittals:	_____	_____
1. Spare parts		

* * *

SECTION 16480
MOTORS, MOTOR CONTROL CENTERS,
STARTERS AND CONTROL EQUIPMENT

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. Provide and make final connections to all motors, motor control centers, starters and accessories, connect equipment furnished under other Sections of the Specifications.

Obtain all wiring diagrams and other information furnished by the manufacturer of the equipment. Coordinate and supplement the wiring diagrams and schedules with any additional function of operational requirements specified in other Sections of the Specifications. Provide control equipment to execute the sequence of operation.

The Contractor is specifically directed to Division 15 for motors, starters, control equipments and devices furnished by the P&D and HVAC trades.

1.02 REFERENCES

- A. NEMA MG-1 - Motors and Generators
- B. NEMA ICS - General Standards for Industrial Control and Systems

1.03 SUPPLEMENTAL SUBMITTALS

- A. Submittal Package

Submit product data for motors and starters as a package.

- B. Product Data:

1. For each type of controller and each type of motor-control center. Include dimensions and manufacturer's technical data on features, performance, electrical characteristics, ratings, and finishes.

- C. Shop Drawings: For each starter and motor-control center.

1. Dimensioned plans, elevations, sections, and details, including required clearances and service

space around equipment. Show tabulations of installed devices, equipment features, and ratings. Include the following:

- a. Each installed unit's type and details.
 - b. Nameplate legends.
 - c. Short-circuit current ratings of buses and installed units.
 - d. Vertical and horizontal bus capacities.
 - e. UL listing for series rating of overcurrent protective devices in combination controllers.
2. Feature, characteristics, ratings, and factory settings of each motor-control center unit.
 3. Wiring Diagrams: Power, signal, and control wiring for class and type of motor-control center. Differentiate between manufacturer-installed and field-installed wiring. Provide schematic wiring diagram for each type of controller.
- D. Coordination Drawings: Floor plans showing dimensioned layout, required working clearances, and required area above and around motor-control centers where pipe and ducts are prohibited.
- E. Field Test Reports: Written reports specified in Part 3.
- F. Manufacturer's field service report.
- G. Maintenance Data: For starters and motor-control centers, all installed devices, and components to include in maintenance manuals specified in Division 1. In addition to requirements specified in Division 1 Section "Closeout Procedures," include the following:
1. Routine maintenance requirements for motor-control centers and all installed components.
 2. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
- H. Load-Current and Overload-Relay Heater List: Compile after motors have been installed and arrange to demonstrate that selection of heaters suits actual motor nameplate full-load currents.
- I. Load-Current and List of Settings of Adjustable Overload Relays: Compile after motors have been installed and arrange to demonstrate that dip switch settings for motor

running overload protection suit actual motor to be protected.

1.04 QUALITY ASSURANCE

- A. Source Limitations: Obtain BACnet compatible controllers of a single type through one source from a single manufacturer. Where BACnet compatible controllers are not available from the unit manufacturer, provide "gateway" to translate the unit manufacturer's protocol to the BACnet protocol.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with NFPA 70.

1.05 COORDINATION

- A. Coordinate layout and installation of starters and motor-control centers with other construction including conduit, piping, equipment, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- B. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases.
- C. Coordinate installation of roof curbs, equipment supports, and roof penetrations.
- D. Coordinate features of motor-control centers, installed units, and accessory devices with pilot devices and control circuits to which they connect.
- E. Coordinate features, accessories, and functions of each motor-control center, each controller, and each installed unit with ratings and characteristics of supply circuit, motor, required control sequence, and duty cycle of motor and load.

PART 2 - PRODUCTS

2.01 MOTORS

- A. Motor (Nameplate) Voltage
 - 1. 120/208 Volt, Three Phase, 4 Wire Incoming Service

- a. Motors less than 1/2 HP: NEMA standard motor voltage 115V single phase, 60 Hz.
 - b. Motors 1/2 HP and larger: NEMA standard motor voltage 200V, three phase, 60 Hz.
 2. 277/480 Volt, Three Phase, 4 Wire Incoming Service
 - a. Motors 1/2 HP and larger: NEMA standard motor voltage 460V, three phase, 60 Hz.
 3. For VFD applications, motors shall be general purpose Inverter Ready motors per NEMA MG1 Part 30.2 designed for a turn down to 20% of full speed. Provide with factory installed grounding rings.
 4. For best motor life and reliability, VFD motors shall be sized to deliver the system flow while running at a maximum motor operating frequency of 60 Hz. If conditions require the motor to operate higher than 60 Hz frequency, the motor operating torque and amperage shall be selected to operate with a 1.0 service factor. Motors that are selected to operate above 1.0 service factor shall be rejected.
- B. Single-phase motor shall be capacitor start, open drip-proof unless otherwise noted.
 - C. Three-phase motors shall be squirrel-cage, open drip-proof unless otherwise noted.
 - D. Motors in general shall have cast iron frame, full voltage starting.
 - E. Drawings shall indicate horsepower, voltage and RPM.
 - F. Temperature rise and insulation system class shall conform to NEMA standards.
 - G. Motors shall be of the highest grade manufactured by: Allis Chalmers Mfg. Co., Baldor Electric Co., Century Electric Co., Continental Electrical Motors Co., General Dynamics Corps., Howell Electric Motors Co., Imperial Electric Co., Peerless Electric Co., Reliance Electric & Engineering Co., Wagner Electric Corp., or Westinghouse Electric & Mfg. Co.

- H. Motor nameplate data shall be in accordance with NEMA Standards.

2.02 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Starters and Motor-Control Centers
 - a. Eaton Corp.; Cutler-Hammer Products.
 - b. General Electrical Distribution & Control.
 - c. Rockwell Automation Allen-Bradley Co.; Industrial Control Group.
 - d. Siemens/Furnas Controls.
 - e. Square D Co.
 2. Variable-Frequency Drives
 - a. Danfoss Inc.; Danfoss Electronic Drives Div.
 - b. Siemens/Furnas Controls.
 - c. Yaskawa
 - d. ABB
 - e. Vacon
 - f. GE Fuji,
 - g. Square D

2.03 MOTOR-CONTROL CENTERS - Not Used

2.04 FUNCTIONAL FEATURES

- A. Description: Modular arrangement of starters, control devices, overcurrent protective devices, transformers, panelboards, instruments, indicating panels, blank panels, and other items mounted in compartments of motor-control center.
- B. Starter Units: Combination starter units of types and with features, ratings, and circuit assignments indicated.
1. Install units with full-voltage, across-the-line, magnetic starters.
 2. Provide units with short-circuit current ratings equal to or greater than short-circuit current rating of motor-control center section.
- C. Spaces and Blank Units: Compartments fully bused and equipped.

- D. Spare Units: Type, sizes, and ratings indicated; installed in compartments indicated "spare".

2.05 MAGNETIC MOTOR STARTERS

- A. Description: NEMA ICS 2, Class A, full voltage, nonreversing, across the line, unless otherwise indicated.
- B. Control Circuit: 120 V
- C. Combination Starter: Factory-assembled combination starter and disconnect switch.
1. Fusible Disconnecting Means: NEMA KS 1, fusible switch with rejection-type fuse clips rated for fuses. Select and size fuses to provide Type 2 protection according to IEC 947-4-1, as certified by a nationally recognized testing laboratory.
 2. Nonfusible Disconnecting Means: NEMA KS 1, nonfusible switch.
 3. Circuit-Breaker Disconnecting Means: NEMA AB 1, motor-circuit protector with field adjustable, short-circuit trip coordinated with motor locked-rotor amperes.
- D. Overload Relay: Ambient-compensated type with inverse-time-current characteristic. Provide with heaters or sensors in each phase matched to nameplate full-load current of specific motor to which they connect and with appropriate adjustment for duty cycle.
- E. Star-Delta Controller: NEMA ICS 2, closed transition with adjustable time delay.

2.06 VARIABLE-FREQUENCY DRIVES - Not Used

2.07 VARIABLE FREQUENCY DRIVE (VFD) BACNET CARD - Not Used

2.08 FEEDER OVERCURRENT PROTECTION

- A. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable

magnetic trip setting for circuit-breaker frame sizes 250 A and larger.

- B. Fusible Switch: NEMA KS 1, Type HD, clips to accommodate specified fuses with lockable handle.

2.09 MOTOR-CONTROL CENTER ACCESSORIES - Not Used

2.10 FACTORY FINISHES

- A. Finish: Manufacturer's standard paint applied to factory-assembled and tested controllers before shipping.

2.11 MANUAL ENCLOSED STARTERS

- A. Description: NEMA ICS 2, general purpose, Class A, with toggle action and overload element.

2.12 MAGNETIC ENCLOSED STARTERS

- A. Description: NEMA ICA 2, Class A, full voltage, nonreversing, across the line, unless otherwise indicated.
- B. Control Circuit: 120 V
- C. Combination starter: Factory-assembled combination starter and disconnect switch.
 - 1. Fusible Disconnecting Means: NEMA KS 1, fusible switch with rejection-type fuse clips rated for fuses.
 - 2. Nonfusible Disconnecting Means: NEMA KS 1, nonfusible switch.
 - 3. Circuit-Breaker Disconnecting Means: NEMA AB 1, motor-circuit protector with field adjustable, short-circuit trip coordinated with motor locked-rotor amperes.
- D. Overload Relay: Ambient-compensated type with inverse-time-current characteristic. Provide with heaters or sensors in each phase matched to nameplate full-load current of specific motor to which they connect and with appropriate adjustment for duty cycle.
- E. Motor Control Push Button Stations and H-O-A Switches

Provide push button stations of the momentary contact type with pilot light, installed with a common faceplate.

Provide "Hand-Off-Automatic" (H-O-A) switches for all starters controlling equipment with automatic actuating apparatus.

2.13 MASTER CONTROL GAS VALVES (MCGV) - Not Used

2.14 GAS METER ROOM - EXHAUST FAN, GAS SAFETY SHUTOFF VALVES AND GAS LEAK DETECTION SYSTEM - Not Used

2.15 PUSHBUTTON STATIONS - Not Used

2.16 BREAKGLASS SWITCHES - Not Used

2.17 KEY-OPERATED CONTROL STATION - Not Used

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Anchor each motor-control center assembly to steel-channel sills arranged and sized according to manufacturer's written instructions. Attach by bolting. Level and grout sills flush with motor-control center mounting surface.
- B. Install motor-control center on concrete basis.
- C. Comply with mounting and anchoring requirements specified in Division 16 Section "Seismic Controls for Electrical Work".
- D. Controller Fuses: Install fuses in each fusible switch.
- E. For control equipment at walls, bolt units to wall or mount on lightweight structural-steel channels bolted to wall. For controllers not at walls, provide freestanding racks.
- F. Install freestanding equipment on concrete bases.

The arrangement and mounting of all control equipment shall be such, that the handle of the safety switch will be easily operable from the floor, at approximately 5'-0" mounting height.

Manually operated control equipment shall have handles or push buttons 4-feet from floor, unless otherwise noted on Drawings.

Provide a white core phenolic nameplate on all motor control equipment.

- G. In general, roof fan motor circuit wiring is run to starters in grouped locations. Starters shall be mounted on steel framework where shown on Drawings.

Pilot light assemblies shall be installed in the covers of respective starters

- H. Connect hand-off-automatic switch and other automatic-control devices where available.

1. Connect selector switches to bypass only manual-and automatic-control devices that have no safety functions when switch is in hand position.

2. Connect selector switches with motor-control circuit in both hand and automatic positions for safety-type control devices such as low-and high-pressure cutouts, high-temperature cutouts, and motor overload protectors.

3. For each motor automatically and/or manually controlled or monitored by the fire alarm system, include control wiring extensions as specified as part of the fire alarm system to an adjacent FPA addressable module.

4. For each motor supplied by a VFD, run 2 #14 from the disconnect switch at the motor to the VFD, and connect so as to de-energize "start circuit" when switch is open. Run with power circuitry or in separate raceway.

5. Control wiring for single phase HVAC motors with manual controllers shall be provided as part of the electrical work. For each such motor, provide wiring and connect to all outlying control devices as directed. Refer to GHAC drawings and specifications for quantities and locations.

- I. Control wiring for plumbing motors will be provided as part of the work of Division 15 as applicable.

- J. Control wiring shall be accomplished utilizing #14 AWG copper conductor with THWN installation.

- K. Nameplates

Identify starters, motor-control center, motor-control center components, and control apparatus wiring. Identify each pushbutton station and motor starter. Identify each interlock switch, indicating purpose of switch.

1. NEMA 1 Enclosures: Rivet or bolt nameplate to the cover
2. NEMA 3R, 4, 4X, 7, or 9 Enclosures: Attach nameplates to the cover using adhesive specifically designed for the purpose.

3.02 FIELD TESTS

- A. Perform tests, in the presence of the Authority's Representative to demonstrate:
 1. That each control device and its related motor starter operate properly.
 2. That each overload and undervoltage protection safety device functions properly.
 3. That each safety shut-off valve and device operates properly.
- B. Tests shall be performed in accordance with the equipment manufacturers' start-up and field test instructions and made jointly with all relevant trades.
- C. Should the tests reveal any defects, promptly correct such defects and rerun the tests until the entire installation is satisfactory in all respects.
- D. Tests shall be coordinated by the Contractor who shall provide (48) hrs. min. notice to the Authority's Representative for approval of schedule.

3.03 TRAINING

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain motor-control centers and variable-frequency drives.
 1. Train Owner's maintenance personnel on procedures and schedules for starting and stopping,

troubleshooting, servicing, and maintaining
equipment and schedules.

2. Review data in maintenance manuals.

END OF SECTION

* * *

LIST OF SUBMITTALS

<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>
Product Data	_____	_____
Shop Drawings	_____	_____
Wiring Diagrams	_____	_____
Coordination Drawings	_____	_____
Maintenance Data	_____	_____
Load-Current and Overload-Relay Heater List	_____	_____
Load-Current and List of Settings of Adjustable Overload Relays	_____	_____
Certificate of compliance with the Quality Assurance requirements	_____	_____
Field Test Reports	_____	_____

* * *

SECTION G01000
SPECIFICATIONS FORMAT

1.01 FORMAT

- A. These Specifications generally follow the Construction Specifications Institute format:

Divisions
Sections
Articles
Paragraphs
Subparagraphs

- B. Generally each Section, except for Division 1 Sections, is divided into three (3) parts:

Part 1 - General
Part 2 - Products
Part 3 - Execution

Note: Certain Sections may contain a "Part 4 - Schedules".

1.02 LANGUAGE

- A. The Specifications language is written using both indicative mood and imperative mood.

Where the imperative mood is used, the language is directed to the Contractor, unless specifically indicated otherwise.

- B. Where a colon (:) is used after a subject, the phrase "shall be" (or variations thereof) is to be inferred.

- C. Instruction Terms

Wherever reference is made in the Contract to the Work or its performance, the terms "directed", "required", "permitted", "ordered", "designated", "prescribed", and words of similar import shall imply the direction, requirement, permission, order, designation or prescription of the Authority.

- D. Approval and Acceptance Terms

"Approved", "acceptable" "satisfactory" and words of similar import shall mean and intend: approved by, acceptable to, or satisfactory to, the Authority.

05/09/2023

DESIGN NO. D019998

- E. Where the word "provide" is used, the meaning shall be that the item or product shall be furnished, delivered, and installed/erected/applied/connected for its intended use and as required for the completed Work.

END OF SECTION

SECTION G01015
MISCELLANEOUS PROVISIONS

1.01 EXAMINATION OF PREMISES

A. Verification of Existing Conditions after Award

1. Various existing conditions at locations of the Work which cannot be determined until removals are under way cannot be indicated on the Drawings or described in the Specifications.
2. Perform all such removals as required to verify all existing conditions before fabricating the work.
3. Where applicable, before removing any enclosure that will expose the interior of a building to the elements or before disturbing any structural work, make all possible preliminary investigations to verify the existing conditions thereat.
4. Where removals or preliminary investigations reveal existing conditions that differ materially from what is indicated or specified, or that may require changes, immediately notify the Authority in writing and await instructions before proceeding further with that part of the Work.

B. Discrepancies in Existing Conditions

During the process of the Work, should conditions be encountered that materially differ from those shown on the Drawings or indicated in the Specifications, or conditions which could not reasonably have been anticipated, which conditions will materially affect the cost of the Work, such conditions shall immediately be called to the attention of the Authority, before they are further disturbed. The Authority will promptly investigate the conditions and if it is found that they do so materially differ, shall issue a change order.

1.02 ASBESTOS AND PCB CONTAMINATED CAULKING

- A. If, during the course of construction, the Contractor believes materials that might contain asbestos or PCB-contaminated caulking may be disturbed during performance of the Work, the Contractor shall immediately notify the Authority's Field Representative of the area(s) of concern.

- B. If the presence of friable asbestos or PCB-contaminated caulking is suspected, the Contractor shall be directed to suspend work in the area in question and be redirected by the Authority to other areas or work, if available. The Authority will obtain a sample of the suspected substance and expedite its analysis in order to confirm whether asbestos is present. Should no friable asbestos or PCB-contaminated caulking be found, the Contractor shall be directed to resume work immediately.

1.03 **FIRE PREVENTION CONTROL**

- A. 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.

- B. Fire Prevention and Protection

Per Section BC 3303.7 of the 2014 NYC Building Code, fire fighting equipment, access at the construction or demolition site and the conduct of all construction or demolition operations affecting fire prevention and fire fighting shall comply with the New York City Fire Code.

- 1. Water Supply

No hazardous or combustible material shall be kept at the site unless water supply for fire protection, either temporary or permanent, is available at the site.

- 2. Fire extinguishers shall be provided in accordance with the New York City Fire Code.

- C. Temporary Fire Protection Systems

Refer to Section S01500.

1.04 **HOUSEKEEPING**

- A. Per Section BC 3303.4, the Contractor shall:

- 1. Keep the Work free from debris at all times.
- 2. Clean all enclosed structures and roof of construction sheds daily.
- 3. Store all food waste in sealed rodent-resistant containers with lids.

4. Remove material and debris from the Site at least once a week. Meet requirements of the New York City Fire Code.
- B. The removal of material and debris shall comply with Section BC 3303.5. The Contractor shall conform with the following:
1. Burning of material and debris is not permitted.
 2. All material and debris shall be lowered by way of chutes, taken down by hoists, or lowered in receptacles. Under no circumstances shall any rubbish be dropped or thrown from one (1) level to another inside or outside any building.
 3. Do not throw material and debris from the windows or other parts of the building. Wet down Mason's debris, dirt and other dust-producing material from time to time.
 4. Remove from the site all surplus materials as the Work progresses.
 5. At the conclusion of the work, all erection plant tools, temporary structure and materials belonging to the Contractor shall be promptly taken away.
 6. In the event the Contractor fails to maintain the premises in a neat condition acceptable to the Authority or fails to keep the building, premises and surrounding sidewalks and streets clean and free from material and debris resulting from the Work, or postpones or delays in the removal of material and debris, the Authority may order such material and debris removed by other parties. In such event, there shall be withheld from any payment to the Contractor a sum determined by the Authority sufficient to cover the cost of removal by other parties.
- C. All materials, fixtures and equipment, removed in the process of the work under this Contract shall remain the property of the Authority. The Authority's Representative will examine the materials, fixtures and equipment removed, and determine which items shall be retained by the Authority. The Contractor shall move and store such items where directed by the Authority's Field Representative. All other materials, fixtures, and equipment shall become the property of the Contractor and

shall be removed and be disposed of in same manner as material and debris.

1.05 OPENINGS AND CHASES

- A. The Contractor shall build openings, including but not limited to channels, chases and flues as required to complete the Work as set forth in the Contract and as directed by the Authority before any work is installed.
- B. After the installation and completion of all work for which openings, including but not limited to channels, chases and flues, have been provided for the Contractor, the Contractor shall build in, over, around and finish all such openings as required to complete the Work.
- C. If a contractor fails to furnish drawings and information required in connection with such openings before the Contractor performs any Work affected thereby, said contractor who so fails to furnish such Drawings and information shall bear the cost of all cutting and refinishing including that part of the Contractor's Work affected.
- D. The Contractor shall furnish and install all sleeves, inserts, hangers and supports required for the execution of the Work.
- E. Specific instructions shall be obtained from the Authority or the Authority's Representative before cutting beams or other structural members, arches and lintels.
- F. The Contractor shall not endanger the Work and shall not cut or alter the Work unless prior approval and instructions are received from the Authority.

1.06 SURVEYS AND LAYOUT

- A. If, for any reason, stakes, batter boards or monuments are disturbed, it shall be the responsibility of the Contractor to re-establish them.
- B. The Authority's Representative may order construction work suspended at any time when location of monuments, stakes, bench marks and other layout markings established by the Contractor are not adequate to permit checking the Work.

- C. The Contractor shall provide and shall maintain axis lines on each floor and shall establish and shall maintain grade marks 4'0" above the finished floor on each floor level.
- D. The Contractor shall furnish such stakes and other required equipment, tools and materials, and all labor as may be required in laying out all parts of the Work.

1.07 SCHEDULING

- A. The Contractor shall deliver to the Authority schedules and forms in accordance with the Contract.
- B. The Authority may require the Contractor to modify schedules that the Contractor has submitted either before or after such schedules are accepted so that:
 - 1. The Work shall not be delayed.
 - 2. Changes in the Work are reflected in the schedules of the Contractor.

1.08 CONTRACT DOCUMENTS

- A. The Contract Documents (Technical Specifications, Contract Drawings, and any addenda to those documents) are available for download at the Authority's Bidset Website. The sets will be available for a limited time (until the end of the following calendar year after award of the contract) and thus it is recommended the documents be retrieved soon after award. The Contractor and its contractors are responsible to reproduce and distribute any documents required for each entity to perform its respective work.

1.09 CONTRACTOR'S DAILY REPORT

- A. As soon as the Contractor has started work on the project, the Contractor shall submit to the Authority reports of the Work performed the previous day by any of the Contractor's employees, including the employees of the Subcontractors.
- B. The reports shall be prepared by the Contractor's Superintendent and shall bear Contractor's signature. Each report shall contain the following information:
 - 1. The type of materials and major equipment being installed by the Contractor and the total number of

employees worked in each category on that particular day.

2. The names of the Subcontractors working and the type of materials and major equipment being installed, together with the total number of employees working for each Subcontractor on that particular day.
3. The major construction equipment being used by each contractor and Subcontractor.

1.10 INTERRUPTION OF UTILITY SERVICES

- A. Except as otherwise expressly provided in the Contract, the Contractor shall submit to the Authority's Representative, for approval, a proposed schedule of all utility shutdowns and cutovers of all types which may be required in connection with the Work. Such schedule shall provide a minimum of two (2) weeks advance notice to the Authority prior to the item of the proposed shutdown or cutover.
- B. Any shutdowns or cutovers shall be at the sole expense of the Contractor.

1.11 MAINTENANCE OF PERMANENT ROADWAYS

- A. The Contractor shall immediately remove dirt and debris which may collect on permanent roadways due to the Work.

1.12 TRAFFIC CONTROL

- A. Routes to and from the location of the Work shall be as indicated in the Contract or as directed by the Authority's Representative. Temporary roadways shall be closed only with prior approval of the Authority.
- B. Parking areas for the use of those engaged in the Work shall be as indicated in the Contract or as directed by the Authority's Representative.

1.13 DISCONTINUE, CHANGES AND REMOVAL

- A. The Contractor shall:
 1. Discontinue all temporary services required by the Contract when so directed by the Authority's Representative. The discontinuance of any such temporary service prior to the completion of the

Work shall not render the Authority liable for any additional cost entailed thereby.

2. Remove and relocate such temporary facilities without additional cost to the Authority, and restore the Site and the work to a condition satisfactory to the Authority.

1.14 MOISTURE AND CONDENSATION CONTROL

- A. The Contractor shall provide for ventilation of all structures until Physical Completion and acceptance of the Work and shall control such ventilation to avoid excessive rates of drying of construction materials, including but not limited to concrete and to plaster, and to prevent condensation on sensitive surfaces.

1.15 STORAGE OF MATERIALS

- A. Provide and maintain adequate storehouses, material sheds, protection or other structures as may be required for any of the Work, or for the storage of materials. Adopt methods, procedures and ways and means to meet the exigencies of all seasons.
- B. All material and equipment shall be stored in an orderly manner so as to prevent harborage for vermin.
- C. All material or equipment not being used shall be stored at least 10 feet, measured along all horizontal dimensions, from all unenclosed perimeters of the building or structure as per Section BC 3303.4.5.
- D. Refer to Section BC 3303.4.7 for requirements for storage of material near sidewalks, walkways, and pathways.

1.16 CONCESSIONS ON SITE

- A. No restaurants, lunchrooms or other concessions of any kind whatsoever shall be operated on the site of this Project except with written permission of the Authority.

END OF SECTION

SECTION G01200
PROJECT MEETINGS

1.01 SUMMARY

- A. Project meetings shall be convened either regularly or as needed to accomplish the following:
1. Coordinate and plan the start of the Work.
 2. Where applicable, coordinate the Work with the school administration and other contractors.
 3. Resolve problems and issues with the design, construction or administration of the Project.
 4. Review the progress of the Work, the quality of the Work, and payments for the Work.
 5. Review and coordinate the safety program.
 6. Review and negotiate change orders.
 7. Review project closeout progress and procedures.

1.02 PRE-CONSTRUCTION MEETING

- A. Prior to the start of Work, the Authority will convene a Pre-Construction Meeting to be attended by representatives of the Authority, the Contractor, primary subcontractors, and the A/E of Record including any required sub-consultants. Project items including, but not limited to, the following shall be established and/or discussed:
1. Key personnel from all parties involved with the Project.
 2. Lines of communication and points of contact.
 3. Mobilization and safety procedures.
 4. Permit applications and use of the premises.
 5. Progress meeting intervals.
 6. Contractor's quality control system and forms to be used on the project.
 7. Submittal processes.

8. Procedures for processing and responding to Contractor's inquiries (e.g.: "Request(s) For Information" ["RFI's"])
 9. Change Order process
 10. Request for payment procedures
- B. For projects where the Work is to be performed in an occupied school, the Contractor may be required to attend a second Pre-construction Meeting with school personnel. The Authority may also require key personnel from the primary subcontractors and the abatement subcontractor (if applicable) to attend such meeting.
- C. The Authority will prepare and provide minutes of these meetings to all attending parties.

1.03 PROGRESS MEETINGS

- A. At intervals established during the Pre-Construction Meeting but typically every 2 weeks, the Authority will convene job site Progress Meetings to be attended by all key project personnel presided by the Authority's representative. The frequency of such Progress Meetings may be modified if the Authority's representative determines that the Work progress or jobsite conditions warrant additional meetings. The Authority's representative will determine the agenda for the meeting. All topics relating to the performance of the Work shall be discussed.
- B. The Authority will prepare and provide minutes of these meetings to all attending parties.

1.05 SAFETY MEETINGS

- A. Schedule and attend safety meetings as described in Section S01535.

1.06 PRE-INSTALLATION MEETINGS

- A. The Authority may convene Pre-Installation meetings to address particular components of the Work requiring CID inspections, special coordination or specialized inspection or technical support, in addition to where specifically indicated in the technical Sections. The Contractor shall assure that all subcontractors, CID inspectors, vendors, suppliers, etc. related to the particular work component at issue are present. The A/E of Record will attend as required. Topics including, but not limited to, approval of submittals, installation

procedures and the timely installation of the work component will be addressed. The Authority's representative will prepare and distribute meeting minutes if deemed necessary.

1.07 CHANGE ORDER MEETINGS

- A. The Authority's representative may convene Change Order Meetings at its offices to resolve change order issues and disputes not otherwise concluded. The Contractor shall assure that all parties necessary to negotiate on its behalf are in attendance.

1.08 PROJECT CLOSE-OUT MEETINGS

- A. The Authority's representative may convene Project Close-Out Meetings to discuss deficiency lists, punch lists, close-out documentation, substantial or final payment request procedures and other topics related to the Final Completion of the Work. The Contractor shall assure that all related Contractor and subcontractor personnel essential to the Final Completion of the Work are in attendance.

END OF SECTION

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SECTION G01600
MATERIAL AND EQUIPMENT

1.01 DELIVERY, STORAGE AND PROTECTION

- A. Materials stored on the Site shall be neatly arranged and protected, and shall be stored in an orderly fashion in locations that shall not interfere with the progress of the Work or with the daily functioning of the Institution.
- B. Should it become necessary during the course of the Work to move materials or equipment stored on the Site, the Contractor, at the direction of the Authority, shall move such material or equipment.
- C. Contractor shall furnish to the Authority's Field Representative a copy of each material order, indicating date of order and quantity of material, and shall also notify the Authority's Field Representative when material has been delivered to the site and state the quantities.
- D. Ample quantities - Contractor shall deliver materials in ample quantities to ensure the most speedy and uninterrupted progress of the work so as to complete the Work within the Contract time.
- E. Manufacturer's containers shall be delivered with unbroken seals and shall bear proper labels.
- F. Contractor shall coordinate deliveries in order to avoid delay in, or the impeding of the progress of the Work. Deliveries shall be made during regular work hours, unless approved otherwise by the Authority.
- G. Stackings - All materials shall be properly stacked in convenient places adjacent to the Work, or in other areas approved by the Authority's Field Representative, and protected as recommended by the respective material manufacturer.
- H. Overloading - If approval is given to store materials in any part of the building area, they shall be so stored as to cause no overloading of the existing structure.
- I. No Interference - If it becomes necessary to remove and restack materials to avoid impeding the progress of any part of the Work or interfering with the work to be done by any other contractor, or interfering with the school's

activities, Contractor shall remove and restack such materials at no additional cost to the Authority.

1.02 APPROVAL OF MATERIALS

- A. Local Laws - All materials, appliances and types of methods of construction shall be in accordance with the Contract Documents, and shall in no event be less than that necessary to conform to the requirements of the Administrative Code and the Charter of the City of New York.
- B. Repute of Manufacturer - No manufacturer will be approved for any materials to be furnished under the Contract unless the manufacturer shall be of good reputation, shall have a plant of ample capacity and shall have successfully produced similar products.
- C. All transactions with the Manufacturers and Subcontractors shall be through Contractor unless Contractor requests in writing to the Authority's Field Representative that the manufacturer or subcontractor deal directly with the Authority's Field Representative. Any such transactions shall not in any way release Contractor from full responsibility under the Contract.
- D. All Materials, fixtures, fittings, supplies and equipment furnished under the Contract shall be new and unused, of standard first-grade quality and of the best workmanship and design. Where existing work is removed or disturbed, all replacement materials shall match existing unless prior approval of variance is given in writing by the Authority's Field Representative.

1.03 MANUFACTURER'S SHOP PAINT

- A. For all manufactured products and equipment requiring shop paint, paint used shall be:
 - 1. In compliance with Federal regulations and with the regulations of the State of New York and of the City of New York.
 - 2. In compliance with Part 205, "Architectural Surface Coatings", Department of Environmental Conservation, State of New York, governing the emission of Volatile Organic Compounds.
 - 3. In compliance with the non-photo chemical reactive solvents requirements of N.Y.C. Law 49.

4. Be compatible with the finish painting for the respective product and the condition of use.
- B. The provisions of paragraph A above shall supersede shop coat paints specified in the respective technical Sections of these Specifications, where in conflict.

1.04 FIELD PAINTING

- A. For all materials, manufactured products and equipment requiring field paint, paint used shall be:
1. In compliance with Federal regulations and with the regulations of the State of New York and of the City of New York.
 2. In compliance with Part 205, "Architectural Surface Coatings", Department of Environmental Conservation, State of New York, governing the emission of Volatile Organic Compounds.
 3. In compliance with the non-photo chemical reactive solvents requirements of N.Y.C. Law 49.
 4. Be compatible with the finish painting for the respective product and the condition of use.
 5. All paints and coatings wet-applied on site must meet the applicable VOC limits of the California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings.
- B. To meet the provisions of paragraph A above for interior and exterior applications, use paints and coatings that comply with the following limits for VOC content when calculated according to U.S. EPA Reference Test Method 24 (Determination of Volatile Matter Content, Water Content, Density, Volume Solids, and Weight Solids of Surface Coatings, Code of Federal Regulations Title 40, Part 60, Appendix A with the exempt compounds) and the following chemical restrictions:
1. Flat Paints and Coatings: VOC not more than 50 g/L.
 2. Non-Flat Paints and Coatings: VOC not more than 100 g/L.
 3. Anti-Corrosive/Rust Preventative Coatings: VOC not more than 250 g/L.

4. Wood Coatings/Varnishes/Stains: VOC not more than 275 g/L.
5. Floor Coatings: VOC not more than 100 g/l.
6. Primer/Sealers/Undercoats: VOC not more than 100 g/l.
7. Stains-Exterior: VOC not more than 250 g/L.
8. Zinc Rich Primer: VOC not more than 340 g/L.
9. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
10. Fire-resistive Coating: VOC not more than 350 g/L.
11. Restricted Components: Paints and coatings shall not contain any of the following:
 - a. Acrolein.
 - b. Acrylonitrile.
 - c. Antimony.
 - d. Benzene.
 - e. Butyl benzyl phthalate.
 - f. Cadmium.
 - g. Di (2-ethylhexyl) phthalate.
 - h. Di-n-butyl phthalate.
 - i. Di-n-octyl phthalate.
 - j. 1,2-dichlorobenzene.
 - k. Diethyl phthalate.
 - l. Dimethyl phthalate.
 - m. Ethylbenzene.
 - n. Formaldehyde.
 - o. Hexavalent chromium.
 - p. Isophorone.
 - q. Lead.
 - r. Mercury.
 - s. Methyl ethyl ketone.
 - t. Methyl isobutyl ketone.
 - u. Methylene chloride.
 - v. Naphthalene.
 - w. Toluene (methylbenzene).
 - x. 1,1,1-trichloroethane.
 - y. Vinyl chloride.
 - z. Perchloroethylene

C. The provisions of paragraphs A and B above shall supersede field-applied paints specified in the respective technical Sections of these Specifications, where in conflict.

1.05 GLUE, ADHESIVE AND SEALANT MATERIALS

- A. The following list of adhesive and sealant V.O.C limits is for the Contractor's use in selecting adhesives and sealants if specified products are not available or if the Contractor is proposing alternate adhesives and sealants.
- B. For interior and exterior applications, use adhesives and sealants that comply with New York State V.O.C. requirements and the following limits for VOC content according to Rule 1168 - "Adhesive and Sealant Applications" of the South Coast Air Quality Management District (SCAQMD), of the State of California; VOC limits correspond to an effective date of July 1, 2005, whichever is more stringent:
1. Wood Glues: 30 g/L.
 2. Metal to Metal Adhesives: 30 g/L.
 3. Adhesives for Porous Materials (Except Wood): 50 g/L.
 4. Subfloor Adhesives: 50 g/L.
 5. Plastic Foam Adhesives: 50 g/L.
 6. Carpet Adhesives: 50 g/L.
 7. Carpet Pad Adhesives: 50 g/L.
 8. VCT and Asphalt Tile Adhesives: 50 g/L.
 9. Cove Base Adhesives: 50 g/L.
 10. Gypsum Board and Panel Adhesives: 50 g/L.
 11. Rubber Floor Adhesives: 60 g/L.
 12. Ceramic Tile Adhesives: 65 g/L.
 13. Multipurpose Construction Adhesives: 70 g/L.
 14. Fiberglass Adhesives: 80 g/L.
 15. Structural Glazing Adhesives: 100 g/L.
 16. Top and Trim Adhesives: 250 g/l.
 17. Structural Wood Member Adhesive: 140 g/l.
 18. Wood Flooring Adhesive: 100 g/L.
 19. Contact Adhesive: 80 g/L.
 20. Special Purpose Contact Adhesive: 250 g/l.
 21. Plastic Cement Welding Compounds: 250 g/L.
 22. ABS Welding Compounds: 325 g/L.
 23. CPVC Welding Compounds: 490 g/L.
 24. PVC Welding Compounds: 510 g/L.
 25. Adhesive Primer for Plastic: 550 g/L.
 26. Architectural Sealants: 250 g/L less water.
 27. Non-Membrane Roof Sealants: 300 g/l less water.
 28. Single Ply Roof Membrane Sealants: 450 g/l less water.
 29. All other Sealants: 420 g/l less water.
 30. Sealant Primers for Nonporous Substrates: 250 g/L less water.

31. Sealant Primers for Porous Substrates: 775 g/L
less water.

C. Adhesives and sealants shall not contain methylene
chloride or perchloroethylene.

1.06 EMISSION LIMITS FOR INTERIOR PAINTS, COATINGS, ADHESIVES,
SEALANTS, FLOORING, CEILINGS, WALLS, THERMAL INSULATION,
AND ACOUSTICAL INSULATION

A. Building products must be tested and determined compliant
in accordance with California Department of Public Health
(CDPH) Standard Method v1.1-2010, using the applicable
exposure scenario.

END OF SECTION

SECTION G01700
PROJECT CLOSEOUT

1.01 SUMMARY

- A. The Contractor shall undertake the performance of all Project Closeout activities in a timely manner. The requirements of this section shall be closely coordinated with the requirements of Specification Section S01650, "Facility Start-Up, Demonstration, and Training" (if applicable), Section G01720, "Record Documents", Section S01730, "Systems Operation and Maintenance Manuals", and Section G01740, "Guarantees, Warranties, and Bonds", which further specify the items required to be submitted as part of the Project Closeout procedure. Project Closeout requirements for specific construction activities are included in the appropriate Sections in Divisions 2 through 16.

1.02 SUBSTANTIAL COMPLETION

- A. Substantial Completion is defined in the General Conditions. (Refer to Article 1)
- B. The Authority intends that Beneficial Occupancy/Use of the Work (as defined in the General Conditions) and Substantial Completion shall occur simultaneously. However, the Authority retains the right to the Beneficial Occupancy/Use of the Work once documentation allowing such use is issued by the applicable governing agency(s). All Work required to achieve Substantial Completion after commencement of Beneficial Occupancy/Use must be done during non-school hours. Should the Authority chose to use the Work prior to Substantial Completion, the Authority will pay the additional cost of performing such work during non-school hours up to the Contractual date of Substantial Completion, after which such additional costs will be the sole responsibility of the Contractor. Prior to occupancy, the cleaning specified in sub-paragraph 1.02.D.5 is to be performed.
- C. The Contractor shall complete and submit the appropriate section of the Certificate of Substantial Completion when the Contractor, in its opinion, determines that Substantial Completion has been achieved. By submitting the Certificate of Substantial Completion, the Contractor certifies the following:

1. The Contract Work has been satisfactorily completed in accordance with the Contract, including all change order work.
 2. All equipment, machinery, instruments and other systems included as part or all of the Work are operational and have been tested, demonstrated and commissioned for use. All specified testing shall be completed and accepted including, but not limited to, sprinkler system testing, fire alarm testing, bacteriological testing of domestic lines, back flow preventor testing, electrical system testing, and hydrostatic pressure testing of sanitary lines.
 3. All documents, permits, and proofs of compliance necessary for the lawful use of the Work have been submitted.
 4. The Work can be safely used for its intended purpose.
- D. As part of meeting the requirements of C above, the following must be completed:
1. Copies of the systems operation and maintenance manuals have been submitted.
 2. Appropriate personnel designated by the Authority have been trained by the Contractor in the operation of all systems and equipment as required by the Contract and the signed confirmation of training letter submitted for each system.
 3. All required Special Inspections have been successfully completed.
 4. Record Documents specified in Section G01720, such as Final Record Drawings (As-Builts) and Final Record Shop Drawings, to be submitted prior to substantial completion have been submitted and are accurate.
 5. The Work has been cleaned, prepared and is ready to be utilized for its intended purpose. The Contractor shall employ workers experienced in cleaning or professional cleaners to clean the Work and all affected areas for use. All surfaces shall be cleaned in accordance with the manufacturers' recommendations. Cleaning and preparation

requirements shall include, but not be limited to, the following:

- a. All surfaces shall be free of dirt, films, dust, stains, blemishes, etc
 - b. All non-permanent labels shall be removed.
 - c. All toilet facilities installed and/or used by the Contractor shall be thoroughly cleaned and disinfected.
 - d. All exterior site work, sidewalks, paved areas, grass areas etc, installed and or used by the Contractor shall be swept, raked smooth and free of debris, rubbish, and litter.
 - e. All protection not needed for the punch lists corrections shall be removed and the affected areas restored.
 - f. All mock-ups, equipment, signs, temporary fences, tools, appliances, etc. necessary to facilitate the Work, but not part thereof or otherwise necessary for punch lists corrections, shall be removed.
 - g. All equipment shall be lubricated as recommended by the manufacturer.
- E. Upon receipt of the Contractor's signed Certificate of Substantial Completion, the Authority will either (1) conduct its own reviews and inspections required to accept the Contractor's date of Substantial Completion, or (2) advise the Contractor of unfulfilled requirements, if they are known.
1. If the Authority does not concur that Substantial Completion has been achieved, a list of deficiencies, showing incomplete Contract Work, will be issued to the Contractor. The Authority will reinspect the Work when notified by the Contractor that the Work has been substantially completed. If the Contractor fails to complete or correct all deficient Work within the period specified, the Authority may have such Work performed by others at the Contractor's expense. Upon completion of the deficient items, the fully executed certificate will be issued.

2. If the Authority concurs, a copy of the Certificate of Substantial Completion, signed and sealed by the Authority's representatives will be issued to the Contractor. The date of Substantial Completion, as determined by the Authority, will be indicated on the form. A Final Punchlist of items to be addressed prior to Final Acceptance will be prepared and issued to the Contractor.
3. If applicable, prior to release of payment upon substantial completion submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Beneficial Occupancy or Substantial Completion, whichever is first, or when the Authority took possession of and responsibility for corresponding elements of the Work.

1.03 **FINAL COMPLETION**

- A. Final Completion is defined in the General Conditions. (Refer to Article I)
- B. The Contract indicates a duration following Substantial Completion at the end of which the Final Completion of the Work must be achieved. Within this period, all Contract Work not required for Substantial Completion must be completed. This includes, but is not limited to, the following:
 1. Final Punchlist: Shortly after the receipt of the fully executed Certificate of Substantial Completion, the Contractor will receive a list of minor items that must be corrected or performed prior to Final Acceptance of the Work. Since the Work will already be occupied or otherwise utilized for its intended purpose, such corrective work must be coordinated with the Authority and be performed after school hours. No additional compensation will be allowed for the completion of the Final Punchlist work. Payment requests for the reduction of retainage upon the successful completion of the Final Punchlist items must be accompanied by a "General Release - Substantial Completion." If the Contractor fails to complete the Final Punchlist work within the period specified, the Authority may have such Work completed by others at the Contractor's expense.

2. Final demobilization and removal of temporary facilities remaining used to address the Final Punchlist items. Restore areas to previously existing condition if applicable.
3. Documentation: All documentation required by the Contract but was not necessary prior to Substantial Completion acceptance must be submitted to the Authority. This includes, but is not limited to, the following:
 - a. Remainder of Record Documents specified in Section G01720 not required to be submitted prior to substantial completion.
 - b. All guarantees and manufacturers' warranties fully executed by all responsible parties.
 - 1) All guarantees and warranties specified in the technical sections of Divisions 2 through 16 are to be effective one (1) day after the actual date of Substantial Completion, unless specified otherwise in the technical section or as per the paragraph below.
 - a) For projects that are phased, the guarantees and warranties for the materials and equipment installed, successfully tested, accepted by the Authority and all authorities having jurisdiction and put into use prior to Substantial Completion shall be effective from the date of acceptance.
 - 2) General Contractor Guarantee governed by Section 17.01 of the General Conditions is to be effective the date so stipulated in that Section.
 - c. All final photographs of the Work, as applicable to the project.
 - d. A final lot survey, as applicable to the project, made by a licensed surveyor and as required by Section §28-118.4 of the NYC Administrative Code.

- e. Certification and survey of lot line installations, as applicable to the project, made by a licensed surveyor.
 - f. Current permits (if applicable)
 - g. Signed receipts for items to be turned over to the school (attic stock, specified tools, keys, spare parts, specified maintenance equipment, etc.)
 - h. Regulatory sign-offs, certificates, and other similar documentation indicating final approval from all agencies having jurisdiction for required documentation. Submit BEC Certificate of Inspection.
4. Final cleaning: The Contractor shall clean and prepare for use, in accordance with sub-paragraph 1.02.D.4 above, all Work affected by the performance of the Final Punchlist and all Work and areas not previously cleaned and made ready for use. Touch-up and otherwise repair and restore marred exposed finishes.
5. Repair: All damage caused by the Contractor shall be repaired or replaced as follows:
- a. New Work, included as part of this Contract, shall be replaced.
 - b. Existing property shall be returned to its condition prior to the Contractor's mobilization for the Work.

1.04 FINAL ACCEPTANCE AND FINAL PAYMENT

- A. Final Acceptance is defined in the General Conditions. (Refer to Article 1)
- B. The Authority will perform a final inspection. Prior to the inspection, the Contractor shall:
 - 1. Complete all contractual obligations necessary for the issuance of a Certificate of Occupancy, if applicable.
 - 2. Submit a statement that the Final Punchlist work has been completed.

- C. The Authority will reinspect the Work of all items rejected during previous inspections.
 - 1. Upon completion of the reinspection, the Authority will notify the Contractor that (1) the Work is acceptable or (2) all Work and obligations required for Final Acceptance have not been fulfilled.
 - 2. The Authority will continue to reinspect the Work until all contractual requirements for Final Acceptance have been achieved.
- D. Upon satisfactory completion of all requirements under the Contract, the Contractor shall submit to the Authority a properly executed General Release and Final Request for Payment. By doing so, the Contractor acknowledges that all stipulations set forth in the General Release are acceptable, including, but not limited to, the following:
 - 1. Resolution of all unilaterally issued change orders.
 - 2. Resolution of all claims.
 - 3. The total Contract value indicated on the General Release and Final Payment Request has been reconciled and is the accepted amount for all obligations due under this Contract.
- E. By issuing Final Payment, the Authority acknowledges Final Acceptance.

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SECTION G01730
SYSTEMS OPERATION AND MAINTENANCE MANUALS

1.01 SUMMARY

- A. Prior to the final inspection, adjustment and startup of systems provided under this Contract, the Contractor shall:
 - 1. Prepare and submit operation and maintenance manuals for building operating systems and equipment, including lighting systems.
 - 2. Prepare and submit instruction manuals covering the care, preservation and maintenance of architectural products and finishes.
- B. Special operating and maintenance data requirements for specific materials, equipment or building operating systems are included in the appropriate Specification Sections of Divisions 2 through 16.
- C. The Contractor shall provide a complete, uniform, collated set of documents described herein.

1.02 SUBMITTALS

- A. Schedule
 - 1. Initial Submittal
 - a. Equipment and Systems Operation and Maintenance Manuals: At least sixty (60) days prior to required training for individual equipment installations, submit a separate searchable Portable Document Format (pdf) file through the Authority's ESUBMITTAL application of each complete manual to the Authority for review. Include a complete index of each manual. The Authority will return the file(s) with comments within twenty-one (21) days of receipt.
 - b. Materials and Finish Maintenance Manuals: At least sixty (60) days prior to Substantial Completion, submit a separate searchable Portable Document Format (pdf) file through the Authority's ESUBMITTAL application of each manual to the Authority for review. Include a complete index of each manual. The Authority

will return the file(s) with comments within twenty-one (21) days of receipt.

2. Final submittal

- a. Equipment and Systems Operation and Maintenance Manuals: At least fifteen (15) days before training, submit a searchable pdf file through the Authority's ESUBMITTAL application and one (1) hard copy of each corrected manual in final form. The hard copy of the manuals shall be forwarded in suitable transfer cases, properly labeled as to the name and number of the Contract; date of submittal; name, address and telephone number of the Contractor; and description of subject matter contained within.
- b. Materials and Finish Maintenance Manuals: At least fifteen (15) days before substantial completion, submit a searchable pdf file through the Authority's ESUBMITTAL application and one (1) hard copy of each corrected manual in final form. The hard copy of the manuals shall be forwarded to the Authority's Project Officer for transfer to the DOE in suitable transfer cases, properly labeled as to the name and number of the Contract; date of submittal; name, address and telephone number of the Contractor; and description of subject matter contained within.

B. Form of Submittal

The Contractor shall submit the Operation and Maintenance Manuals in the form of an instructional manual. Organize such pdfs and manuals into suitable sets of manageable size. Where possible, assemble instructions for similar equipment in a single binder and pdf file. Plumbing, mechanical and electrical equipment operation and maintenance manuals shall be divided into separate files and binders by technical discipline.

1. Binders: For each manual, provide heavy gauge, commercial quality, durable 3-ring elliptical, heavy board, vinyl-covered loose-leaf binders, in thickness as necessary to accommodate contents, sized to receive 8¹/₂ in. x 11 in. paper. Binders shall also have plastic sheet lifters, metal backbone, metal hinges, concealed rivet

construction and three-trigger position Dublock mechanism (lock, unlock, open). The binder shall have a clear plastic sleeve on the spine to hold labels describing the contents and pockets in the inside covers to store additional material if necessary. Binder color shall be selected by the Authority.

- a. Where two or more binders are necessary to accommodate data, compile material in each binder into related groupings in accordance with the Specification's Table of Contents. Cross-reference other binders where necessary to provide essential information for proper operation or maintenance of the piece of equipment or system.
 - b. Binders shall be identified on the front and spine with the typed or printed title "EQUIPMENT AND SYSTEMS OPERATION AND MAINTENANCE MANUALS" or "MATERIAL AND FINISHES MAINTENANCE MANUALS" (whichever is applicable), Contract number and name, and subject matter covered. Volume numbers for multiple volume sets of manuals shall be indicated. The use of business labels is prohibited.
2. Dividers: Provide 3-hole, heavy weight, white ledger stock paper dividers with clear celluloid insertable tabs for each separate Section. Provide typewritten description for each tab insert (front & back), to indicate the appropriate Specification Section. Provide a typed description of the product and major parts of equipment included in the Section on each divider.
 3. Protective Plastic Jackets: Provide protective transparent plastic jackets designed to enclose diagnostic software for computerized electronic equipment.
 4. Text Material: Where written material is required as part of the manual, use the manufacturer's standard printed material, or if it is not available, specially prepared data, neatly typewritten, on 8¹/₂in. x 11 in., 20 lb. white bond paper.

5. Drawings: Where drawings or diagrams are required as part of the manual, provide reinforced punched binder tabs on the drawings and include with the text.
 - a. Where oversize drawings are necessary, fold the drawings to the same size as the text pages and use as a fold-out.
 - b. If drawings are too large to be practically used as a fold-out, place the drawing, neatly folded, in the front or rear pocket of the binder. Insert a typewritten page indicating the drawing title, description of contents and drawing location at the appropriate location in the manual. Drawings shall cross reference the appropriate manual volume and Specification Section.

1.03 MANUAL CONTENT (GENERAL)

- A. In each manual, the Contractor shall include the information specified in the individual Specification Section and the following information for all components of building equipment and its controls:
 1. General system or equipment description.
 2. Design factors and assumptions.
 3. Copies of approved shop drawings, product data stating equipment size and selected options, installation instructions and setup/calibration procedures.
 4. Load and performance testing reports including equipment and system startup/performance documentation.
 5. Fire/flame spread test certificates.
 6. System or equipment identification, including:
 - a. Name of manufacturer/vendor/installing contractor address, point of contact and telephone numbers.
 - b. Model number.
 - c. Serial number of each component.

7. Standard operating instructions.
8. Emergency operating instructions.
9. Wiring diagrams including color coding, labeling and terminal designations. Where field connections are made to other systems, terminal IDs for both systems and any connection points necessary must be indicated.
10. Inspection and test procedures.
11. Detailed preventive maintenance procedures, frequencies and special tool requirements.
12. Operator trouble-shooting guide.
13. Precautions against improper use and maintenance.
14. Copies of warranties, including extended warranty options.
15. General owners operating/service manual.
16. Factory service manuals, including repair instructions and illustrated parts listing.
17. Safety Data Sheets (**SDS**).
18. Sources of required maintenance materials repair/replacement parts and related services.
19. Copies of inspections and certifications by governing authorities.

B. Manual Index

Organize each Manual into separate sections for each piece of related equipment. As a minimum, each manual shall contain a title page, a table of contents, and copies of Product Data, supplemented by drawings and written text.

C. Title Page

Provide a title page in a transparent plastic envelope as the first sheet of each manual. Provide the following information.

1. Subject matter covered by the manual.
2. Name and number of the Contract.
3. Date of submittal.
4. Name, address, and telephone number of the Contractor and Subcontractor.
5. Name, address and telephone number of the Architect and the Engineer of Record.
6. Cross reference to related systems in other operation and maintenance manuals.

D. Table of Contents

1. Include a typewritten table of contents for each volume after the Title Page, arranged systematically according to the specification format. A list of each product identified by product name or other appropriate identifying symbol and indexed to the content of the volume shall be included. The Table of Contents shall also be provided in electronic form.
 - a. Where more than one volume is required to accommodate data for a particular system, provide a comprehensive table of contents for all volumes in each volume of the set.

E. General Information

Provide a general information Section immediately following the Table of Contents, listing by specification Section each product included in the manual, identified by product name. Under each product, list the name, address, telephone number and point of contact of the subcontractor or installer, and the maintenance contractor (if applicable). Clearly delineate the extent of responsibility of each of these entities. In addition, list a local source for replacement parts and equipment.

F. Product Data

Where manufacturer's standard printed data is included in the manuals, include only sheets that are pertinent to the part or product installed. Mark each sheet to identify each part or product included in the

installation. Where more than one item in a tabular format is included, identify each item, using appropriate references from the Contract Documents. Identify data that is applicable to the installation and delete references to information that is not applicable.

G. Written Text

Where manufacturer's standard printed data is not available, and information is necessary for proper operation and maintenance of equipment or systems or it is necessary to provide additional information to supplement data included in the manual, prepare written text to provide necessary information. Organize the text in a consistent format under separate headings for different procedures. Where necessary, provide a logical sequence of instruction for each operation or maintenance procedure.

H. Drawings

Provide specially prepared drawings where necessary to supplement manufacturer's printed data to illustrate the relationship or component parts of equipment or systems, or to provide control or flow diagrams. Coordinate these drawings with information contained in the Record Documents to assure correct illustration of the completed installation. Do not use original Project Documents as part of the Operation and Maintenance Manuals.

1.04 EQUIPMENT AND SYSTEMS OPERATION AND MAINTENANCE MANUALS

- A. The Contractor shall refer to the individual technical Specification Sections for the equipment and systems that require such manuals to be provided and for additional information regarding the operation and maintenance of the various pieces of equipment and operating systems that shall be included in the manuals.
- B. Provide separate manuals for each grouping of similar equipment, each operating system, and each electric and electronic system.
- C. Provide the following information for each piece of equipment, each building operating system, and each electronic or electronic system.
 - 1. Description: Provide a complete description of each unit and related component parts, including the following information:

- a. Equipment or system function.
 - b. Operating characteristics.
 - c. Limiting conditions.
 - d. Performance curves.
 - e. Engineering data and tests.
 - f. Complete nomenclatures and number of replacement parts.
2. Manufacturer's Information: For each manufacturer of a component part or piece of equipment, provide the following information:
- a. Printed operating and maintenance instructions.
 - b. Assembly drawings and diagram required for maintenance.
 - c. Recommended parts inventory listing.
3. Maintenance Procedures: Provide information detailing essential maintenance procedures, including:
- a. Routine operations.
 - b. Trouble shooting guide.
 - c. Disassembly, repair and reassembly.
 - d. Alignment, adjusting, calibrating, and checking.
 - e. Name and address of at least one local service agency.
4. Operating Procedures: Provide equipment and system operating procedures, including the following information:
- a. Start-up procedures.
 - b. Equipment or system break-in.

- c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Instructions on stopping.
 - f. Shut-down and emergency instructions.
 - g. Day and night operation.
 - h. Summer and winter operating instructions.
 - i. Required sequences for pneumatic, electric, electronic or direct digital control systems.
 - j. Special operating Instructions.
- 5. Servicing Schedule: Provide a schedule of routine servicing and lubrication requirements, including a list of required lubricants for equipment with moving parts. Include recommended schedule for calibrating any sensors and actuators.
 - 6. Controls: Provide a comprehensive description of the sequence of operation and as-installed control diagrams by the control manufacturer for systems requiring controls.
 - 7. Coordinating Drawings: Provide coordination Drawings of each sub-contractor.
 - 8. Valve Tags: Provide charts of valve tag numbers, with the room number location and function of each valve.
 - 9. Circuit Directories: For electric and electronic systems, provide complete circuit directories of panelboards, including the following information:
 - a. Electric service.
 - b. Controls.
 - c. Telecommunications.
 - d. Computer network.
 - e. Security.

1.05 MATERIAL AND FINISHES MAINTENANCE MANUALS

A. The Contractor shall refer to the individual technical Specification Sections for the products and materials that require such manuals to be provided and for additional information on the care and maintenance of materials and finishes that shall be included in the manual.

B. Provide one section for architectural products, including applied materials and finishes, and a second section for products designed for moisture protection and products exposed to the weather.

C. Architectural Products

Provide manufacturers' data and instructions on care and maintenance of architectural products, including applied materials and finishes.

1. Manufacturer's Data: Provide complete information on architectural products, including the following information, as applicable:

a. Manufacturer's catalog number.

b. Size.

c. Material composition.

d. Color.

e. Texture.

f. Reordering information for specially manufactured products.

2. Care and Maintenance Instructions: Provide information on care and maintenance, including manufacturer's recommendations for types of cleaning agents to be used and methods of cleaning, highlighting any item that could be damaged by normal/standard cleaning methods. Information regarding cleaning agents and methods that could prove detrimental to the product shall also be included. Include manufacturers' recommended schedule for cleaning and maintenance.

D. Moisture-Protection and Weather-Exposed Products

Provide complete manufacturers' data, including instructions for inspection, maintenance and repair of products exposed to the weather or designed for moisture protection purposes.

1. Manufacturers' Data: Provide manufacturers' data, including the following detailed information, as applicable:
 - a. Applicable standards.
 - b. Chemical composition.
 - c. Installation details.
 - d. Inspection procedures.
 - e. Texture.
 - f. Reordering information for specially manufactured products.
 - g. Maintenance information.
 - h. Repair procedures.
2. Care and Maintenance Instructions: Provide information on care and maintenance, including manufacturer's recommendations for types of cleaning agents to be used and methods of cleaning, highlighting any item that could be damaged by normal/standard cleaning methods. Information regarding cleaning agents and methods that could prove detrimental to the product shall also be included. Include manufacturers' recommended schedule for cleaning and maintenance.

END OF SECTION

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SECTION G01740
GUARANTEES, WARRANTIES & BONDS

1.01 SUMMARY

- A. The Contractor shall provide the General Contractor's Guarantee for the Work; specific guarantees and warranties for products and installation as identified in the individual technical Sections of Divisions 2 through 16 of the Specifications; and all required bonds. Refer to Section G01700 for effective dates of the guarantees and warranties.

1.02 SUBMITTALS

- A. General Contractor's Guarantee and Bonds

Submit the General Contractor's Guarantee and Bonds as per Articles 17 and 14 respectively of the General Conditions.

- B. Specific Guarantee and Warranty Submittal Schedule

1. Initial Submittal: At least thirty days prior to the guarantee and warranty effective date, submit to the Authority for review a searchable Portable Document Format (pdf) files of the complete set of unexecuted guarantees and warranties ready for execution by the required parties through the Authority's ESUBMITTAL application. Include a complete index of each set. The Authority will return the file with comments within twenty-one (21) days of receipt.
2. Final Submittal: Upon written notification that the warranty and guarantee documents are acceptable, submit a pdf file through the Authority's ESUBMITTAL application and forward one bound set of the executed originals of the executed guarantees and manufacturer warranties to the Authority's Project Officer. Documents are to be properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer as applicable. Submit such warranties within fifteen (15) days of the effective date of the guarantees and warranties. Such guarantees and warranties must be included as part of the bound sets. The documents shall be forwarded in suitable transfer cases, properly labeled as to the name and number of the Contract; date of submittal; name,

address and telephone number of the Contractor; and description of subject matter contained within.

C. Specific Guarantee and Warranty Form of Submittal

Organize the guarantee and warranty documents in the pdf file into an orderly sequence based on the table of contents of the Technical Specifications and for the hard copy:

1. Bind the guarantees and warranties in heavy duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8¹/₂" by 11" paper.
2. Provide heavy paper dividers with celluloid covered tabs for each separate guarantee and warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address and telephone number of the installer.
3. Identify each binder on the front and the spine with the typed or printed title "GUARANTEES AND WARRANTIES", the Project title or name, and the name of the Contractor.
4. Table of Contents

Include a typewritten table of contents for each volume, arranged systematically according to the specification format. A list of the warranties and guarantees for each product included, identified by product name or other appropriate identifying symbol, shall be provided. The list is to include the warranty number, length of the warranty/guarantee, the date it begins, the date it expires, and the responsible party.

5. Refer to the individual Sections of Divisions 2 through 16 of the Specifications for specific requirements regarding the content and submittal of guarantees and warranties.

1.03 GUARANTEE AND WARRANTY REQUIREMENTS (GENERAL)

- A. When correcting guaranteed or warranted Work that has failed or is defective, the Contractor shall remove and

replace other work that has been damaged as a result of such failure or defect or that must be removed and replaced to provide access for correction of warranted Work.

- B. Upon determination that Work covered by a guarantee or warranty has failed or is defective, the Contractor shall replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The entity responsible for the warranty/guarantee of the failed or defective item of Work is responsible for the cost of warranty/guarantee work regardless of whether the Authority has benefited from use of the Work through a portion of its anticipated useful service life.
- C. The Authority reserves the right to withhold acceptance of Work for the Project where a technical section specific guarantee, warranty, certification, or similar commitment is required on such work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

1.04 CONTRACTOR'S GUARANTEE

- A. The Contractor shall furnish a comprehensive written guarantee (pdf file and one hard copy) in the following form:

"GUARANTEE"

PROJECT _____

CONTRACT NO. _____

The Contractor hereby guarantees that the Work specified for the aforesaid Contract will be free from defects of material and workmanship for a period as specified in the General Conditions.

The Contractor also guarantees that it will repair or replace, whichever may be deemed necessary by the Authority, all defective material or workmanship in the Work that may appear within the guarantee period to the satisfaction of the Authority and without any cost or expense to the Authority.

Contractor

By _____

Date _____

Sworn to me before this

_____ day of _____, 20__

_____ Notary Public

- B. Scheduling of corrective Work will be determined by the Authority. Work required to correct failed or defective material or workmanship during the guarantee periods shall be done by the Contractor without cost to the Authority.
- C. Should the Contractor fail to remedy defects immediately, the Authority may furnish such materials and labor as are necessary to correct such failure or defect in the Work at the Contractor's expense.

1.05 CONTRACTOR'S GUARANTEE OF ASBESTOS FREE BUILDING/WORK

- A. For new building work, including additions, the Contractor shall furnish a written guarantee (pdf file and one hard copy) that the building and work has been constructed of materials that do not contain asbestos. The guarantee shall be in the following form:

"ASBESTOS FREE BUILDING"

PROJECT _____

CONTRACT NO. _____

The Contractor hereby guarantees that the Work is free of asbestos-containing material and, in accordance with the Project Specifications and product data sheets approved by the A/E of Record, no products have been installed that contain asbestos.

Contractor

By _____

Date _____

Sworn to me before this

_____ day of _____, 20____

_____ Notary Public

B. For existing building work, including work in existing buildings as part of an addition project, the Contractor shall furnish a written guarantee (pdf file and one hard copy) that the work installed has been constructed of materials that do not contain asbestos. The guarantee shall be in the following form:

"ASBESTOS FREE WORK"

PROJECT _____

CONTRACT NO. _____

The Contractor hereby guarantees that the Work is free of asbestos-containing material and, in accordance with the Project Specifications and product data sheets approved by the A/E of Record, no products have been installed that contain asbestos.

Contractor

By _____

Date _____

Sworn to me before this

_____ day of _____, 20____

_____ Notary Public

1.06 WARRANTIES AND GUARANTEES OTHER THAN "CONTRACTOR'S GUARANTEE"

A. The Contractor shall furnish all warranties and guarantees as specified in the respective Sections for products and systems in addition to the Contractor's Guarantee described in Article 1.04 above and shall be for such periods and with such conditions as stipulated in these Specifications.

1.07 BONDS

- A. The Contractor shall provide bonds as required in Article 14 of the General Conditions.

1.08 DISCLAIMERS AND LIMITATIONS

- A. Manufacturers' disclaimers and limitations on product warranties do not relieve the Contractor of the Contractor's Guarantee of the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign specific warranties with the Contractor as identified in the individual specification sections of Divisions 2 through 16 from their respective obligations thereunder.

END OF SECTION

SECTION S01010
SUMMARY OF WORK

1.01 WORK UNDER THE CONTRACT

A. The Work shall be as described in the Contract Documents and shall include, but not be limited to the following general items of work:

1. Remove and abate all asbestos and hazardous materials as identified by IEH.
2. Remove portions of the cafeteria floor to expose under floor sanitary piping. Repair the floor after the plumbing work is complete.
3. Modify the existing sanitary and vent piping to abandon a section of back-pitched pipe. Provide new sewage ejector pit and ejector pump.
4. Provide fall protection fencing over existing openings at the rooftop parapet wall.
5. Provide steel stairs and crossover at the roof over existing gas pipes and electrical conduits. secure the crossover to the roof structure and flash into the roof waterproof membrane.
6. Replace brickwork at two sets of auditorium egress stairs, replace coping stone at top of property line wall and replace wrought iron fence at top of property line wall. provide waterproof membrane tied to stairs and walls to prevent water infiltration into the cellar storage rooms.
7. At the north stair bulkhead, repoint exterior brick and replace slate ledge. at the interior side of the north stair bulkhead above the 5th floor, replace plaster and paint to repair water damage.
8. At the front balcony near the Custodian's Office, provide water proof membrane, repoint bricks and modify the drain pipe. Inside the Custodian's Office, repair damaged plaster and paint the entire room.

9. Abandon section of back-pitched sanitary pipe. Provide sewage ejector pump, sanitary and storm piping to elevate piping above the DFE and to separate sanitary and storm systems.

1.02 COMMENCEMENT OF WORK

- A. The Contractor must commence the Work enabled by the issuance of a permit within ten continuous calendar days of the issuance of the permit. If the Work does not commence within the ten (10) continuous calendar day milestone, future allowances, if any, for delays agreed to by the Authority will be reduced by a number of days equal to the number of days between the ten continuous calendar day milestone date and the actual start date.

1.03 ALLOWANCES - Not Used

1.04 ALTERNATES - Not Used

1.05 PRODUCTS, MATERIAL, AND EQUIPMENT PURCHASED BY THE AUTHORITY - Not Used

1.06 PRODUCTS, MATERIAL, AND EQUIPMENT ORDERED IN ADVANCE - Not Used

1.07 PHASING

1. To complete all work of all trades within the required Contract Duration and to accommodate ongoing school activities and Project needs, the Work shall be in accordance with the "Phasing Exhibit".

1.08 WORK UNDER OTHER CONTRACTS - Not Used

1.09 ITEMS NOT INCLUDED

The following items shown on the Drawings are not included in the Work:

- A. Items indicated "By Others".
- B. Items indicated "N.I.C." (Not in Contract).
- C. Existing construction not indicated or specified to be removed, replaced or altered.

1.10 CUTTING, PATCHING AND REMOVALS

- A. Contractor shall do all cutting and patching, painting and finishing of existing work which is disturbed while performing the Work. Contractor shall be responsible for restoring new work which is damaged. All work shall be restored to provide a new appearance and to be structurally sound.
- B. The work shall be done by competent workmen skilled in the trade required by the restoration.
- C. As soon as practicable after the commencement of work and prior to any imminent placing of structural concrete, structural steel, and masonry, the Contractor shall submit to the Authority a sketch indicating the location and size of all penetrations, including, but not limited to, sleeves and ducts, which will be required to accommodate the respective trades in order that it may be determined if such penetrations will materially weaken the building structure. The sketch will be stamped and returned if approved. If not approved, reasons will be stated and submitted to the Contractor. The Contractor shall continue to submit sketches as the work progresses and shall not proceed with portions of Work having penetrations until such penetrations are approved.
- D. Examination
 - 1. Prior to cutting, drilling, or removal, investigate both sides of the surface involved. Determine the exact location of structural members.
 - 2. If unforeseen obstructions are encountered, take precautions necessary to prevent damage and obtain instructions from the Authority before proceeding with the Work.
- E. Preparation
 - 1. Provide temporary shoring and other supports necessary to prevent settlement or other damage to existing construction which is to remain.
 - 2. Prepare existing surfaces properly to receive, and where required, to bond with the Work.

F. Removals, Cutting, Altering

1. In addition to items indicated on Drawings to be removed, remove existing construction superseded by the Work except items such as pipes, conduits, recessed boxes, and ducts which are built into existing construction that is to remain. Cut off and conceal such items at face of remaining construction. Provide cover plates on recessed boxes.
2. Remove and alter existing construction as required to install and connect the Work to adjacent construction in an approved manner.
3. Cut and alter existing materials as required to perform the Work. Limit the cutting to the smallest amount necessary. Core drill around holes and saw-cut other openings where possible.
4. Perform cutting, drilling, and removals in a manner that will prevent damage to construction that is to remain.

G. Patching

1. Patch existing construction and finishes defaced, damaged, or left incomplete due to alterations or removals. Patching, except as otherwise indicated, shall be limited to the areas which have been cut or altered; match materials, finishes, underlying construction, and quality of area patched.

H. Existing Premises Work: in addition to Work described above for cutting and patching, perform the following:

1. Remove portions of existing slabs, beams, walls and partitions; cut new openings in slabs, walls and partitions for new chases, doors, equipment, steel beams, columns, lintels, and other items, do all cutting and removal of existing work required by the Drawings and the Specifications, or as may be required for the proper installation of the new Work. Block up and patch slabs, walls, partitions, ceilings, and other areas and surfaces, with materials indicated on the Drawings or specified

herein. If type of material for patching is not indicated, match existing.

2. Provide all supports, shorings, bracing, and other means, required for existing beams, columns, lintels, walls, and other components, at locations where alterations occur.
3. Remove portions of existing walls, slabs, fireproofing and ceilings where required to provide for connections and reinforcing of existing steel and installation of new steel. See framing details on Drawings.
4. Existing unfinished, unexposed walls and ceilings that become exposed walls and ceilings of finished rooms and other locations due to the Work of this Contract, shall be finished to match the adjoining wall and ceiling finish, unless otherwise specified.
5. Existing masonry walls and partitions that are to be finished with plaster, or tile, shall have all existing paint, tile, plaster and other finishes removed, joints raked out to a depth of 1/2", and the wall surfaces hacked and roughened to provide a proper bond for new materials.
6. The option of installing self-furring metal lath secured in place with hardened spiral steel nails, may be used on walls and partitions referred to in preceding Paragraph in place of raking joints and hacking wall surfaces as specified, provided all required adjustments are made to suit conditions.
7. All holes in existing slabs and floors due to removal of piping, enclosures, duct enclosures, and other items, shall be slabbed over and filled properly before any floor finishes are installed.
8. Avoid damaging existing electric conduits in floor fill and slabs when cutting holes through slabs or removing floor fill; verify conditions at the building.
9. Where partitions are indicated to be removed, they shall be removed down to the structural slab or

supporting structural members. Where new partitions are to be installed, remove floor finishes down to solid concrete fill or existing slabs.

10. Remove existing floors or portions of floors as required to install new floor or extend existing floors.
11. Where alterations occur in rooms and no new finish floor is indicated or specified, the existing floor shall be carefully protected and after alteration Work is completed, do all patching, repairing and replacing that may be required to provide a complete finished floor.
12. Remove hung and furred ceilings or portions of ceilings as indicated on the Drawings, or herein specified, or required for proper installation of new Work.
13. In rooms and locations where doors are removed, also remove the door stops and blocks thereof secured to wall or floors.
14. Remove saddles at door openings where no longer required.
16. Remove cabinets, wardrobes, and built-in equipment in all locations where indicated on Drawings, where required for installation of new work, or as may be required to suit new conditions. If these objects are known or assumed to be coated with lead-based paint in accordance with Section S01900, Article titled "PRECAUTIONS AGAINST LEAD PAINT EXPOSURE" they shall be completely sealed in 6-mil polyethylene prior to transport from the work area, and they shall be disposed of in accordance with Section S01900, Article titled "DISPOSAL OF PAINTED WASTE AND DEBRIS".
17. Where doors are to be removed, also remove all trim, frames, bucks, blocking, and other miscellaneous components, unless otherwise indicated on Drawings. If these objects are known or assumed to be coated with lead-based paint in accordance with Section S01900, Article titled "PRECAUTIONS AGAINST LEAD

PAINT EXPOSURE", they shall be completely sealed in 6-mil polyethylene prior to transport from the work area, and they shall be disposed of in accordance with Section S01900, Article titled "DISPOSAL OF PAINTED WASTE AND DEBRIS". Where windows are to be removed, see Section 08522 Aluminum Double Hung Windows - Replacement Installations & Section 02081 - Asbestos Abatement.

18. Remove exposed bolts, supports, brackets, cleats, grounds, and other items, that are no longer required for the purpose for which they were originally installed.
19. Cut new openings in exterior walls, if and where indicated on the Drawings, floor to ceiling, for passage to new addition, at all floors.
20. Where new vinyl composition tile floors are indicated on the Drawings at locations where existing finish floor is asphalt tile the existing finish floor and adhesive shall be entirely removed. The use of solvents which would prevent proper bonding of new flooring is prohibited.
21. All existing work damaged or lost as a result of performing the required new Work, shall be patched, repaired or replaced with new, and finished to match the new Work.
22. Where existing work required to be removed and replaced is found to be defective in any way, it shall be reported to the Authority before it is disturbed.

23. Certain items, equipment, and materials indicated to be removed shall be salvaged and delivered to the Division of School Facilities or other location as indicated in Section 02070 - Selective Removals and Demolition.

1.11 PROJECT WORKING HOURS

- A. Refer to "Phasing Exhibit" for project working hours.
- C. No overtime work shall be performed without prior written approval by the Authority.

- D. When performing work during "After hours" periods as determined by the NYC Building Department, obtain and pay for all required permits. Secure permits from the Department of Buildings under the Department of Education's continuing "After-Hour Work Permit". Use D.O.E. Form P.O. 68, which can be obtained from the designated representative of the Director of Field Operations, Office of Building Services, 44-36 Vernon Blvd, Long Island City, NY 11101.

1.12 PROGRESS PHOTOGRAPHS

- A. The Contractor shall engage a professional photographer to take and submit to the Authority, digital color photographs of the Site and the Work being performed under this Contract. The digital photographs shall be taken prior to start of Work, thereafter on a monthly basis, and at the completion of the Work. The number and locations from which the digital photographs are taken shall be subject to the direction and approval of the Authority. The pictures taken prior to the start shall be sufficient to record the conditions existing prior to the commencement of Work. This includes the areas of work as well as the finishes that may affect the work. Those taken on a monthly basis shall be as directed by the Authority to sufficiently document and record the overall progress of the Work, including site, construction, architectural and structural details. This includes site and building conditions of adjoining properties prior to and during the construction.
- B. All digital color photographs shall be in the JPEG color format and shall be concisely labeled with date, time project number and subject. The digital photographs shall be stored on CD's, DVD's or flash drives; each labeled with the project and date taken. The digital photographs shall be, at a minimum, 10.0 mega-pixel, high resolution, best quality.
- C. The electronic media shall be delivered to the Authority's representative monthly and, at the latest, must accompany the monthly requisition for the period photographed.

- D. The cost for taking, processing and delivering the electronic media shall be included in the Contractors Bid Amount.
- E. The Contractor shall provide an average of twenty (20) digital photographs (as described above) per month. The preconstruction photos shall be sufficient to adequately document pre-existing conditions of existing buildings and adjacent properties. For existing building work, they must document the area to be worked on prior to any removals.
- F. In addition to the photographs required to be taken to be taken by the professional photographer, the Contractor shall take photographs of work completed each day and attach to the daily logs.

1.13 FINAL LOT SURVEY - Not Used

1.14 LOT-LINE INSTALLATIONS - Not Used

1.15 MONUMENTS AND BENCH MARKS

- A. When City Monuments or bench marks occur within the limits of, or in the vicinity of, any proposed excavation or demolition, such monuments or bench marks shall not be disturbed.

The excavation or demolition shall not be carried nearer than 5'-0" to such monuments and bench marks until they have been referenced and reset, or otherwise disposed of, under the direction of the Bureau of Highways. The labor required to remove and reset such monuments and bench marks shall be supplied as a part of the Contract.

1.16 MAINTENANCE CONTRACTS - Not Used

1.17 COMMISSIONING REQUIREMENTS

- A. The Contractor shall comply with the Commissioning Requirements defined in Section S01660, Supplemental Commissioning Requirements.

1.18 BMS/DDC COORDINATION - Not Used

1.19 TRADE COORDINATION

- A. The Work of all trades is to be coordinated. Ensure that all penetrations made by the various trades into other trade work has been sealed to an airtight/watertight condition.
- B. Ensure that piping containing liquids not related to the space or items that may cause condensate do not pass through electrical/telecommunication rooms, elevator machine rooms, and other spaces where leaks for the system may damage electrical components. Also, sanitary lines shall not pass through kitchens.

1.20 SAFEGUARDS DURING CONSTRUCTION AND DEMOLITION

- A. The Contractor is responsible to follow all requirements required by the NYC Administrative Code and Chapter 33 of the 2014 NYC Building Code to ensure safety of the public and property as well as those employed in construction or demolition operations.

1.21 SUSTAINABILITY REQUIREMENTS - Not Used

1.22 MS4 REQUIREMENTS - Not Used

END OF SECTION

* * *

S01060PERMITS, FEES, AND CERTIFICATES OF OCCUPANCY1.01 REQUIREMENTS

- A. The Contractor shall make the necessary arrangements for, and shall obtain, all permits and approvals from all agencies, authorities, departments, etc., having jurisdiction, including, without limitation, permits with permitted hours of work and of sufficient duration, as are required to perform the Work.
- B. The Contractor shall pay all costs, fees and expenses associated with all permits, approvals, permit renewals, inspections etc. required for the work. The Contractor should note that as a public authority, the School Construction Authority is exempt from the assessment of fees by certain agencies, departments, other authorities etc. It is the responsibility of the Contractor to ascertain whether the School Construction Authority is exempt from the assessment of fees by other agencies, departments, other authorities etc.
- C. Except for the items listed in paragraph D below, all permits, applications, and approvals normally processed through the New York City Department of Buildings shall be processed through the Authority's Building Code Compliance Division (BCC). Items processed through BCC do not require the payment of fees.
- D. Permits, applications, and approvals for the following items shall be processed directly through the NYC Department of Buildings. The Contractor shall pay all costs and fees for the following permits, applications, and approvals:
 - 1. Cranes and Derricks
 - 2. After-hours work
 - 3. Elevators
 - 4. Bureau of Electrical Control
 - 5. Material Hoists and Hoistways
 - 6. Mechanical demolitions associated with building demolition projects. The application is to be submitted to BCC for review and pre-filing before the applicant submits to the Department of Buildings BEST squad for formal review, with the folder being returned to BCC by the applicant for final approval.
 - 7. Equipment Use Permit B Form 276 for boilers (aka Certificate of Compliance)

8. Equipment Use Permit B Form 16A for fuel tanks associated with boilers (aka Certificate of Compliance)
- E. Engage the services of qualified, third-party, licensed design professionals to submit any required affidavits or design certifications to obtain permits indicated in paragraph D.
- F. As soon as possible, but in no event more than thirty (30) continuous calendar days of the commencement date indicated on the Notice to Proceed, the Contractor must submit to the Authority's Building Code Compliance (BCC) Division (and/or all other agencies, bureaus, authorities, etc. with jurisdiction) all permit applications and other documentation necessary to obtain permits for the performance of all Work required under this Contract. Under no circumstances will allowances for lost time be granted for delays caused by incomplete, incorrect, or untimely submissions of application documentation.
- G. Permits from all agencies must be secured prior to expiration of application and renewed prior to expiration of the permit itself.
- H. The Contractor shall be responsible for the timely renewal of all permits and associated renewal fees until completion of the related work or as required by the governing agency.
- I. The Contractor shall pay all associated costs and fees and make all required arrangements through the appropriate utilities for temporary and permanent electrical power, water, sewer, gas, and other connections to the utilities involved. The Contractor shall provide deposits required by utility companies for the associated services. Accordingly, the Contractor will be the recipient of any refunds due and shall make all arrangements to facilitate any refunds directly with the utility company. The SCA will not pursue any refunds on behalf of the Contractor.
- J. Filing Procedures with BCC
 1. The Contractor shall engage DOB registered Representatives as follows:
 - a. Class I Filing Representative to present, submit, or furnish applications or

construction documents, and remove documents from BCC.

- b. Class II Code and Zoning Representative to present, submit, or furnish applications or construction documents, remove documents from BCC, and to appear before and attend appointments with plan examiners or BCC technical staff seeking construction document approvals.
 2. BCC may request a copy of the Representative's DOB identification card. BCC will abide by any DOB disciplinary actions taken against the Representative.
 3. The correct and timely submittal of the documentation is solely the responsibility of the Contractor. Under no circumstances will time extensions be granted for delays caused by incomplete, incorrect, or untimely submissions of application documentation. The firm/individual engaged by the Contractor shall not be the same firm/individual engaged by the Designer of Record for filing of the Design Documents.
- K. The Contractor is responsible for obtaining and renewing all Temporary Certificates of Occupancy (TCOs) and obtaining the final Certificate(s) of Occupancy (CO), as well as Letters of Completion, Certificates of Compliance for service equipment installed, and Place of Assembly Certificates of Operation for all related code compliance applications.
- L. Throughout the duration of the Work, the Contractor shall arrange for and coordinate all required inspections. No additional compensation will be paid for repairs, patching and replacement of work required to be removed, opened, or otherwise disturbed to facilitate such inspections.
- M. For fire alarm installations, the Contractor is responsible for all filing and payment of fees for permits and inspections required by the FDNY until the FDNY letter of approval is received. Additionally, arrange and pay for all necessary visits by the FA system vendor until approval by the FDNY is received. Note: Reimbursement for FDNY fees and FA system vendor visits required as a result of design modifications will be addressed on a case by case basis.

- N. Before final payment can be issued, the Contractor shall provide the applicable Documentation indicating that all final inspections required by City agencies having jurisdiction have passed and achieved final sign-off. All reports and proofs of inspections are to be submitted. The Contractor shall coordinate and arrange for all such inspections. No additional compensation will be paid for repairs, patching, and replacement of work required to be removed, opened or otherwise disturbed to facilitate such inspections.

END OF SECTION

SECTION S01300
SUBMITTALS

1.01 SUMMARY

- A. Contractor shall provide all Submittals required by the Contract. The Contractor shall adhere to all submittal and scheduling. After examination of the Submittal by the Authority's Representative and the return of such items by the Authority to Contractor, the Contractor shall make corrections indicated and shall furnish to the Authority the required number of corrected items.
- B. Required Submittals include, but are not limited to, the following:
 - 1. Submittal Schedule
 - 2. Submittal Status Reports
 - 3. Product Data
 - 4. Samples
 - 5. Shop Drawings
 - 6. Calculations
 - 7. Test Reports
 - 8. Certifications
 - 9. Inspection Reports
 - 10. Qualifications
 - 11. Record Documents
 - 12. Operation and Maintenance Manuals
 - 13. Warranties and Guarantees
- C. Manufacturer's Safety Data Sheets (MSDS) for all products supplied for the Work are to be kept at the site available for inspection by the Authority, Department of Education personnel, and all workers.

1.02 DEFINITIONS

- A. Products, materials, systems and equipment are collectively called "products" for the purposes of the Contract Documents.
- B. Unacceptable and Incomplete Submittals

Submittals that do not contain the required information specified herein, such as specification section and location of work, etc.; or do not specifically indicate the actual item proposed; drawings that are only

duplications of the Contract Drawings; and those shop drawings not prepared by specialty firms for items requiring such expertise (e.g. Reinforcing steel shop drawings to be prepared by a rebar detailer, structural steel to be by a steel detailer, etc.) will be considered unacceptable or incomplete submissions.

- C. Submittal Coordinator is the Authority's designee to manage the electronic submissions for the project.

1.03 SUBMITTAL SCHEDULE

- A. The Contractor shall submit a submittal schedule showing the anticipated time of commencement and completion of all Submittals. The timetable requirements for the submission of the submittal schedule and its updates shall be the same as required by the Section "Progress Schedule" for the Project Schedule. The submittal schedule shall coincide with the Project Schedule and shall reflect the allocated times for review and shall account for all product lead times.
- B. The sequence of the Submittals is to be reasonably prioritized to permit sufficient time for review, possible resubmissions, and subsequent procurement of the items sufficiently in advance of the work without submitting too many items at one time. The Authority will review the schedule and make comments as necessary. Schedules indicating that an unreasonably large number of submittals for any particular trade are to be made at one time will be rejected. The AEOR will place the submittals on "Hold" if they are out of sequence and will be reviewed when deemed appropriate to meet the schedule.
- C. The Submittal Schedule shall be coordinated with the Project Progress Schedules.
- D. See paragraph 1.06G regarding time to be allocated for review of submissions by the Authority. Also incorporate the time required for review of Product Substitutions, which is described in Section S01630.

1.04 SUBMITTAL AND CLOSE-OUT LOG

- A. Within twenty-one days of NTP, the Contractor shall create a project specific submittal log in the Authority's submittal application found under the

Authority's Construction & Architecture Management Platform (hereinafter referred to as CAMP) system for the project (refer to Article 1.08 for application description) from the template in the application, deleting the items that don't apply and adding those that are part of the project based on the project specification. The log shall include all divisions, proposed package numbers (Specification number and title) and submittal titles applicable for the project. Applicable Specification numbers and titles are not to be changed from those in the template. This log will be reviewed by the Project Officer and AEOR. Upon Project Officer and AEOR concurrence, the log will be created in the Authority's Contract Management system and numbers will be assigned to each submission. Only after this process has been completed will the Contractor be able to start the Submittal process.

- B. An eCloseout log will be available within CAMP immediately after acceptance of the eSubmittal log by the PO and AEOR. The Contractor is expected to add and/or remove closeout items that apply to the project closeout and transfer process within 10 business days of the eSubmittal log acceptance. Punchlist of the said project will be managed in the eCloseout module of CAMP. As-built Drawings, O&M Manual, and technical warranty review and approval process will remain as part of the eSubmittal review process.

1.05 SUBMITTAL STATUS REPORTS

- A. Starting two weeks after submission and acceptance by the Authority of the Submittal Schedule, the Contractor shall submit a bi-weekly Submittal Status Report, based on the Submittal Schedule, to the Authority's Field Representative containing the following information:
 - 1. A list of all Submittals which have been sent to the Authority, giving name of the Subcontractor, Drawing number, title, scheduled submittal date, and actual date of submission. Submittals that have been returned due to insufficient information shall indicate such on the report and the initial submission date revised to that when the Authority's accepts the submission for review and enters the submission in CAMP (Refer to Section

S01500). CAMP is the official project receptacle for tracking submission dates and actions.

2. An indication of the desired priority of the return, if necessary.
 3. Overdue drawings ("Aged") are to be indicated in bold.
- B. The Status Report shall be delivered to the Authority's Field Representative on days designated by the Authority's representative throughout the active period of Construction.

1.06 CONTRACTOR RESPONSIBILITY, GENERAL

- A. The review of Submittals by the Authority, which will typically be by the appropriate Design Professional of Record for the item submitted except those to be reviewed by other Authority Departments, shall not relieve the Contractor of responsibility for (1) the accuracy and proper dimensioning; (2) for the proper fitting and construction of the Work; and (3) the furnishing of materials or Work required by the Contract but not indicated on the Shop Drawings. Acceptance of Submittals shall not be construed as approving departures from the Contract Drawings, Supplementary Drawings (Drawings initiated by change orders or Notice of Direction (NOD)) or Specifications. The Contractor is responsible for clearly indicating (clouding, flagging, etc.) any portions of the submittal that vary in any way from the Contract Documents.
- B. The Contractor shall be responsible for coordinating all submissions of the various trades and subcontractors before submittal so as to avoid conflicting locations and routing of items and interferences between items and to ensure that the submissions are in accordance with the requirements of this Section. Corrections resulting from such conflicts and interference shall be made by and at the expense of the Contractor. The Authority reserves the right to withhold acceptance of a Submittal requiring coordination with other Submittals until all related Submittals are received.
- C. It shall be the Contractor's responsibility to carefully review all Submittals to ensure conformance with the

Contract requirements including verification of dimensions, clearances, compatibility, and coordination with other product data and shop drawings submitted for other work.

- D. Submittal packages are expected to be submitted individually within the system. When applicable, packages with similar submittal items (e.g. different P&D valve types) may be submitted as a single package. Submittal packages shall include the Contract name and number, the Contractor, and applicable subcontractor, manufacturer or supplier. Submittals shall completely identify the specification section, Contract Drawings, and the locations at which materials or equipment are to be installed. Submittals shall be accompanied by an e-transmittal in the format provided in Appendix A on the Contractor's letterhead. For each item, the appropriate column shall be marked as to whether the submittal is per spec, an "or equal", or an alternate substitution.
- E. Where printed materials describe more than one product or model, clearly identify which item is submitted for acceptance.
- F. If the Authority finds a Submittal unchecked and incomplete or unacceptable, it will be returned to the Contractor for correction prior to any further processing or review by the Authority regardless of any urgency claimed by the Contractor. In such a situation, the Contractor will be responsible for any resulting delays to the scheduled Contract completion. Furthermore, the Authority may hold the Contractor responsible for increased costs incurred by the Authority resulting from the Contractor's failure to comply with the requirements set forth herein.
- G. The Contractor shall anticipate twenty-one (21) calendar days (excluding National Holidays) after receipt by the Authority's Design Professional of Record (or other SCA department depending on submittal type) to the day the commented submittal is returned, except for items listed below that require a longer review period as they are looked at by multiple entities. For those items listed, the Contractor shall anticipate an additional **fourteen (14)** days for review. Processing of incomplete or unacceptable submissions by the Authority shall not reduce the number of calendar days specified above for

the Authority's review once the submission is properly made. Furthermore, the Contractor shall provide Submittals in accordance with the accepted Submittal Schedule. Should the Contractor vary from the established schedule in its submissions, the Contractor understands that the Authority may require additional time for review as it deems necessary beyond that set forth above. This additional time shall in no way relieve the Contractor from performing its work on schedule. The Contractor may also request and pay overtime for the review to be done on an expedited basis.

The Authority reserves the right to **reject** the Contractor submittals that are not sent in accordance with the accepted schedule. Resubmissions shall be treated the same as initial submissions with respect to time for review. Under no circumstances shall the Contractor be entitled to any extension of time or compensation for any delay in the review of a submittal caused by the Contractor's failure to submit in accordance with the accepted schedule or sufficiently in advance of the work to allow for the review and processing described above. The following items require a longer review period.

1. All HVAC and plumbing equipment that is connected to a Building Management System.
 2. Switchboards and VFD's connected to the Building Management System.
 3. Emergency generator when the project has a Building Management System.
 4. Subslab depressurization system when the project has a Building Management System.
 5. Division 14 equipment.
- H. The Contractor shall clearly designate the trade that is to perform the work when the use of "Work by Others" or other similar phrases are indicated on Submittals to the Authority's Representative.
- I. No portion of the Work shall commence until required Submittals are Satisfactory to the Authority.

1.07 AUTHORITY'S RESPONSIBILITY, GENERAL

- A. The review of Submittals by the Authority will be for general conformance with the requirements of the Contract Documents only and shall not be interpreted as confirming or approving detailed dimensions, quantities or approval of deviations from the Contract Documents. The Authority's review shall not relieve the Contractor of its responsibility for the accuracy of its submittals nor for the furnishing and installation of materials and equipment in accordance with the Contract Documents. The Authority's review of a separate item shall not be deemed to include a review of the complete assembly in which it functions.
1. Acceptance of Submittals shall not to be interpreted as approval of a substitute material or system indicated thereon. Submittal of substitutions will be accomplished in accordance with the requirements set forth in Specification Section S01630, "Product Substitution".
 2. Acceptance of a Submittal, with or without notation, does not acknowledge a change to the contract
- B. The Authority will review and return to the Contractor satisfactorily prepared Submittals within twenty-one (21) calendar days (excluding National Holidays) after receipt by the Design Professional of Record (or other SCA department depending on submittal type), including transmittal time.
- C. The Authority will review all satisfactorily prepared Submittals and will return each Submittal to the Contractor with a stamped comment indicating the Authority's response to the submission. The stamp will indicate one of the following responses:
1. "No Exceptions Taken" - The Work covered by the submittal may proceed to fabrication/installation provided it complies with requirements of the Contract Documents. This review action does not authorize changes to Contract Sum or Contract time. ("Approved" or "Accepted" are alternate comments with the same meaning.)

2. "Make Correction Noted" - The Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract. The response indicates that portions of the submittal have been questioned and found to be in deviation/conflict with the requirements of the Contract Documents, notes have been added for clarity, and/or the submittal requires field verification. Resubmission is required only if the Contractor is unable to comply with noted corrections. Resubmission must clearly indicate items varying from the noted corrections and other changes made from the previous submission. ("Approved as Noted - No Resubmission Required" is an alternate comment with the same meaning.)
 3. "Rejected: Revise and Resubmit" - The response indicates that the submittal is deficient. Additional information is required to complete the review. Work covered by the submittal may not proceed - purchasing, delivery, fabrication, or installation MAY NOT be undertaken. The Contractor is to revise or prepare a new submittal according to the comments. ("Revise and Resubmit" is an alternate comment with the same meaning.)
 4. "Rejected: Not acceptable for review" - The response indicates that the item does not meet the requirements of the Contract, or the submittal is incomplete and has not been reviewed. Do not proceed with the Work covered by the submittal - purchasing, delivery, fabrication, or installation MAY NOT be undertaken. Prepare a new submittal complying with the Contract requirements; resubmit immediately. ("Not Approved" is an alternate comment with the same meaning.)
- D. Shop drawings not required to be reviewed, means and methods submittals, Site Safety Drawings, or design drawings for Contractor designed items, such as Structural Stability drawings, will be marked as "Reviewed: No Action Taken", or other similar terms, depending on the item submitted, and will not utilize the stamp designations listed in C above. As such, they will typically be indicated by the designation "No Action Taken" (NAT) in the Authority's eSubmittal application.

- E. Do not permit Submittals marked Rejected (or the similar terms listed above)" to be used at the Project site, or elsewhere where Work is in progress.
- F. For unique conditions where long-lead fabrication items are sufficiently detailed to allow for fabrication but the installation details or other portions of the submittal are not sufficient for the entire submittal to be stamped as either C.1 or C.2 above, those drawings marked "rejected: revise and resubmit" may also have an additional marking or stamp indicating "Fabrication only may proceed", which will permit the item to be fabricated, dependent on meeting any corrections noted, but not delivered to the site. Any modifications required due to final means of installation shall be at the Contractor's cost.

1.08 SUBMITTAL SUBMISSION PROCEDURE

- A. All submittals are to be made through the Authority's submittal application in CAMP, accessible via the web.
 - 1. The Contractor is not required to obtain its own submittal software to interface with the Authority's software but its computer system must be a working PC/Internet capable device able to run the CAMP application. Any computer equipment or mobile devices used to connect to Authority's applications must be kept up to date and in a state of good repair (SOGP). This includes, but is not limited to, the latest operating system patches, security patches and anti-virus updates.
 - 2. This is a mandatory requirement and no other computer software shall be utilized for submittal purposes, and no data transfer from other computer programs into CAMP shall be permitted.
 - 3. The Authority will afford training of the eSubmittal and Closeout applications in CAMP for the Contractor's designated personnel that possess computer literacy in Windows® and basic typing skills.
 - 4. All submittals are to be created in Adobe PDF, as Bluebeam® will be utilized for marking up the drawings. Contractor is responsible for having the appropriate software to create the pdfs.
- B. Each submission shall have an e-transmittal page (refer to sample in Appendix A) with all pertinent information created by the Contractor and a submittal identifier generated in the eSubmittal application that will follow the submittal till it is accepted with no further submissions. All pages/sheets/ transmittals associated with the drawing shall then be uploaded.
- C. Each submittal entered in the application is required to be tagged from the pull-down menu with one of the following:
 - 1. "Per Spec/Basis of Design"

2. "Or Equal Substitution/non-basis of Design"
 3. "Alternate Substitute"
- D. If the Submittal contains variations from the Contract Documents, the Contractor shall make specific mention of such variations in the transmittal and shall flag them on the Submittal item so as to be readily apparent. Any variations must be continuously flagged throughout the submittal process. Acceptance of submittals inclusive of an item or items which vary from the Contract Documents but not flagged as such does not constitute acceptance of the variance(s). The Contractor shall remedy the installation of such unaccepted item(s) by its removal and installation of contract compliant item(s). Acceptance of a submittal or an installation on other projects does not constitute acceptance on this project. Submissions that contain substitution of "products" that differ from the Contract Documents shall be clearly listed and will be considered and reviewed in accordance with the process described in Section S01630, "Product Substitutions". Variations to details due to field conditions shall be so flagged as such.
- E. Submit required data for each item as specified in the technical sections. However, if a product specified in the technical section by specific product name or model number is proposed for use, Manufacturer's test reports (except those required in the field to verify performance), manufacturer's qualifications, and samples (except for those requiring selection or acceptance of color, texture, appearance, or other variable characteristic, field mock-ups, and those showing thickness, fabrication shape, and type of material), are not required to be submitted. Exceptions are for items such as Rooftop DX units where the design parameters are developed per the project and must show all compliances.
- F. Acceptance of a "product" does not constitute acceptance for installation at locations other than that provided in the Contract Documents.
- G. Upon acceptance of a submittal (submittals stamped as "No Exceptions Taken" or "Make Corrections Noted") as indicated in the submittal application in CAMP, the Contractor shall make one copy of the submittal document at full size for use by the Authority. The copy is to be

provided to the Authority's Project Officer or designated representative.

1.09 RESUBMISSIONS

- A. The resubmission procedure shall be the same as for the initial submission in all respects except the following:
1. The Submittal application will use the same number as the initial Submittal submission but will give a review cycle modifier to indicate a subsequent submission. If a submittal was given "No Exceptions Taken" or "Make Corrections Noted" and thus closed in the system but is then required to be resubmitted, the Contractor must request the submittal coordinator for the project to open the submittal to allow the next cycle modifier to be provided by the application.
 2. No new material, other than what may be incidental to the required correction, shall be included on the same transmittal for a resubmission.
 3. The Authority's review of resubmitted items shall generally be restricted to revisions to the original Submittal, unless the Contractor makes other revisions in addition to those indicated. All changes (revisions) to resubmitted items or the additional changes by the contractor must be clearly encircled, highlighted, or otherwise designated.
 4. Submittals by the Contractor that by virtue of the review action assigned to it require an unreasonable number of reviews by the Authority (over 3 total - 1 initial, 2 resubmissions) may warrant a cost back-charge to be assessed against the Contractor. The Contractor shall be held liable for all delay and increased labor costs incurred by the Authority for additional review(s) of such Submittals including all legitimate overhead expenses and mark-ups associated with the additional review(s). If a submittal requires a third submission, the Authority may require a meeting to resolve the deficiencies in the submittal.

5. Under no circumstances will the Authority's rejection of a Submittal or requirement for resubmission of a Submittal be cause for any claim by the Contractor for an extension of Contract Time or adjustment to the Contract price.

1.10 PRODUCT DATA

- A. See the individual technical Sections of these Specifications for those items of work requiring the submission of Product Data.
- B. Compile Product Data into a single submittal for each element of construction or system. Product Data includes, among other information, printed information such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams and performance curves. Where Product Data must be specially prepared because standard printed data is inadequate, submit as "Shop Drawings".
- C. The Contractor shall submit all Product Data.
 1. Mark each item to show applicable choices and options. Where Product Data sheet includes information on several products, some of which are not pertinent, mark copies to indicate the applicable information. Include the following information:
 - a. Manufacturer's printed recommendations.
 - b. Compliance with recognized trade association standards.
 - c. Compliance with recognized testing agency standards.
 - d. Application of testing agency labels and seals.
 - e. Notation of dimensions verified by field measurement.
 - f. Notation of coordination requirements.

1.11 SAMPLES

- A. See the individual technical Sections of these Specifications for those items of work requiring the submission of Samples.
- B. Provide a copy of the e-transmittal to accompany the sample submittals. Log in sample e-transmittal in the eSubmittal application upon sending it out for review. Each Sample shall be labeled with the following information:
 - 1. Project title.
 - 2. Contract name and Contract number.
 - 3. Date of submission.
 - 4. Name and quality of the material.
 - 5. Name of Contractor, name of Subcontractor, Material Supplier and Manufacturer, as applicable.
 - 6. Contract Drawing numbers and Specification Section, Division and Paragraph numbers used as reference in preparing Samples.
- C. Samples on Display: When Samples are specified to be equal to samples in the office of the Authority, they shall be carefully compared to such samples for verification that they are equal in all respects.
- D. Samples shall be of sufficient size and quantity to show the quality, type, color, finish and texture of the material required to be furnished by the Contractor pursuant to the Contract. Furnish specific sizes and quantities where indicated in the respective technical Sections. Additionally, provide photos to sufficiently document the samples and upload it to CAMP for record.
- E. Valuable Samples, such as hardware, plumbing and electrical fixtures, not destroyed by inspection or test, will be returned to the Contractor and may be incorporated into the Work after all questions of acceptability have been settled, providing suitable

permanent records are made as to location of the Samples, their properties, and other pertinent information.

- F. Field samples (Mock-ups) required by individual Specification Sections are mock-ups erected on site to illustrate workmanship, finishes, coatings, or textures and to establish the standard by which the Contract Work will be judged. Mock-ups shall be provided in the sizes prescribed in the Contract or as may be required by the Authority. Comply with submittal requirements, and process transmittal forms along with photos to provide a record of the Submittal and subsequent review action.
- G. Except for the field samples (mock-ups), provide three (3) samples of each item required to the Authority unless otherwise indicated.

1.12 SHOP DRAWINGS

- A. See the individual technical Sections of these Specifications for those items of work requiring the submission of Shop Drawings.
- B. Shop drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates and similar drawings. Shop Drawings shall show in detail, materials, dimensions, thicknesses, assembly, attachments, relation to adjoining work, and all other pertinent data and information. The Contractor shall check shop drawings, verify all dimensions and field conditions and check and coordinate the Shop Drawings of any Section or trade with the requirements of other sections or trades as related thereto, as required for proper and complete installation of the Work.
- C. Prepare composite shop drawings and installation layouts, of ceiling finishes, trades above ceilings and elsewhere to depict proposed solutions for tight field conditions. These composite shop drawings and field installation layouts shall be coordinated in the field by the Contractor and its Subcontractors for proper relationship to the work of all other trades, based on field conditions.
- D. Submit shop drawings, drawn to accurate scale. Reproductions of Contract Documents will not be acceptable.

- E. The Contractor shall submit manufacturer's drawings and specifications when necessary to explain fully apparatus and equipment required by the Work. These manufacturer's drawings and specifications shall be treated as Shop Drawings. Manufacturer's catalog numbers alone are not acceptable as sufficient information for compliance with this requirement.
- F. Provide clear and adequate space (3 $\frac{1}{2}$ in. x 8 in. min.) on submitted shop drawings for the Authority's review stamp.
- G. The Contractor shall not use or distribute, for construction purposes, any shop drawings that do not include the Designer of Record's acceptance stamp.
- H. The Contractor shall be responsible for distributing prints (if needed) of shop drawings to its Subcontractors and materials suppliers.
- I. The Contractor shall bear all costs incurred for such reproduction and distribution. Prints of all reviewed shop drawings may be made from prints that carry the appropriate review stamps.

1.13 CALCULATIONS

- A. See the individual technical Sections of these Specifications for those items of work requiring the submission of Calculations.
- B. Only those Calculations that are for permanent parts of the Work will be reviewed by the Authority. These calculations will be reviewed only for compliance with stipulated design criteria.

1.14 TEST REPORTS

- A. See the individual technical Sections of these Specifications for those items of work requiring the submission of Test Reports.

1.15 CERTIFICATIONS

- A. See the individual technical Sections of these Specifications for those items of work requiring the submission of Certifications.

1.16 INSPECTION REPORTS

- A. See the individual technical Sections of these Specifications for the items of work subject to inspections by manufacturers or other entities.

1.17 QUALIFICATIONS

- A. See the individual technical Sections of these Specifications for requirements concerning the qualifications of the entities performing items of the work.
- B. Qualifications for companies shall be a list of projects with references that verify the project requirements are met. Where the qualification is for a licensed professional, submit a copy of the license and resume.

1.18 RECORD DOCUMENTS

- A. See the individual technical Sections of these Specifications and Section G01720 for requirements concerning Record Documents.

1.19 OPERATION AND MAINTENANCE MANUALS

- A. See the individual technical Sections of these Specifications and Section S01730 for requirements concerning submission of Operation and Maintenance Manuals.

1.20 WARRANTIES & GUARANTEES

- A. See the individual technical Sections of these Specifications and Section G01740 for those items of work requiring the submission of Warranties and/or Guarantees.

1.21 SUSTAINABILITY SUBMITTALS - Not Used**END OF SECTION**

**APPENDIX A – SAMPLE TRANSMITTAL LETTER
(THIS FORM CAN BE DOWNLOADED FROM THE SCA’S WEB SITE)**

Company Letterhead

TRANSMITTAL LETTER

Company Name and Address

Company Address

Company Phone #

Company Fax #

Date:	11/11/2011
School	PS 283, Bronx
Project	Parapet Replacement/Exterior wall Renovation
PCM Proj Name	PS283X02
Contract #	C00000XXXXX
Design # / LLW #	D12345
P.O.	Firstname Lastname
A/E Reviewer	Firstname Lastname
☐ Resubmission	

To: **XYZ Architecture**
xx-xx Thomson Avenue
Long Island City, NY 11101

Attn: **Submittal Coordinator**

* Only one Submittal Title per transmittal to be included in each e-submittal package.
 * More than one item of similar design or part of a system may be included in ESUBMITTAL/package*.
 * A copy of the transmittal to accompany a Sample submittal is to be attached in the ESUBMITTAL application upon sending for review.

LIST OF ITEMS SUBMITTED

Division	Spec Section/ Package No.	Spec Title	Submittal Title	As Spec/ Basis of Design ¹	"or Equal" Substitut ²	"Alt" Substitut ³
03	03300	Cast-in-Place Concrete	Concrete Mix Design			

¹ Item is listed in specification or for items listed on Drawings as Basis of Design

² Item is being submitted as an Equal product to that specified or is different than the Basis of Design (whether manufacturer is included in the spec or not)

³ Item is an alternate substitution - Does not match material specified

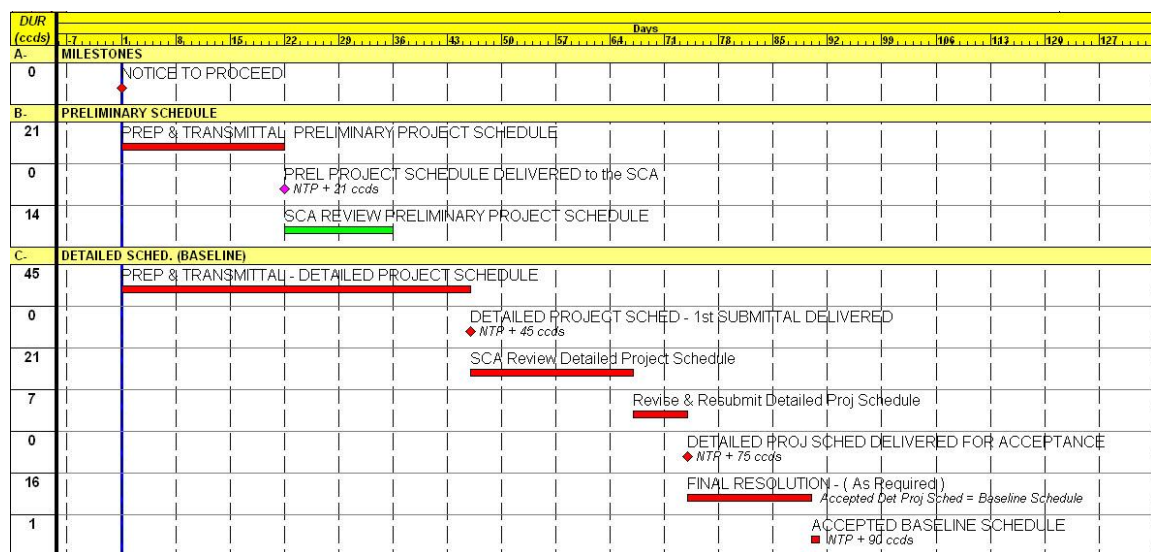
⁴ A Table of Content or parts listing indicating which size/length/gauge, etc. needs to be reviewed.

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SECTION S01312
PROGRESS SCHEDULE

1.01 METHODS

- A. The Contractor shall comply with project schedule development and updating requirements as specified herein.
- B. The Contractor shall employ or retain the services of a Construction Scheduler with verifiable construction scheduling experience, subject to review and acceptance by the Authority. Upon request, the Contractor shall provide the Authority with identification, qualifications and experience of the proposed scheduling staff member(s).
- C. To develop a Detailed Project Schedule, the Contractor shall utilize a version of scheduling software that is fully compatible with that used by the Authority.
- D. All schedule submittals shall be developed using Oracle's P6 Professional Project Management (P6) software. This schedule shall be developed using accepted CPM (Critical Path Method) techniques using the precedence diagramming method.
- E. As used in this Specification Section, "days" mean consecutive calendar days (ccd) while "working days" are days excluding applicable non-working time (for example weekends and holidays).
- F. Updates to the Baseline Detailed Project Schedule shall be submitted monthly until Substantial Completion is declared by the Authority or as otherwise directed by the Authority. The updates shall be submitted no later than the 5th of the month of which it is due and shall be in accordance with 1.09 Of this section.

1.02 PRELIMINARY AND DETAILED SCHEDULE PREPARATION TIMELINE

A. Upon receipt of Notice to Proceed (NTP), the Contractor or its designee shall promptly prepare a Preliminary Project Schedule and subsequently a Detailed Project Schedule and shall submit for the Authority's acceptance as follows:

1. The Preliminary Project Schedule shall be submitted no later than twenty-one (21) days after the NTP. (Refer to Article 1.03)
2. The initial submittal of the Detailed Project Schedule shall be provided to the Authority for review no later than forty-five (45) days from the NTP. (Refer to Article 1.04)
3. The Contractor shall incorporate all corrections, and revisions required and provide an updated version of the Detailed Project Schedule for review and acceptance no later than seventy-five (75) ccbs after NTP to ensure that the Detailed Project Schedule is declared the Project Baseline Schedule no later than ninety (90) ccbs after the NTP. The ninety days shall include fourteen (14) ccbs review times for each submittal of the Detailed Project Schedule.

B. Remedies

1. Preliminary Project Schedule: The Authority will take a credit of three thousand dollars (\$3,000) if the Preliminary Project Schedule is not submitted within 21 ccds of the NTP.
2. Acceptable Baseline Detailed Project Schedule: The Authority will take a credit of five thousand dollars (\$5,000) if an acceptable Baseline Detailed Project Schedule is not submitted within 90 ccds of the NTP.
3. Monthly Schedule Updates: The Authority will take a credit of two thousand dollars (\$2,000) for each schedule update not submitted within the period it was due.
4. Scheduling Firm Services: In additions, if an Acceptable Baseline Detailed Project Schedule is not provided by the Contractor within 90 days of the NTP or a total of three updates are not provided by the Contractor for the periods they are due, the Authority may engage the services of a scheduling firm to develop a project schedule or update an existing schedule. This will enable the Authority to monitor the progress of the work. Should this occur;
 - a. The total costs of such services will be back charged to the Contractor.
 - b. Any schedules and updates developed by a scheduling firm engaged by the Authority are for the Authority's sole use and do not, in any way, represent an acceptance of responsibility by the Authority to schedule the work or relieve the Contractor of the obligation to complete the work within the durations specified by the Contract.
5. Failure of the Contractor to comply with the schedule submission requirements of this section may result in the Authority withholding full payment (or a portion of the full payment thereof) due the Contractor until such time as the Contractor submits the required schedules.

6. The Authority will accept the submitted information only after all corrections have been made and all issues resolved. The Authority may also find the Contractor in default if items in this Section are not complete.

1.03 PRELIMINARY PROJECT SCHEDULE DEVELOPMENT

- A. The Preliminary Project Schedule shall be a detailed plan of all operations, including submittals, permitting, testing, and construction activities, for either the first ninety (90) days after NTP or to the point where the Contractor plans to mobilize on site (whichever is greater). This submittal will also depict a summary level (CSI level 3 or 4) schedule of the major activities for the remainder of the Work.
- B. The Preliminary Project Schedule will be reviewed by the Authority and returned with comments as necessary. Information from the Preliminary Project Schedule will be used as the foundation for development of the Detailed Project Schedule.

1.04 DETAILED PROJECT SCHEDULE

- A. The Baseline submittal of the Detailed Project Schedule must utilize the entire Contract duration as specified in the Notice to Proceed.
- B. The Detailed Project Schedule shall be the Contractor's working schedule used to plan, organize, execute, and track the project. The Detailed Project Schedule is the primary vehicle used to report actual performance, progress, and convey the Contractor's execution plan to complete all remaining Work.
- C. The Detailed Project Schedule shall show the sequence in which the Contractor proposes to perform the Work, and account for all major and intermediate milestone activities, phasing, restrictions of access, availability of work areas and the availability and use of labor, materials, and equipment.
- D. A current update of the Detailed Project Schedule shall be used as the Basis of all delay claims. (Refer to Article 1.09 - SUBMITTALS)

- E. The Contractor shall ensure and represent that all subcontractors performing any portion of the Work have knowledge of the accepted Detailed Baseline Project Schedule and the Monthly Updates, and are in agreement therewith.
- F. The amount of detail shall be to the satisfaction of the Authority and shall, at a minimum, include:
1. Contract major milestones as indicated in Article 1.07 must be identified, and included in the Detailed Project Schedule.
 2. All submittal, owner review & approval, purchase, manufacture, and delivery activities for all major materials and equipment.
 3. Deliveries of owner-furnished equipment and/or materials.
 4. Preparation, submittal, and approval of drawings, material samples, and safety plans.
 5. Preparation, submittal, review, and approval of permits required by all regulatory agencies and other third parties.
 6. Performance of tests, submission of test reports, and approval of test results.
 7. Commissioning of each mechanical and low-voltage system is to be clearly delineated and scheduled such that they will be completed prior to Substantial Completion.
 8. Completion dates of all items required for Phased Completion (if applicable).
 9. Completion dates of all items required for Substantial Completion.
 10. Completion dates of all items required to obtain a Temporary Certificate of Occupancy (TCO) and Certificate of Occupancy (CO).

11. Completion dates for close-out of regulatory and punch list items prior to Final Payment and transfer of the project.
- G. Activities identified in the Detailed Project Schedule shall have the duration in units of whole working days. Construction activity durations shall not exceed ten (10) working days unless specifically approved by the Authority. This is to ensure that activities are not generalized and that each activity and sub-activity are defined as narrowly as reasonable to facilitate schedule tracking. Durations for non-construction activities such as procurement of materials, delivery of equipment, concrete curing, etc. may exceed ten (10) working days without prior approval; however, these are still subject to review by the Authority. Activity Duration shall be based on the available resources required for performing each activity and shall be the result of definitive labor hours and resource planning by the Contractor to perform the Work and with consideration of on-site work conditions. If requested by the Authority, the Contractor shall justify the reasonableness of a planned activity time duration.
- H. Activity descriptions shall clearly and uniquely define each activity with a description of the work that is readily identifiable. Each activity shall have a narrative description that includes a verb or work function (i.e. submit, form, pour etc.) an object (slab, foundation, etc.) and, for any construction activities, a specific location. The work related to each activity shall be limited to one responsibility and one trade.
- I. Activity Relationships shall be assigned to clearly establish predecessor and successor relationships to each activity. Open ended activities are not permitted with the exception of the first and last activities in the network, the first activity being NOTICE TO PROCEED and the last being FINAL COMPLETION. The use of relationship lag times is discouraged and only permitted with approval by the Authority; use of negative lag is never permitted.
- J. Activity Constraint Dates are only to be used to reflect contractual/owner designated constraints unless specifically authorized by the Authority.

- K. Float or slack, in the schedule, shall not be for the exclusive use or benefit of either the Authority or the Contractor, but shall be available for use by both the Authority and the Contractor.
- L. The Authority will return comments in accordance with Article 1.02. Each resubmittal after the Detailed Project Schedule is delivered for acceptance shall comply with all requirements of this section. Review and response by the Authority will be given within ten (10) working days after resubmission. The Contractor's receipt of the comments within the time specified shall not in any way affect the Contractor's responsibility to complete the project within the Contract duration.
- M. Failure by the Authority to return comments or indicate acceptance status will on no way relieve the Contractor's obligation to submit monthly schedule updates.
- N. At the request of the Authority, the Contractor shall be required to make a presentation to explain or clarify the intended logical sequence of construction activities depicted in the detailed project schedule. The Contractor and designated scheduler shall discuss anticipated challenges and outline construction methodology and flow of work to show how and when major milestones will be achieved. In addition, the Contractor may, at no cost to the Authority, be required to participate in additional project meetings necessary to obtain acceptance of the above noted submittals.

1.05 ACTIVITY AND CALENDAR CODING STRUCTURE

A. Activity Coding

All Activities (baseline and added) shall be coded inside the P6 PROJECT Environment/PROJECT LEVEL (NOT the GLOBAL Environment/ENTERPRISE LEVEL) to facilitate selection, sorting and preparation of reports. The Contractor will use the seven-digit Package # (found on the Notice to Proceed) as the Project ID prefix.

Activity coding shall consist of a seven-digit Project ID followed by a dash, followed by activity coding (PROJECT ID-ACTIVITY CODE). Activity codes must be

created at the project level and shall utilize the coding scheme outlined below:

RESP Responsibility - Identify Contractor, Authority, Subcontractor, etc. responsible for the Work.

PHAS Phase - Breakdown of activities in Milestones, Pre-Construction, Procurement, Construction and Closeout Activities.

LOCN Location - Breakdown by Floor or elevation.

AREA Area - Breakdown by room, area, block or wing. May be used as a subdivision of PHASE to include milestones, permits, subcontractor approvals, submittals fabrication and delivery. Subdivision of the site and buildings into logical modules such as blocks, wings.

TRAD Trade - Breakdown by CSI Code or Specification Section.

B. Project Calendar Coding

All calendars created and assigned to activities shall be Project-level calendars. The Contractor shall use the same seven-digit Package# (found on the Notice to Proceed) that is used as the Project ID prefix for Activity Coding.

The Calendar Name shall consist of the seven-digit Project ID # followed by a dash, followed by a descriptive Calendar Name (PROJECT ID-CALENDAR NAME)

- C. The Contractor's proposed Activity and Calendar coding and must be submitted with the Preliminary Project Schedule. A meeting may be requested by the Authority to discuss the scheme and other schedule information prior to the submittal of the Detailed Project Schedule. The accepted coding scheme and WBS Structure must be incorporated into the Detailed Project Schedule.

1.06 WORK BREAKDOWN STRUCTURE (WBS)

- A. A multi-level hierarchal WBS shall be incorporated in all P6 schedules. An initial, proposed WBS Structure

must be submitted with the Preliminary Project Schedule. The levels (nodes) shall include, but not be limited to:

LEVEL 01 - is the Contract or Project Level

LEVEL 02 - shall have a minimum of four nodes; Pre-Construction, Procurement, Construction or Phase of Construction, and Closeout

LEVEL 03 - Specification Section T

- B. The Contractors proposed WBS structure must be submitted with the Preliminary Project Schedule. The accepted WBS Structure must be incorporated into the Detailed Project (Baseline) Schedule.

1.07 MAJOR MILESTONES

- A. The following is a list of Major Milestones and activity groups that the Contractor is obligated to include and maintain in the Detailed Project Schedule Submission. However, the content of the schedule shall not be limited to this list. The Authority may change, add, or modify the milestones and activity groups as required:

Major Common Milestones / Activities Groups (Utilize as applicable)	
I. MAJOR MILESTONES	
	NTP
	DOB Permit & Insurance
	Mobilization
	Subcontractor 'Buyout'
	Site preparation
	Procurement Long Lead Items
	Site Safety Plans
	Shop Drawings Submittals / Approvals
	Abatements
	Site Demolition
	Inspection
	Site Safety
	Check List
	Fire Inspection

Major Common Milestones / Activities Groups (Utilize as applicable)	
	Engineering Inspection
	Testing & Inspection
	Final Cleanup
	Punch-list
	Utility Testing
	FID Inspection/Approval
	P/L & Agency Sign - offs
	Substantial Completion
	Final Completion
II. ACTIVITY GROUPS	
1. State of Good Repair	
B. Major Modernization and Rehabilitation	
1B1	Full Modernization
	Side Walk bridging
	Aluminum Window Procurement
	Cast Stone Procurement
	Brick Procurement
	Scaffolding
	Parapet Demolition
	Parapet Restoration
	Masonry Restoration & Pointing
	Window Abatement
	Window Installation
	Pre-roofing Meeting
	Roofing Installation
	Roof Testing
	Interior Abatement
	Interior Finishes
	Boiler Abatement
	Boiler Demolition
	Utilities Connections
	Temporary Boiler
	New Boiler Installation
	Test New Boiler and Commissioning
1B2	Interior Modernization
	Interior General Construction
	Interior Finishes
	Interior Demolition - M.E.P. Systems
	Interior Roughing - M.E.P. Systems
	Interior Finish - M.E.P. Systems
	Commissioning of Systems
1B3	Exterior Modernization
	Aluminum Window Procurement

Major Common Milestones / Activities Groups (Utilize as applicable)	
	Cast Stone Procurement
	Brick Procurement
	Scaffolding
	Parapet Demolition
	Parapet Restoration
	Masonry Restoration & Pointing
	Window Installation
	Pre-roofing Meeting
	Roofing Installation
	Interior Abatement
	Interior Finishes
C. Building Upgrade	
1C1	Asbestos
	Interior Abatement
	Interior Demolition
	Interior General Construction
	Interior Finishes
	Exterior Abatement
	Exterior Demolition
	Exterior Construction
1C2	Boiler Conversion
	Underground Drainage
	Installation of Temporary Unit
	Boiler Feed Equipment
	Install Oil Tank and Piping
	Boiler RM/Pit Concrete Floor/Pads
	Boilers & equipment set in place
	Climate control
	Temporary hot water
	Complete Oil Systems
	Complete boiler control system
	Complete distribution system
	Install Gas Piping
	Installation of New Unit
	Install Boiler Vent
	Main Steam Header
	Hydro test boiler
	Boiler Permit
	Boiler Accessories
	Boiler Room Pit/Concrete Floor
	Commissioning of Systems
1C3	Climate Control
	Install Valves
	Install Radiators

Major Common Milestones / Activities Groups (Utilize as applicable)	
	Install Piping
	Install Thermostats
	Test System and Commissioning
1C5	Kitchen Conversion
	Procurement of kitchen equipment
	Demolition / Asbestos abatement
	Temporary Kitchen / or Satellite Food
	Order Furniture / Equipment
	Complete serving area
	Concrete Repair
	Doors and Frames
	Plumbing/Electrical
	Ansul System Testing
	Interior Lighting
	Finishing
	Commissioning of Systems
	Fire Department sign-off
	Public assembly approval
1C6	Low-Voltage Electrical System
	1. Install Intrusion Alarm
	2. Install Fire Alarm
	3. Install P.A. System
	4. Install Central Monitoring Station
	5. Fire Department Inspection/Deficiency report
	Low-Voltage - PA System
	Low-Voltage - Fire Alarms
	Low-Voltage - Sound System
	Low-Voltage - Smoke Detection
	Commissioning of System
1C7	Electrical Lighting Fixtures
	Electrical Lighting - Classrooms
	Interior Abatement Walls & Ceilings
	Electrical Rough In - Conduits
	Electrical Demolition
	New Electric Fixtures - Classrooms
	Interior Finishes - Walls & Ceilings
	Electrical Lighting - Corridors
	Electrical Rough In - Conduits
	New Electric Fixtures - Corridors
	Interior Finishes - Corridors
	Electrical Lighting - Stairways
	Abatement Stairways
	Electrical Rough In - Conduits
	New Electric Fixtures - Stairways

Major Common Milestones / Activities Groups (Utilize as applicable)	
	Interior Finishes - Stairways
1C8	Elevators & Escalators
	Elevators
	Elevators - Passenger
	Elevator Procurement
	Demo & Remove Ex. Elevator
	Install New Elevator Cab & Components
	Install New Elevator Equipment
	Interior Finishes
	Elevator Testing & Inspections, Commissioning
	Elevators - Sidewalk
1C9	Reinforcing Cinder Concrete Slabs
	Cinder Concrete
	Form Work
	Concrete Repair
	Reinforcing Concrete Slab
	Remove Form
	New Concrete
	External Wall
	Internal Wall
1C10	Flood Elimination
	Waterproofing Procurement
	Install Waterproofing System
1C11	Air Conditioning Retrofit
	Chilling Duct Installation & HVAC System
	Unit all Equipment
	Panel Board /Control Unit /Electrical System
	Electrical/ Plumbing
	Insulation
	Finishing
	Commissioning of Systems
1C12	Lead Paint Abatement
	Clearance
	Dust Wipe
	Target (Classrooms)
1C13	Reinforcing Support Elements
	Exterior Abatement
	Exterior Demolition
	Exterior Construction
	Interior Abatement
	Interior Demolition
	Interior General Construction
	Interior Finishes
D. Rehabilitation of Physical Education Facilities	

Major Common Milestones / Activities Groups (Utilize as applicable)	
1D1	Athletic Fields
	Athletic Equipment Procurement
	Site Equipment Procurement
	Site Drainage & Grading
	Football/Soccer Field Installation
	Track Installation & Striping
	Bleacher/Seating/Misc Structures
1D2	Playground Redevelopment
	Play yard Redevelopment
	Playground Equipment Procurement
	Site Drainage & Grading
	Playground Infrastructure
	New Playground Surfacing & Striping
1D3	Swimming Pools
	Swimming Pool Procurement
	Site Demolition & Dewatering
	Swimming Pool Repairs
	Site Repairs
	Refill Pool & Test, Commissioning
E. System Replacements	
1E1	Roofs
	Roofs Replacement
	Pre-roofing Meeting
	Roofing Installation
	Roof Testing
1E2	Parapets
	Cast Stone Procurement
	Scaffolding
	Parapet Demolition
	Parapet Restoration
1E3	Painting and Plastering
1E4	Windows
	Window Replacement
	Aluminum Window Procurement
	Window Abatement
	Window Installation
	Window Testing
	Interior Abatement
	Interior Finishes
1E5	Exterior Masonry
	Brick Procurement
	Scaffolding
	Masonry Restoration & Pointing
	Masonry Wash down
1E6	Electrical Systems

Major Common Milestones / Activities Groups (Utilize as applicable)	
	Abatement
	Pull Wires
	Install Switchboard
	Install Service Entry
	Con Edison Connections
	Electrical Systems - Wiring
	Electrical Systems - Switchboard
	Electrical Systems - Service Entry
1E7	Heating Plant Upgrade
	Heating Plant Upgrade - Vacuum Pump
	Heating Plant Upgrade - Oil Pump
	Heating Plant Upgrade - Heat Exchangers
	Heating Plant Upgrade - Safety Valves
	Heating Plant Upgrade - Boiler Controls
	Heating Plant Upgrade - HVAC
	Heating Plant Upgrade - Fans
	Heating Plant Upgrade - Piping Valves
	Heating Plant Upgrade - Fuel Tank
	Heating Plant Upgrade - Tubes
	Commissioning of Systems
	Training schedule
1E7	Heating Plant Upgrade - Burners
	Heating Plant Upgrade - Grates
	Heating Plant Upgrade - Settings
	Heating Plant Upgrade - Breaching
	Heating Plant Upgrade - Draft Fans
	Heating Plant Upgrade - Feed Pump
	Commissioning of Systems
1E8	Domestic Piping
	Abatement
	Install Piping
	Install Valves
	Install Water Heater
	Install Sprinkler heads
	Install RPZ valves
	Install Yard Drains
	Domestic Piping - Valves
	Domestic Piping - Water Heater
	Domestic Piping - Sprinklers
	Domestic Piping - RPZ Valves
	Domestic Piping - Yard Drains
1E9	Toilets - Students
	Toilets - Students - Water Closets
	Toilets - Students - Urinals
	Toilets - Students - Stalls

Major Common Milestones / Activities Groups (Utilize as applicable)	
	Toilets - Students - Sinks
1E10	Toilets - Staff
	Toilets - Staff - Water Closets
	Toilets - Staff - Urinals
	Toilets - Staff - Stalls
	Toilets - Staff - Sinks
1E11	Floors
	Floors - Classroom
	Flooring Procurement
	Classroom Furniture Removal
	Classroom Floor Abatement
	Classroom Floor Repairs
	New Classroom Floor Installation
	Wax & Polish New Classroom Floor
	Classroom Furniture Installation
	Floors - Gymnasium
	Gym Flooring Procurement
	Gym Equipment Removal
	Gym Floor Abatement
	Gym Floor Repairs
	New Gym Floor Installation
	Stripe Gym Floor
	Wax & Polish Gym Floor
	Gymnasium Equipment Installation
	Floors - Lunchroom
	Lunchroom Flooring Procurement
	Lunchroom Equipment/Furniture Removal
	Lunchroom Floor Abatement
	Lunchroom Floor Repairs
	New Lunchroom Floor Installation
	Wax & Polish Lunchroom Floor
	Lunch room Equipment/Furniture Installation
	Floors - Auditorium
	Auditorium Flooring Procurement
	Auditorium Equipment/Seating Removal
	Auditorium Floor Abatement
	Auditorium Floor Repairs
	New Auditorium Floor Installation
	Wax & Polish Auditorium Floor
	Auditorium Equipment/Seating Installation
	Floors - Corridors
	Corridor Flooring Procurement
	Corridor Floor Abatement
	Corridor Floor Repairs
	New Corridor Floor Installation

Major Common Milestones / Activities Groups (Utilize as applicable)	
	Wax & Polish Corridor Floor
1E12	Paved Areas - Blacktop
1E13	Paved Areas - Concrete
	Underground Utilities
	Substructure Excavation
	Foundation and Substructure
	Concrete Finishing
	Landscaping
	Street Restoration
	Paved Areas - Concrete - Retaining Wall
	Paved Areas - Concrete - Sidewalk
1E14	Fencing
	Fencing - Chain Link
	Fencing - Wrought Iron
1E15	Kitchen Areas
	Underground Utilities
	Demolition and Site Preparation
	Doors and Windows
	Interior Masonry
	Mechanical
	Electrical
	Plumbing
	HVAC
	Interior Finishing
	Equipment-Kitchen
	Fire Protection System
	Kitchen Areas - Ventilation & Exhaust Systems
	Kitchen Areas - Conveyor Belt
	Kitchen Areas - Ansul Fire Suppression System
	Kitchen Areas - Walk - In Freezer
	Commissioning of Systems
1E16	Containerization
	Procure Equipment
	Install Interior Equipment
	Install Sitework
1E17	Auditorium Upgrade
	Auditorium Upgrade - Stage
	Auditorium Stage Flooring Procurement
	Auditorium Stage Equipment Procurement
	Auditorium Stage Floor Abatement
	Auditorium Stage Floor Repairs
	New Auditorium Stage Floor Installation
	Wax & Polish Auditorium Floor
	Auditorium Stage Equipment Installation
	Auditorium Upgrade - Curtain

Major Common Milestones / Activities Groups (Utilize as applicable)	
	Auditorium Curtain Procurement
	New Auditorium Curtain Installation
1E18	Gymnasium Upgrade
	Misc. Gymnasium Upgrade Equipment
	Ceiling & Interior Wall Repair & Restoration
	Restore/Replace Gymnasium Upgrade floors
	Install Gymnasium Upgrade Equipment
2. System Expansion	
B. Common Facilities - Additions	
2B1	Lunchrooms
	Procure Windows & Doors
	Interior Construction
	Install new Light & HVAC
	Install Kitchen Equipment
	Install Lunchroom Furniture
2B2	Auditoriums
	Procure Window & Doors
	Interior Construction
	Install new Lights & HVAC
	Install Auditorium Seats
	Install Stage Equipment
	Install Windows & Doors
2B3	Gymnasiums
	Misc. Gymnasium Equipment Procurement
	Interior Construction
	Install new Gymnasium Floors
	Install Gymnasium Equipment
	Interior Finishes
2B4	Swimming Pools
	Misc. Pool Equipment Procurement
	Install drains, piping and valves
	Install Swimming Pools
	Install HVAC
	Install Floor & pool equipment
	Interior Finishes
	Commissioning of Systems
	Training schedule
C. New Physical Education Facilities	
2C1	Athletic Fields
	Subcontractor Submittals / Appr.
	Fab & Dely-(LLI) Major Matl & Eqpt
	Owner Deliverables
	Site Protection(in-Place)
	Utility Shut Downs

Major Common Milestones / Activities Groups (Utilize as applicable)	
	U/G MEP's Complete
	Site Work Complete
	Bleaches Complete
	Any BLDG Structures Complete
	Landscaping Complete
	Fencing Complete
2C2	Playgrounds
	Subcontractor Submittals / Appr.
	Fab & Dely-(LLI) Major Matl & Eqpt
	Owner Deliverables
	Site Protection(in-Place)
	Utility Shut Downs
	U/G MEP's Complete
	Site Work Complete
	Eqpt in-place
	Any BLDG Structures Complete
	Landscaping Complete
	Fencing Complete
	Paving Complete
D. Common Facilities - Building Add/Mod	
2D1	Lunchrooms
	Subcontractor Submittals / Appr.
	Fab & Dely-(LLI) Major Matl & Eqpt
	Owner Deliverables
	Site Protection(in-Place)
	Utility Shut Downs
	MEP Roughing
	Structural Work
	Carpentry Roughing
	Finishes
	HVAC
	Kitchen / Lunchroom equipment
	Commissioning of Systems
2D2	Auditoriums
	Subcontractor Submittals / Appr.
	Fab & Dely-(LLI) Major Matl & Eqpt
	Owner Deliverables
	Site Protection(in-Place)
	Utility Shut Downs
	MEP Roughing
	Structural Work
	Carpentry Roughing
	Finishes
	Seats
	Stage Equipment / Lighting

Major Common Milestones / Activities Groups (Utilize as applicable)	
	HVAC
	Commissioning of Systems
2D3	Gymnasiums
	Subcontractor Submittals / Appr.
	Fab & Dely-(LLI) Major Matl & Eqpt
	Owner Deliverables
	Site Protection(in-Place)
	Utility Shut Downs
	MEP Roughing
	Structural Work
	Carpentry Roughing
	Finishes
	Gym Equipment
	Special Flooring
	HVAC
2D4	Swimming Pools
	Subcontractor Submittals / Appr.
	Fab & Dely-(LLI) Major Matl & Eqpt
	Owner Deliverables
	Site Protection(in-Place)
	Utility Shut Downs
	Asbestos Abatement
	Demo
	MEP Roughing
	Structural Work
	Carpentry Roughing
	Finishes
	Mech Filtration System Sys(Eqpt)
	HVAC
	Fill Pool
	Commissioning of Systems
A. Educational Enhancements	
3A1	Technology
	Equipment
	Install drains, piping and valves
	Install Floor, Furniture and Equipment
	Interior Finishes
3A2	Room Conversions
	Subcontractor Submittals / Appr.
	Fab & Dely-(LLI) Major Matl & Eqpt
	Owner Deliverables
	Site Protection(in-Place)
	Utility Shut Downs
	Structural Work

Major Common Milestones / Activities Groups (Utilize as applicable)	
	MEP Roughing
	Carpentry roughing
	Finishes
	Special Eqpt
	HVAC
	Commissioning of Systems
3A3	Special Education
	Install Floor, Furniture and Equipment
	Interior Finishes
3A4	High School Restructuring
	Misc. Procurement - Equipment
	Install Floor, Furniture and Equipment
	Interior Finishes
4. Safety and Security	
A. Safety and Security	
4A1	School Safety
	School Safety - Intrusion Alarm
	School Safety - Exterior Doors
	School Safety - Security Lighting
	School Safety - Window Guards
	Utility Shut Downs
	Structural Work
	MEP Roughing
	Carpentry Roughing
	Finishes
	Special Eqpt
	Commissioning of Systems
4A2	Emergency Lighting & Fire Safety Retrofits
	Fab & Dely-(LLI) Major Matl & Eqpt
	Owner Deliverables
	Site Protection(in-Place)
	Utility Shut Downs
	Structural Work
	MEP Roughing
	Fire Prot. PPG Roughing
	Carpentry Roughing
	Finishes
	Fire Prot. PPG Finishes
	Special Eqpt
	Commissioning of Systems

1.08 SHORT (THREE-WEEK) INTERVAL/TWO-WEEK LOOK-AHEAD

- A. On a bi-weekly basis, the Contractor shall provide a three (3) week short interval schedule in a format

satisfactory to the Authority. The purpose of this schedule is to report the actual progress of the past week against the previous short interval look-ahead activities and add any additional activities planned for the next two weeks. Copies shall be provided to the Authority.

- B. Each Task listed on the short interval schedule shall be representative of the most current Detailed Project Schedule and include a reference to an activity shown on the current update.

1.09 SUBMITTALS

- A. Every schedule submittal shall be provided with a corresponding narrative. These schedule submittals are to be submitted in hard copy as well as in electronic format on a CD or other media accepted by the Authority. When opened, the electronic format shall provide flawless restoration of the native files (P6(.xer) for Primavera schedule files and MS Word and/or Adobe Acrobat for Narrative and supporting document submittals).
- B. Detailed Project Schedule
 - 1. For each submittal of the Detailed Project Schedule, the following layouts, reports, graphics are required and shall be included.
 - a. An All Activity Detailed Barchart Layout grouped by Activity Code (Article 1.05) and then sorted by Early Start, Early Finish, and then Total Float. Each activity line shall display the Activity ID (Act ID), Description (Name), Original Duration (OD), Remaining Duration (RD), Start (ES), Finish (EF), and Total Float (TF), Baseline Original Duration (BL OD) Baseline Start (BL Start), Baseline Finish (BL Fin), Baseline Total Float (BL TF). The top line of the barchart area shall contain the early and float bars; the second line of the barchart shall depict the accepted baseline dates showing baseline total float bars.
 - b. The Authority may request additional reports from time to time limited by the capabilities P6. Such additional reports

shall be provided to the Authority at no additional cost. The Contractor shall furnish two copies of the complete progress schedule as outlined above with each initial submittal and each update.

c. In addition, the Monthly Update submittal must contain a Narrative Report that includes:

- 1) A discussion of progress through the update period and status of the project with respect to completion of the schedule.
- 2) A discussion of changes, delays or other circumstances affecting Progress.
- 3) A listing and brief explanation of modifications to the previously submitted network including logic changes and activity additions, deletions or modifications.

2. For each schedule submittal and corresponding narrative, the Contractor shall provide a copy of the computer file(s) in electronic format on a CD or other media accepted by the Authority. When opened, the electronic format shall provide flawless restoration of the native files and an electronic copy of the Narrative Report.
3. Each electronic submission of the Detailed Project Schedule shall be assigned a unique file name consisting of the seven-digit Project ID (as noted on the Notice to Proceed followed by a dash followed by a unique file name clearly marked (i.e. ProjID- B000 = B/L rev0, ProjID-B001 = B/L rev01 etc.) to indicate the specific submission. Similarly, update submittals shall be named ProjID-Uxxx where xxx is a sequential number, starting with 001, indicating the revision or issue number.
4. If additional submittals are necessary, the Contractor shall provide a CD for each submittal and hard copy of all the above in duplicate.

- C. The Short Interval/Two-week Look-ahead schedules are to be submitted two working days prior to scheduled job meetings in a format satisfactory to the Authority, typically a hard copy format.

1.10 DETAILED PROJECT SCHEDULE UPDATING

- A. The initial updating shall take place immediately after the Authority accepts the Contractor's Detailed Project Schedule as Baseline. The data (status) date for the first update shall not exceed seven (7) days from the date of receipt of the accepted Baseline Schedule.
- B. Subsequent updates of the Detailed Project Schedule shall be submitted monthly until Substantial Completion is achieved. The schedule data date shall be set to the last working day of the period unless otherwise directed by the Authority. Updates must be provided to the Authority's Project Officer no later than fourteen (14) days after the 'schedule data date'. Updates shall reflect actual or reasonably anticipated progress as of the last working day of the period.
- C. The Authority may request meetings with the Contractor to review the Detailed Project Schedule to jointly verify:
 - 1. Actual activity start dates.
 - 2. Actual activity completion dates.
 - 3. Percentage of Work reported in place (if required).
 - 4. Activity percent completion.
- D. In addition, the Authority may request meetings with the Contractor's Scheduling representative to:
 - 1. Resolve out-of-sequence logic
 - 2. Assess the impact, if any of any pending change orders.

3. Incorporate accepted time extensions.
 4. Review revised logic (as-built and projected) and changes in activity duration, cost, and labor hours assigned.
- E. If, in the estimation of the Authority, the project slips to a point where the critical path is a negative four (4) weeks or jeopardizes the timely completion of the project, the Contractor shall, at no additional cost to the Authority, provide monthly updates of a resource Detailed Project Schedule to show actual progress, actual labor hours and dollar expenditures as well as updated estimates of labor required to complete on an activity-by-activity basis.
- F. Contractor's failure to provide required scheduling information within the required timeframe or to adhere to the currently accepted schedule may result in denial of all or a portion of the progress payment until such time as the required schedule information is submitted and accepted by the Authority.
- G. The Contractor shall submit an "As-Built Schedule", as the last schedule update showing all activities, with the exception of punch list and closeout tasks, at 100 percent completion from NTP to Substantial Completion. This schedule shall reflect the exact manner in which the project was actually constructed.

1.11 CHANGES, DELAYS, CLAIMS AND TIME EXTENSIONS

- A. The Contractor will forfeit his right to submit any time extension claim if no acceptable Baseline Schedule is submitted and accepted by the Authority in accordance with the specified requirements.
- B. All requests for time extension must comply with the following requirements:
1. The Contractor notifies the Authority in writing within five calendar of the anticipated delay. The written delay notice shall include a detailed explanation of the alleged delay. If the Contractor fails to provide timely, detailed, and

written notice, the Contractor waives entitlement to a time extension for the alleged delay.

2. Within four weeks of submitting the delay notice, the Contractor shall submit a Time Impact Analysis, based on the current schedule update, as described below. Note that the Time Impact Submittal is an independent schedule update and will in no way replace the monthly schedule update.
 3. The alleged delay for which the Contractor is seeking a time extension must delay both the critical path and the scheduled Substantial Completion date or Phasing Exhibit milestones.
 4. These requirements apply even if the alleged delay occurs after the Contract Substantial Completion date or increases the negative float of a path of work that is not critical.
- C. The Time Impact Analysis must include a written narrative and supporting impact schedule detailing the project delays resulting from the alleged delay. The impact schedule, separate and distinct from the Detailed Project Schedule update, shall demonstrate that the changes or anticipated delays affect activities of the current accepted Detailed Project Schedule. The Impact Schedule shall be incorporated into the accepted Detailed Project Schedule only after it is accepted and a time extension is approved. The fragnet submitted as part of the Impact Analysis must illustrate the impact of these change or delays on Substantial Completion.
- D. In the event that the Contractor does not submit a Time Impact Analysis relating to the time requested within ninety (90) days after their request is received by the Authority, the Contractor shall be deemed to have waived any claim or right to additional compensation and/or extension of time, and no additional compensation and/or extension of time shall be granted.
- E. Evaluation of each Time Impact Analysis by the Authority will be made within three weeks after receipt unless the Authority determines that

additional information or meetings and negotiations are necessary. Any change order, if required shall be issued by the Authority. Upon Authority acceptance, fragments illustrating the influence of changes and delays shall be incorporated into the Detailed Project Schedule during the next update.

- F. In the event the Contractor does not agree with the decision of the Authority regarding the impact of a change or delay, the Contractor may seek resolution of the disputes in accordance with the Contract.

END OF SECTION

* * *

SECTION S01400
QUALITY CONTROL

1.01 SUMMARY OF WORK

- A. Provide for testing and quality control as specified herein and in the various Specification Sections of Divisions 2 through 16. Cooperate with the Authority and its representatives in performing Special Inspections and other quality control inspections, including Progress Inspections, designated to be the Authority's responsibility.
- B. If initial testing for a product, system, equipment, or item results in failure, the Contractor shall pay for all costs for subsequent retesting until approval is obtained. No part of the time lost to retesting shall be made the subject of claim for extension of time or for excess costs or damages by Contractor.
- C. Inspections and tests performed by the Authority in no way relieve the Contractor of the responsibility to construct in accordance with the Drawings and Specifications and Contractor expressly understands that there is no warranty given by the Authority to the Contractor in connection with such inspection and tests or certifications made under Special Inspection or other quality control inspection.

1.02 SPECIAL INSPECTIONS

- A. Items designated for "Special Inspection" under the provisions of the New York City Building Code shall be inspected, tested and witnessed by or under the supervision of a Special Inspector.
- B. The Authority will select Special Inspection Agencies and pay for all Special Inspection services required for the project.
- C. The Special Inspector is to file all initial amendments or Statements of Responsibility Form TR1, properly executed, before work commences and all final amendments immediately upon completion of work with the Building Department. A copy of each approved amendment or Form TR1 must be on file with the Authority's Building Code Compliance division before work commences and copies of final amendments or TR1 Forms must be on file before final acceptance of the Work.

- D. Special Inspectors, as defined in Chapter 1 of Title 28 of the Administrative Code, are to be individuals having required qualifications and authorized by the NYC Building Department to perform or witness particular Special Inspections required by the NYC Building Code. The Special Inspector shall keep records of inspections for the period of six years from the date of project sign-off. They are to be filed with the N.Y.C. Department of Buildings and/or have such reports be otherwise made accessible for review. Reports shall indicate that work inspected was done in conformance with approved construction documents. Discrepancies are to be brought to the immediate attention of the Contractor for correction. If the discrepancies are not corrected, the discrepancies shall be brought to the attention of the Authority and the Engineer of Record prior to the completion of that phase of the work. Special inspection reports and records are to be in the form and format supplied by the Building Department.
1. The Special Inspector shall report conditions noted as hazardous to life, safety on health, to the immediate attention of the commissioner.
 2. Reports of partially completed work shall be accepted when such reports indicate the code compliant status of completed work and the condition of the remaining work.
- E. The Contractor shall submit a statement of special inspections as a condition for permit insurance on forms supplied by the NYC Department of Buildings for work listed under Section BC 1704 of the 2014 NYC Building Code for those inspections the Contractor is responsible for.
- F. As described in Section BC 1704, Special Inspection for an item may be designated either as continuous requiring full time observation by a Special Inspector who is continuously present in the area where the work is being performed or as periodic requiring intermittent observation where the work has been or is being performed and at the completion of the work.
- G. The Special Inspector shall be acceptable to the registered design professional of record. The design professional and Authority reserves the right to interview the proposed inspector and if deemed not acceptable, a new inspector meeting the requirements for

Special Inspector for the required task shall be proposed.

1.03 PROGRESS INSPECTIONS

- A. Items designated for "Progress Inspection" under the provisions of the 2014 NYC Building Code will be inspected, tested and witnessed on a periodic basis as per Section BC 110.3 and per Section 101-07 of Chapter 100 and Chapter 5000 of the Rules of the City of New York. Such inspections shall be by or under the supervision of qualified individuals from a Progress Inspection Agency or other person(s) engaged by the Authority.
- B. The Authority will select Progress Inspection Agencies and pay for all Progress Inspection services required for the project unless noted otherwise in the Contract.
- C. Discrepancies found by the Progress Inspector will be brought to the immediate attention of the Contractor for immediate correction.
- D. Contractor shall leave areas of work open until the required inspections are done, or if not inspected prior and inspection is required for sign off will need to open the locations and make all repairs at no cost to the Authority.

1.04 ADDITIONAL QUALITY CONTROL TESTING AND INSPECTION

- A. Additional quality control testing and inspection is specified in the various Specification Sections of Divisions 2 through 16. Unless such testing and inspection is specifically identified as the responsibility of the Authority, it shall be the Contractor's responsibility to perform all such testing and inspection.
- B. Whenever the Contractor is required by these Specifications to perform testing or inspections, it shall engage an independent experienced laboratory or professional engineer/architect to perform such testing and inspection. The Contractor's (or Subcontractors') own staff shall not perform specified inspections and testing.

1.05 CONTRACTOR RESPONSIBILITY FOR ACCOMODATING TESTING AND INSPECTION

- A. The Contractor shall provide cooperation, access, and submittals necessary for the Authority and its agents to perform all inspections and testing in accordance with requirements listed herein, as well as providing all fuel and material. Do not cover or enclose work subject to inspection prior to acceptance. The Contractor shall expose, re-cover or re-enclose any work covered or enclosed prior to acceptance at no cost to the Authority.
- B. The Contractor shall notify the Authority's Project Officer, or Inspection Agency(ies) if so directed by the Project Officer, at least 48 hours before the specific work item commences for which inspection is required.
- C. Once inspections to be made by the Authority or its agents have been ordered out by the Contractor and a cancellation follows, the Contractor will be charged the rate charged to the Authority for each person so ordered to appear, unless a cancellation order is received 24 hours before the requested service time.
- D. Upon notification by the Special/Progress Inspector of a nonconformance of a concrete delivery, the concrete shall not be used and the concrete delivery truck in question shall immediately leave the site. The Contractor shall assure that all necessary provisions are made such that the integrity of the placed concrete is maintained until placement of the next acceptable delivery can commence. If the Contractor continues to place nonconforming concrete after notification, the Contractor shall be responsible for removing and replacing all such concrete. All provisions necessary to remove and replace the nonconforming concrete are the responsibility of the Contractor including, but not limited to any required engineering, shoring, removal and replacement of other affected installations etc. Under no circumstances whatsoever will time extensions be granted for delays related to the Contractor's placement of nonconforming concrete.

1.06 MANUFACTURERS' FIELD OBSERVATIONS AND TESTS

- A. The Contractor shall ensure that the manufacturers provide observations and tests as specified in the respective technical Sections.
- B. Documentation generated by observations and tests, including test reports, shall be incorporated into the

Quality Control Report prepared by the Contractor's Quality Control Representative.

1.07 MOCK-UPS AND FIELD SAMPLES

- A. Provide mock-ups and field samples as specified in the respective technical Sections.
- B. Review actions, including disapprovals and/or approvals must be documented in the Quality Control Report prepared by the Contractor's Quality Control Representative.

1.08 ACCEPTANCE TESTS

- A. Governmental Agencies

All equipment and appliances furnished and installations made under the Contract shall conform to the requirements of the Specifications, and shall in any event be not less than that necessary to comply with the minimum requirement of all governmental agencies having jurisdiction.

- B. Notice of Tests

Whenever the Specifications or any governmental agency having jurisdiction requires the acceptance test, Contractor shall give written notice 72-hours in advance to all parties concerned of the time when these tests will be conducted.

- C. Utilities and Instruments

The Contractor shall furnish energy, fuel, oil, water, air, smoke, light and electrical instruments as required for all testing.

- D. The Contractor shall furnish labor, material, and instruments necessary to conduct the acceptance tests at no additional cost to the Authority.

- E. Certificates

The final acceptance by the Authority shall be contingent upon the Contractor delivering to the Authority all necessary certificates evidencing compliance in every respect with the requirements of the agencies having jurisdiction. All such certificates shall be documented

on the Quality Control Report prepared by the Contractor's Quality Control Representative.

1.09 CONTRACTOR QUALITY CONTROL (CQC) SYSTEM

A. General

The Contractor shall establish and maintain an effective quality control system in order to furnish the Authority with a quality product constructed in accordance with the Contract Documents. The quality control system shall consist of plans, procedures, and organization necessary to provide materials, equipment, workmanship, fabrication, construction, and Commissioning operations that comply with the contract requirements. The system shall cover all construction operations, both on-site and off-site, and shall be keyed to the proposed construction sequence.

B. Coordination

At the Preconstruction Meeting, before start of construction and prior to acceptance by the Authority of the Contractor's Quality Control Plan, the Contractor shall meet with the Authority's Project Officer (PO) and designated Field Representative (FR) to discuss Contractor's quality control system. During the meeting a mutual understanding of the system details shall be developed, including the forms for recording the CQC daily operations, control activities, testing, administration of the system for both on-site and off-site work, and the interrelationship of Contractor's Management and control with the Authority's Construction Management, Architectural and Engineering, and Quality Control/Quality Assurance operations. Minutes of the meeting will be prepared by the Authority and signed by Contractor, the Project Officer and Field Representative.

The minutes shall become a part of the contract file. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings.

C. Contractor Quality Control Plan

The Contractor shall furnish for acceptance by the Authority's Project Officer, not later than 30 days after date of Notice to Proceed, a Contractor Quality Control (CQC) Plan, which the Contractor proposes to use to implement the Contract requirements. The plan shall identify personnel, procedures, controls, instructions,

records, and forms to be used. Construction will be permitted to begin only after acceptance of the CQC plan or acceptance of an interim plan applicable to the particular feature of work to be started.

This plan shall include, as a minimum, the following to cover all construction operations, both on-site and off-site, including work by subcontractors, commissioning consultants, fabricators, suppliers and purchasing agents:

1. A description of the quality control organization, including a chart showing lines of authority and communication within the Contractor's project management and quality control organizations, and their relationship to the Authority's Project Management, Architecture and Engineering, and Quality Assurance/Quality Control Units.
2. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function.
3. A document executed by an executive of the Contractor having signatory authority issued to the Contractor's Quality Control Representative initiating the authority to implement all phases of the Quality Control Plan, including the three phase control system, consisting of preparatory, initial and follow-up inspections for all aspects of the work specified.
4. Procedures for scheduling and managing submittals, including those of subcontractors, off-site fabricators, suppliers and purchasing agents.
5. Schedules for the Authority's "Special" and "Quality Control Inspections", and tests and schedules for Contractor inspection tests, manufacturer's tests, acceptance tests. Schedules shall include the test name, specifications paragraph requiring tests, feature of work to be tested, test frequency and individual or testing laboratory (including telephone number) responsible for each test.
6. System and procedures for tracking control tests and first two inspection phases.
7. System and procedures for tracking construction deficiencies and corrective action taken for each.

8. Reporting procedures, including proposed reporting formats. See Paragraph K this article hereinafter for documentation requirements.
9. A list of features of work. A feature of work is a task that is separate and distinct from other tasks and has separate control requirements. As a minimum, each Section of the Specifications shall be considered as a feature of work. However, there may be more than one feature under a Section of the Specifications.

D. Acceptance of Plan

Acceptance of the Contractor's plan is required prior to the start of construction and after the coordination meeting is held. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Authority reserves the right to require Contractor to make changes in the CQC plan and operations, including any person assigned a CQC function as necessary, to obtain the quality specified.

E. Notification of Changes

After acceptance of the CQC plan, the Contractor shall notify the FR in writing a minimum of seven calendar days prior to implementation of any proposed change. Proposed changes are subject to acceptance by the Project Officer after review and recommendation by the FR.

F. Quality Control Organization

1. CQC Organizational Staffing

- a. The Contractor shall designate and identify a CQC representative based on the criteria established herein:
- b. The CQC representative, who is a separate individual from the Contractor's Construction Superintendents, shall have as his/her primary function the implementing of the Quality Control Plan, and shall be at the site of work at all times during progress, with complete authority as demonstrated in the authorization letter signed by a signatory of the Contractor to take any action necessary to ensure

compliance with the contract and act in all CQC matters.

2. Providing the CQC representative in no way relieves the Contractor of meeting the basic requirements of quality construction in accordance with Contract requirements. Names and qualifications (provided in Resume format) of the entire CQC staff, including supplemental inspection specialists, and testing personnel other than the Special Inspectors, shall be part of the CQC plan.
3. The Contractor shall provide qualified inspection specialists, who may be subcontract foremen, as necessary to assure Contract compliance when electrical and mechanical work is being installed. These specialists shall have a minimum of five (5) years at the skilled-craft or foreman level or hold engineering degrees. Names and qualifications in Resume format shall be submitted as part of the CQC Plan.

G. Submittals

Submittals shall be as specified in Section S01300. The CQC representative shall be responsible for certifying that all submittals are in compliance with the Contract requirements.

H. Control

Contractor Quality Control is the means by which the Contractor assures that the construction, including work of subcontractors and suppliers, complies with the requirements of the Contract. The controls shall be adequate to cover all construction operations, including both on-site and off-site fabrication, and will be keyed to the proposed construction sequence. The controls shall include at least three phases of control to be conducted by the CQC representative for all features of work and include as a minimum the following:

1. First Phase Control: This first or preparatory phase of control shall be performed prior to beginning work on each feature of work. It shall include:
 - a. A review of each paragraph of applicable specifications. Resolve differences, if any.

- b. A review of the Contract Drawings. Resolve differences, if any.
- c. A check to assure that all materials and/or equipment have been tested, submitted, and approved.
- d. A check to assure that provisions have been made to provide required testing and the Authority "Special Inspections and tests". The schedule for "Special Inspections" and quality control services will be reviewed for completeness and timeliness.
- e. Examination of the work area to assure that all required preliminary work has been completed in accordance with the Contract Documents. Deficient work shall not be built upon.
- f. A physical examination of required materials, equipment, and sample work to assure that they are on hand and conform to approved shop drawings or submitted data.
- g. A review of the appropriate activity hazard analysis to assure safety requirements are met.
- h. Discussion of procedures for constructing the work.
- i. A check to ensure that portion of the plan for the work to be performed has been accepted by the Field Representative.
- j. The Authority's designated Field Representative shall be notified by the CQC representative and a preparatory meeting scheduled at least two weeks in advance of initiating any of the required actions for this first phase of inspection. This preparatory meeting shall be conducted jointly by the CQC representative and the Authority's FR and shall be attended by other CQC personnel as applicable, including the foreman responsible for the feature of work. The results of the meeting shall be documented by separate minutes prepared by the CQC representative and attached to the CQC report.

Subsequent to this meeting and prior to commencement of work, Contractor shall instruct applicable workers as to the acceptable level of workmanship required in the CQC plan in order to comply with the Contract Documents.

2. Second Phase Control: The second or initial work phase of control must be accomplished at the beginning of a feature of work. It shall include:
 - a. A check of preliminary work.
 - b. Verification of full contract compliance for initial construction.
 - c. Establish quality of workmanship.
 - d. Resolve any differences that may still exist.
 - e. Check safety to include compliance with safety plan and activity hazard analysis.
 - f. The FR shall be notified by the CQC representative at least 48 hours in advance of beginning the second phase. Separate minutes of this phase shall be prepared by the CQC representative and attached to the CQC report. The second phase shall be repeated for each new crew to work on-site, or any time acceptable specified quality standards are not being met.
3. Third Phase control: The third or follow-up phase of control consists of daily checks being performed to assure continuing compliance with Contract requirements, including control testing, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of work that may be affected by the deficient work.
4. Supplemental phases of control: Resumption of work after a substantial period of inactivity or changes to Contractor's quality control plan and personnel may necessitate the need for reconfirming the first and second phases of control.

I. Testing Procedure

Other than "Special Inspections" and other testing and inspection explicitly assigned to the Authority, the Contractor shall perform all tests and inspections specified or required to verify that measures are adequate to provide a product that conforms to Contract requirements. A list of tests including the Authority "Special Inspections" to be performed shall be furnished as a part of the CQC plan to the Project Officer.

1. The list shall include the test names, frequency, specifications paragraph containing the test requirements, and the personnel and industry recognized testing laboratory responsible for each type of test.
2. Results of all tests taken, both passing and failing tests, will be recorded on Contractor's Quality Control report for the date taken. Specifications paragraph reference, location where tests were taken, and the sequential number identifying the test will be given. Actual test reports may be submitted later, if approved by the FR, with a reference to the test number and date taken. An information copy of tests performed by an off-site or commercial test facility will be provided directly to the FR. Failure to submit timely test reports, as stated, may result in nonpayment for related work performed and disapproval of the test facility for this Contract. Costs incidental to transportation of Samples or materials will be borne by the Contractor.

J. Completion Inspection

Prior to completion of all work or any increment thereof established by the completion time stated in Contract Specifications, the CQC representative shall conduct a preliminary completion inspection of the work and develop a list of deficiencies that do not conform to the approved Drawings and Specifications. Such a list of deficiencies shall be included in the CQC documentation and shall include the estimated date by which the deficiencies will be corrected. The CQC representative and the Authority's FR shall jointly perform a second completion inspection to ascertain that all deficiencies noted on the Contractor's and the Authority's FR list of deficiencies have been corrected.

1. A blank form for listing outstanding deficiencies, which is to be incorporated and utilized in the CQC Plan, is attached at the end of this Specifications Section.
2. The completion inspection and any deficiency corrections required by this Paragraph shall be accomplished within the time stated for completion of the entire work or any particular increment thereof if the Project is divided into increments by separate interim completion dates.

K. Documentation

1. The Contractor shall maintain current daily records of quality control operations, activities, and tests performed, including the work of Subcontractors and suppliers and submit daily CQC reports to the Authority's designated Field Representative as noted herein.
2. All documents and records compiled to create a complete CQC Report shall be on an acceptable form and shall accompany the Contractor's Daily Reports required in Section G01015. The CQC Reports shall include factual evidence that required quality control activities and/or tests have been performed, including but not limited to the following:
 - a. Test and/or control activities performed with results and references to Specifications/Drawings requirements. The control phase shall be identified. List deficiencies noted along with corrective action.
 - b. Material received with statement as to material acceptability and storage.
 - c. Identification of submittals reviewed, with contract reference, by whom, and action taken.
 - d. Off-site surveillance activities, including actions taken.
 - e. Job safety evaluations stating what was checked, results, and instructions or corrective actions.

- f. Instructions given/received and conflicts in Drawings and/or Specifications.
- g. Contractor's verification statement shall be included above the CQC representative signature and shall indicate the following Contractor's verification: "The above report and attachments are complete and all supplies, materials, equipment and workmanship incorporated into the work are in full compliance with the Contract requirements except where noted". Deficiencies shall be entered on the blank Contractor Quality Control list of Outstanding Deficiencies attached at the end of this Specification Section.
- h. Weather conditions encountered; and any delays encountered.
- i. Both conforming and deficient features: The original and one copy of these records in report form shall be furnished to the FR daily by 12 noon of the day after the date covered by the CQC Report. All reports shall be legible, literate and complete.
- j. CQC Reports need not be submitted for each day on which no work is performed. As a minimum, one report shall be prepared and submitted for every seven days of no work and/or on the last day of a no work period. All calendar days shall be accounted for throughout the life of the Contract. The first report following day(s) of no work shall be for that day only.
- k. CQC Reports are to be signed and dated by the Contractor's QC representative.
- l. The report from the CQC representative shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel. A blank form for a CQC Report for incorporation and utilization in the CQC Plan is attached at the end of this Specifications Section.

L. Notification of Noncompliance Identified by the Authority

1. The FR will notify the Contractor of any detected noncompliance identified by any Agent of the Authority with the foregoing requirements. The Contractor shall immediately take corrective action after receipt of such notice. Such notice, when delivered to Contractor or Contractor's representative at the site of the work, shall be deemed sufficient for the purpose of notification. The Contractor shall include notification of the Deficiencies on the CQC Report for that day and enter the deficiencies on the blank Contractor Quality Control List of Outstanding Deficiencies (sample attached at the end of this Specification Section) for tracking until corrected.
2. If Contractor fails or refuses to comply promptly, the Authority's Project Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim by Contractor for extension of time or for excess costs or damages.

M. Payment

Separate payments will not be made for providing and maintaining an effective Contractor Quality Control program as required above, and all costs associated therewith shall be included in the bid.

NOTE: Forms titled "Contractor Quality Control Report" and "Contractor Quality Control List of Outstanding Deficiencies" are included on the next two (2) pages.

END OF SECTION

* * *

CONTRACTOR QUALITY CONTROL (CQC) REPORT

School: _____ Report No. _____
 Borough: _____ Reporting Period: _____
 Project Title: _____ Weather: _____
 Contractor: _____ CQC Representative: _____
 Contract No.: _____ Superintendent: _____
 Contractor's Telephone # _____

1. CONTRACTOR QUALITY CONTROL INSPECTIONS PERFORMED:

Identify Preparatory "P", Initial "I" and Follow-up "F" inspections.

2. CHECKLIST FOR CONTRACTOR QUALITY CONTROL ACTIONS:

- A. ☐ Preparatory Inspection. (See attached minutes of meeting).
 B. ☐ Testing performed. (See attached test results or CQC test reports).
 C. ☐ Outstanding deficiencies/corrective action (See attached outstanding deficiencies list).
 D. ☐ Special instructions given or received and actions taken.
 E. ☐ Delivery of equipment and materials to be installed.
 F. ☐ Submittal Actions.
 G. ☐ Permit Actions.
 H. ☐ Job Safety.
 I. ☐ Other; identify. (Do not repeat items on Contractor's Daily Report).

Address checked items below or on attachments:

3. CONTRACTOR'S VERIFICATION STATEMENT:

The above report and attachments are complete and all supplies, materials, equipment and workmanship incorporated into the work are in full compliance with the contract requirements except where noted.

Date: _____ Signature: _____
 Contractor's Q.C. Representative

05/09/2023

DESIGN NO. D019998

CONTRACTOR QUALITY CONTROL LIST OF OUTSTANDING DEFICIENCIES

School: _____

Borough: _____

Project Title: _____

Contractor: _____

CQC Report No.: _____

Date: _____

Contract No.: _____

No.	Spec. Ref. or Dwg. No.	Description of Deficiency	Location in Building	Date Found	Date to be Corrected	Date Corrected	Upon Correction Initials CQC Rep.	Remarks

05/09/2023

DESIGN NO. D019998

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SECTION S01500
TEMPORARY FACILITIES AND CONTROLS

1.01 REQUIREMENTS

- A. The Contractor shall provide the temporary facilities and controls as hereinafter specified and as required by law.

1.02 SECURITY

A. Security Guard Services

1. All security guards and security guard firms must comply with the Security Guard Act, Article 7-A, of the General Business Law.
 - a. All security guard firms must be licensed with the Department of State. Prior to placement of any security guards at the Site, the Contractor shall provide the Authority with a copy of the security guard firm's license.
 - b. All security guards must be registered as required by the Security Guard Act. Security guards shall carry their registration cards whenever they are on the Site. Additionally, a copy of the registration card for each security guard assigned to the site must be submitted to the Authority prior to beginning the assignment.
 - c. Without limiting the Authority's other rights and remedies, the Authority shall not pay for the services of any security guard unless the Authority has been furnished with a copy of the firm's license and the security guard's registration card as provided above.
2. The Contractor shall provide security guards in accordance with the Phasing Exhibit.

B. Employee Identification

1. The Contractor shall provide photo-identification badges for all of the Contractor's employees and, in addition, require that all Subcontractors provide photo-identification badges for their

employees. Badges are to be worn on outer clothing and be conspicuously displayed at all times while present on the premises of the Authority or the Department of Education.

- a. The badge is to include the Contractor's name, the employee's name, an employee identification number, date of birth, height and weight, and a photograph of the employee. The identification number shall correspond to the employee's social security number.
 - b. The Contractor shall maintain an internal record of each such employee identification number and the social security number to which it corresponds. The social security number shall not be displayed on the badge.
2. The Contractor is hereby notified that any employee of the Authority, the Department of Education, or any law enforcement agency shall have the right to inspect identification badges. If the Contractor's employee refuses to display or produce a badge for examination, the Authority shall be notified and the Contractor may be directed to remove the employee from the premises.
- C. No visitors shall be permitted on the Site without prior approval by the Authority.

1.03 HEAT/AMBIENT CONDITIONS DURING CONSTRUCTION

- A. All work shall be performed under such ambient temperature and humidity conditions as required to satisfactorily carry out the Work of this Contract. The Contractor is responsible for providing and maintaining any methods, in addition to those provided by the building, as required to maintain such ambient conditions required by the material/equipment manufacturers or as otherwise required by the Contract Documents. Existing occupied areas affected by the work shall be maintained at temperatures typical of occupied buildings as directed by the Authority.

1.04 HEAT DURING CONSTRUCTION - BOILER REPLACEMENT PROJECTS - Not Used

1.05 TEMPORARY LIGHTING, POWER AND ELECTRIC SERVICE**A. General**

1. The Contractor shall provide, maintain, and pay for all temporary lighting and power required, including exterior lighting and security lighting, in connection with the Contractor's operations from the commencement of the Work until the completion of the project or for such other time as directed by the Authority. When the use of such temporary lighting and power is no longer required, all temporary wiring and equipment shall be completely removed by the Contractor.
2. The Contractor shall make the necessary application to the utility company and pay for all charges, costs and expenses incidental to the installation and maintenance of temporary lighting and power as required in connection with the Contractor's operations, and the Contractor shall pay for all power used.
3. Where temporary lighting and power is approved to be taken from the main electrical power of an existing building, the cost of the current or power so used will be borne by the Department of Education.
4. The required temporary lighting must be maintained for twenty-four (24) hours a day and seven (7) days a week at all stair levels and in all corridors below ground; in all other spaces temporary lighting is to be maintained only during working hours.
5. All temporary wiring and equipment shall be in conformity with the New York City Electrical Code. Three-phase temporary power circuits shall be installed as required to operate construction equipment of the various trades and to install and test equipment and operate as required for construction purposes such as pumps, mechanical equipment and elevators.

6. All temporary lighting shall use high-efficacy lamps as required by Section BC 3303.2.3.1 of the 2014 NYC Building Code (Local Law 18/2014).

B. Minimum Illumination

1. The minimum illumination permitted at any time, anywhere within and outside of the Building, shall not be less than the requirements of the Labor Law Dept. of Labor, State of N.Y. or OSHA or any other agency having jurisdiction, but in no case less than 20 FC average and no less than 2 FC at any point.
2. The minimum lighting requirement anywhere about the site shall be 2 FC average and 0.5 FC minimum at any point.
3. If the Authority's Representative decides that the temporary illumination within the building, or on adjacent site is unsatisfactory, the Contractor shall:
 - a. Provide additional lighting units in designated areas.
 - b. Increase the number of lighting units in simultaneous operation.

C. Temporary on Site Exterior Security Lighting System

1. Provide a temporary on-site exterior security lighting system for prevention of vandalism and thefts during the course of construction.
2. The security lighting system must be completely installed and operating at the earliest possible date as directed by the Authority.
3. A plan detailing the layout of all trailers and the site lighting shall be provided along with the Temporary Lighting Submittal.
4. Minimum lighting shall be 2 FC average and 0.5 FC minimum at any point.

1.06 TEMPORARY WATER

- A. Furnish and pay for water used for temporary service as described herein. Make all arrangements for such water with the agency having jurisdiction and provide special metering and piping if required.
- B. Provide and maintain a temporary water system of size and capacity as required to supply the needs of all contractors for the Work.
- C. Provide no less than two 3/4" hose bibs conveniently located.
- D. Provide and pay for all connections and permits.
- E. Provide 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 Authority in perfect condition. Any repairs required due to temporary use shall be made at the sole expense of the Contractor.
- F. Provide a line of adequate size to the temporary toilet facilities if such facilities require water.
- G. Protect temporary and permanent lines against any damage.
- H. Prevent water damage to the Work. Refer to the Article "Water Control" for protection requirements including submission of a WDPP.
- I. Remove all temporary lines when directed by the Authority's Representative when such lines are no longer required.

1.07 TEMPORARY TOILET FACILITIES

- A. The Contractor shall provide, stock, and maintain toilet accommodations for all persons employed or engaged in the Work; such facilities shall meet any and all requirements of law, rule or regulation. The Contractor shall remove such facilities at the completion of the Work or at such earlier time as the Authority's Representative may direct.

- B. Provide one chemical toilet unit adjacent to the security guard's station for the Authority's use or as directed by the Authority.
- C. If, upon the approval and direction of the Authority's Representative, a toilet room in a school building is used as a temporary toilet facility, such temporary toilet facility shall be maintained in a sanitary condition by the Contractor. In all permanent toilet rooms, all plumbing fixtures and room finish shall, upon completion of the work, be free from any damage, defacement or other defects. The cost of any necessary repair or replacement shall be borne by the Contractor.
- D. Sanitary Facilities

Sanitary facilities shall be provided during construction, remodeling, or demolition activities in accordance with the 2014 New York City Plumbing Code.

1.08 TEMPORARY FIRE PROTECTION SYSTEMS DURING CONSTRUCTION - Not Used

1.09 FIRE WATCH DURING CONSTRUCTION

- A. A Fire Watch shall be provided for the following conditions:
 - 1. When open flame or spark-producing tools and equipment such as heating kettles, blow torches and welding rods are being used, the Contractor shall provide personnel engaged for fire watch purposes (fire guards) to maintain a fire watch over the operation of these items at all times during the use and until all materials have cooled sufficiently to no longer constitute a fire hazard. Provide additional fire guards required by the FDNY as determined by the FDNY inspector after work is under way.
 - 2. When the work includes installation of, replacement of, or modification to an existing Fire Alarm system and its operation is required for use of the building but the new or modified system has not yet been accepted by the FDNY, the Contractor shall provide fire guards to maintain a fire watch.

Provide the number of fire guards required by the FDNY for the size of the building during the times and at the locations as directed by the SCA.

1.10 HOISTS, HOISTWAYS, AND ELEVATORS - Not Used

1.11 TEMPORARY ENCLOSURES - Not Used

1.12 TEMPORARY FENCE ENCLOSURES - Not Used

1.13 TEMPORARY ROADWAYS - Not Used

1.14 MAINTENANCE OF PARKING AREAS - Not Used

1.15 STAGING AREAS

A. The Authority may, at its discretion, designate temporary staging areas for the Contractor for such purposes as storage of materials, erecting a field office. The staging areas shall be located in a location identified by the project officer. Provide fencing and secure in-swinging gates to fully enclose the areas and prevent unauthorized entry. Fences and gates shall be at least 8 feet high unless directed otherwise by the Authority. Submit drawings of the staging areas to the Authority for prior approval, indicating locations of all facilities and details of fences and gates. Maintain the areas and facilities in safe, clean, and orderly condition. As per Section BC 3307.4.7, the barrier for storage areas adjacent to pedestrian paths shall be solid for at least 4'-0" in height. In the area where a material hoist is located, the solid protection shall extend from the ground level to the height of the overhead protection.

B. When directed by the Authority, remove temporary staging area facilities, repair all damage, and finish the area as directed.

1.16 WATER CONTROL - Not Used

1.17 POLLUTION CONTROL

The Contractor shall:

A. Comply with all laws, rules and regulations governing pollution control, including but not limited to those of

the Department of Environmental Conservation of the State of New York.

- B. Take all necessary precautions including, but not limited to digging and maintaining settling basins and dams; diverting streams, and taking all other actions that may be necessary to prevent silt, and waste of any kind from being deposited, silting and reduction of quality of streams below the construction area and downstream properties as a result of the Work.
- C. Refrain from the disposal of volatile fluid wastes into storm or sanitary sewer systems, approved sewage disposal systems or any waterway.
- D. Refrain from burning trash or waste materials.

1.18 TEMPORARY FIELD OFFICES

A. Contractor's Field Office

- 1. The Contractor shall provide for its use all temporary office facilities necessary for the performance and management of the construction. Such facilities must be in place and in operation within thirty (30) days of the start date indicated on the NTP. No space within the existing building will be provided to the Contractor for such temporary offices unless otherwise indicated. Contractor's field office shall be made of metal or other noncombustible material.
- 2. The Contractor must obtain written approval from the Authority for any temporary facility located on the site. The Contractor shall relocate such temporary office facility to other locations, approved by the Authority, as necessary to facilitate the expeditious completion of the Work at no additional cost to the Authority.
- 3. Temporary toilet and sink shall be connected to an approved sewage disposal system.
- 4. The Contractor shall provide and maintain for its use an interface with the Authority's Construction and Architecture Management Platform system, herein after referred to as CAMP.

5. Utilization of Authority's Construction Management system and Related Requirements
 - a. The Contractor shall provide and maintain all computer related equipment and services to allow uninterrupted data transfer between the Contractor and CAMP, accessible via the web. The Contractor is not required to obtain its own Construction Management Software to interface with the Authority's software but its computer system must support the ability to load a browser and be a working PC/Internet capable device able to run the CAMP application. Any computer equipment or mobile devices used to connect to Authority's applications must be kept up to date and in a state of good repair (SOGR). This includes, but is not limited to, the latest operating system patches, security patches and anti-virus updates.
 - b. To facilitate communication with the Authority and its representatives, as well as to log-in various construction related documents, the Authority will provide access to various folders and modules within CAMP. The Contractor shall utilize CAMP to communicate with the Authority and its representatives and to log all construction related documents. This is a mandatory requirement and no other computer software shall be utilized, and no data transfer from other computer programs into the Authority's Construction Management system shall be permitted.
 - c. If the Contractor is not adequately familiar with CAMP, the Authority will provide, on a limited basis, rudimentary training for the Contractor's designated personnel possessing computer literacy in Windows® and basic typing skills.
6. At the completion of the Project, the Contractor shall remove the temporary office facilities from the Site, discontinue temporary services, and repair the Site and finish the area as directed by

the Authority. The refurbishing of the site also applies to temporary facility relocation.

1.19 PROJECT IDENTIFICATION

A. Project Information Panels

1. Project Information Panels shall meet the latest requirements of Section BC 3301.9. The Authority will provide the rendering to be placed on the panels.
2. Contractor shall install the required panels at locations required by the Building Code.
3. Maintain the project information panels for the duration of the Work of the Project as per Section BC 3301.9:
 - a. Panels are to remain legible and good structural condition, securely attached, level, plumb, and free of sharp edges, protruding nails and similar hazards.
 - b. If deemed necessary, in the opinion of the Authority, repaint all or portions of the sign (except for lettering and artwork), supports and appurtenances, at the Contractor's expense.

B. Project Sign

1. A Project Sign will be furnished by the Authority. The sign will be delivered to the site by the Authority's vendor and installed by the Contractor at a location determined by the Authority.
 - a. The Contractor shall provide a suitable frame for the sign and shall erect sign, providing required supports, bracing, and painting of frames, supports and bracing, all at the expense of the Contractor.
 - b. Countersink all nails and screw heads after erection; fill holes and touch-up paint.

- c. The content of the sign shall not be obscured, defaced or disfigured by panel attachments, including grommets or grommet holes.
- 2. Maintain the sign for the duration of the Work.
 - a. Panels are to remain legible and good structural condition, securely attached, level, plumb, and free of sharp edges, protruding nails and similar hazards.
 - b. If deemed necessary, in the opinion of the Authority, repaint all or portions of the sign (except for lettering and artwork), supports and appurtenances, at the Contractor's expense.
- C. No other signs or advertisements shall be displayed on the Site, except as required by the Contract or required by Building Code.

1.20 RODENT AND PEST CONTROL

- A. During the Work, the Contractor shall provide rodent and pest control. Engage the services of a New York State Department of Environmental Conservation (DEC) licensed exterminating company with a minimum of 3 years of successful experience to keep the premises free of rodents, pests, insects, and other vermin. The licensed exterminator is to make biweekly inspections at a minimum.
- B. Provide lockable tamperproof and anchored bait stations and traps. Only those insecticides and rodenticides not prohibited by Local Law 37 of 2005 may be utilized. Bait traps shall be changed out on a monthly basis and other traps on a more frequent basis to ensure they are continuously effective. Fill all rodent burrows within the project boundaries during the duration of the project, inclusive of areas under bridging, and remove all items that may facilitate harborage during the inspection of traps. Provide exterior pest control until completion and demobilization of all exterior work areas, inclusive of storage areas, sidewalk bridging, etc.
- C. Maintain the storage of material and equipment in an orderly manner and do not allow vegetation in landscaped

areas to be overgrown to prevent harborage for vermin. Construction debris shall be housed in containers and removed regularly.

- D. For existing occupied school building site, provide bait stations and traps within the perimeter of fenced-in areas of the construction site to keep the site free of rodents and other vermin. Any rodent and pest control within the existing building will be provided by Others under contract with the Department of Education.

1.21 TREE PROTECTION

- A. Provide adequate protection for the duration of the Project Work for existing trees that are to remain at the Site. Contractor shall bear the expense of replacing trees that are damaged.
- B. No trees outside the property line within the public right of way shall be disturbed or removed without the permission of the Commissioner of the Department of Parks and Recreation. Protection shall be provided around the trunks of all trees with written notification at least 48 hours prior to commencement of such work. Such trees shall be protected pursuant to the requirements of the Department of Parks.
- C. Provide photos of trees prior to beginning construction operations, including installation of bridging and sheds. Engage an ISA Certified Arborist to develop plans and supervise the protection of the trees.

1.22 SCAFFOLDING

- A. General:
 - 1. The Contractor shall furnish and securely set scaffolds required for the Work.
 - 2. All scaffolds shall be of good, sound materials, of adequate dimensions for its intended use and substantially braced and tied to ensure absolute safety for its users, school personnel, and the public.

3. Scaffolds shall be in conformance with the requirements of the New York City Building Code and all laws and regulations having jurisdiction.

B. Exterior Scaffolding

1. Suspension Scaffolds:

Suspension scaffolds are not permitted. Scaffold platforms suspended by ropes or other non-rigid means from overhead are prohibited.

2. All Other Types of Scaffolds (Supported Scaffolds):

- a. Supported scaffolds shall have a completely rigid supporting system, transferring all vertical loads to the ground, sidewalk shed, or building structure below.
- b. Scaffolds shall be filed by the Contractor with the Authority's Facilities Inspection Division. All applications shall be submitted by a licensed professional Engineer or Architect.
- c. Scaffolds shall be checked by a licensed Professional Engineer hired by the Contractor, who shall inspect and certify that scaffolds installed comply with the manufacturer's specifications and the New York City Building Code and all laws and regulations having jurisdiction and are safe to perform the Work of the Contract. The Contractor shall submit such certification to the Authority and display a copy at the job site for verification.
- d. Scaffolds shall not be anchored to the outer wythe of masonry walls for lateral bracing.
- e. Lateral bracing shall be anchored by one or more of the methods described in subparagraphs 1), 2), or 3), below. Prior to erection of the scaffolds, the Contractor shall submit the method(s) to the Authority for review and approval. The submittal shall be prepared, signed and sealed by a Registered Architect or

licensed Professional Engineer, and this Architect or Engineer shall certify the structural adequacy of all anchorage methods to be utilized for the Project.

- 1) Provide anchorage through the outer wythe of masonry into the second wythe of masonry. The existing wall must be of solid masonry construction.
- 2) Secure scaffolds to the building structural steel or reinforced concrete member.
- 3) If the Contractor finds an alternate method of bracing preferable, the Contractor shall submit the proposed alternative method, certified by the Contractor's Architect or Engineer, to the Authority for review and approval.

f. The Contractor shall be responsible for the stability and safety of the scaffolds and anchorage until their removal, and for restoration of the entire wall where damaged or disturbed by bracing.

1.23 SIDEWALK SHEDS, PROTECTIVE SHEDS, FENCES, CHUTES, ETC.

- A. Provide and maintain sidewalk sheds and on-site protective sheds as specified in Section S01535 - Safety Program.
- B. Sidewalk sheds, on-site protective sheds, fences, railings, over-the-sidewalk chutes, and other such temporary facilities shall be filed by the Contractor with the Authority's Building Code Compliance (BCC) Division and shall meet the requirements for design and color as required by Section BC 3307. All applications shall be submitted by a licensed professional Engineer or Architect. Include all required design and location information as required by Section BC 3307 on the filed documents. Notify the Department of Buildings within two days of removing sheds.
- C. Sidewalk sheds and on-site protective sheds shall be constructed to provide complete, continuous protection as

required by applicable regulations and the Contract Documents, without gaps or openings between protective elements, or between the shed and the face of building where the shed abuts the building.

- D. Provide vandal resistant light fixtures with wire guard, and with self-ballasted compact fluorescent lamps or LED lamps. Provide and maintain temporary lighting at all times, inspecting daily at a minimum. Make repairs due to vandalism and replace burned out lamps immediately.
1. Temporary lighting wiring shall be run in rigid galvanized conduit (RGC). The conduit shall be run exposed and secured, in an approved manner, below the shed. The Contractor shall provide branch circuit wiring from a panel in the building and run three THW conductors (Black-White-Green) per circuit. Core drill (2") the conduit entrance into the building and insert a 1½" threaded sleeve. The Contractor shall remove the conduit and wires and place a threaded cap on the sleeve thru the building after temporary lighting is removed. Sidewalk shed plans submitted shall include type of fixtures, type and rating of light source, horizontal spacing of fixtures, vertical height above sidewalk, and type of conduit.
 2. All temporary wiring shall be installed in accordance with the requirements of the Bureau of Electrical Control as per NYCDOB Policy Notice 99-9. A temporary certificate of inspection issued by that Bureau shall be obtained by the Contractor and delivered to the Authority's Representative.
 3. As per Section BC 3307.6.4.8, all lamps shall have a minimum luminous efficacy of 45 lumens per watt or greater and be rated to operate at temperatures of 5°F and higher.
 4. Provide a minimum of 2 foot-candle measured at the level of sidewalk walking surface. Photosensors shall be utilized to control lighting according to the amount of daylight available and shall be equipped for fail-safe operation such that if they fail, the lamps will provide the required lighting levels.

- E. Tamper-Resistant Fasteners: All fasteners and connections used in the construction of sheds shall be tamper-resistant type. Tamper-resistant fasteners shall be used in such manner as to prevent unauthorized removal or loosening of any part of the shed. Specialized tools shall be required for removal.
1. Provide tamper-resistant fasteners for connection of all components and materials of the shed, including but not limited to pipe bracing, pipe railings, beam clamps, couplings, outriggers, extensions, protective guards, and enclosure walls built around the perimeter of the shed deck. Non-tamper resistant nuts, bolts, screws, nails, and pins are prohibited unless used in conjunction with a device which makes the entire connection assembly tamper-resistant.
 2. Bolts shall have tamper-resistant heads or shall be welded to prevent removal. Screws shall have tamper-resistant heads such as Torx or socket security hex head with center pin.
 3. Tamper-resistant nuts
 - a. Nuts shall be conical shape with multiple slots, requiring specialized socket tool for installation and removal. Corrosion resistant zinc alloy (Zamac 5 - AC41A). Compressive strength, 87,000 psi. Shear strength, 38,000 psi. Impact strength (CHARPY), 48 ft.lbs. Hardness BHN, 91. Size and threads as required to suit studs and bolts. Remove all sharp edges. Manufacturers:
 - 1) Trident Tamper-Resistant Nuts; Tanner Bolt & Nut Corp., 4302 Glenwood Road, Brooklyn, NY 11210. Telephone 718 434-4500.
 - 2) Trigroove Tamper-Resistant Nuts; Fastenal Company, Farmingdale, NY. Telephone 516 391-0980.
 - b. Provide zinc plated hex nuts, cylindrical spacers, and/or washers beneath tamper-resistant nuts where required for a proper

connection. Fully tighten the entire assembly for tamper resistance. The diameter of the tamper-resistant nut shall not exceed the outside dimension of a hex nut or spacer beneath it, in order to prevent unauthorized removal.

- c. Fully tighten all fasteners. Wherever a standard nut is used it shall be fully tightened and a tamper-resistant nut shall be installed over it to prevent unauthorized removal. Where through bolts or rods are used, provide tamper resistant devices at both ends, or weld one end to prevent turning.
- F. Provide all required daily and periodic inspections as required by Section BC 3307 and maintain protective in good working order.
- G. Protection of adjoining roofs shall meet the requirements of Section BC 3309.10. Protection of adjoining windows shall meet the requirements of Section BC 3309.14.
- H. Protect all unenclosed openings for the duration of the project in accordance with Section BC 3308.

1.24 TEMPORARY STAIRWAYS

- A. Stairs Undergoing Alteration or Demolition in an Existing Building

Stairs undergoing an alteration in an existing building shall be maintained as per Section BC 3303.9. Stairs in buildings undergoing a full demolition shall comply with Section BC 3306.9.9.

- C. Such stairs shall be lighted at all times and be kept free of equipment, debris, and material.

END OF SECTION

* * *

SECTION S01524
CONSTRUCTION WASTE MANAGEMENT

1.01 SUMMARY

- A. This Section includes requirements for the following:
 - 1. Recycling non-hazardous demolition and construction waste.
 - 2. Disposing of non-hazardous demolition and construction waste.
- B. The Contractor is to recycle a minimum of 75% non-hazardous demolition and construction waste, with a goal of reaching 95%.

1.02 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.

1.03 PERFORMANCE REQUIREMENTS

- A. Salvage/Recycle Requirements: The Authority's goal is to salvage and recycle as much non-hazardous demolition and construction waste as possible including the following materials:
 - 1. Demolition Waste:

- a. Concrete.
- b. Concrete reinforcing steel.
- c. Brick.
- d. Concrete masonry units.
- e. Asphaltic concrete
- f. Synthetic Turf
- g. Wood studs.
- h. Wood joists.
- i. Plywood and oriented strand board.
- j. Wood paneling.
- k. Wood trim.
- l. Structural and miscellaneous steel.
- m. Rough hardware.
- n. Roofing.
- o. Insulation.
- p. Doors and frames.
- q. Door hardware.
- r. Windows.
- s. Glazing.
- t. Metal studs.
- u. Gypsum board.
- v. Acoustical tile and panels.
- w. Carpet.
- x. Plumbing fixtures.
- y. Piping.
- z. Supports and hangers.
- aa. Valves.
- bb. Sprinklers.
- cc. Mechanical equipment.
- dd. Electrical conduit.
- ee. Copper wiring.
- ff. Lighting fixtures.
- gg. Lamps.
- hh. Ballasts.
- ii. Electrical devices.
- jj. Switchgear and panelboards.

2. Construction Waste:

- a. Masonry and CMU.
- b. Lumber.
- c. Wood sheet materials.
- d. Wood trim.
- e. Metals.
- f. Roofing.
- g. Insulation.

- h. Carpet and pad.
- i. Gypsum board.
- j. Piping.
- k. Electrical conduit.
- l. Packaging: Regardless of salvage/recycle goal indicated above, salvage or recycle 100 percent of the following uncontaminated packaging materials:
 - 1) Paper.
 - 2) Cardboard.
 - 3) Boxes.
 - 4) Plastic sheet and film.
 - 5) Polystyrene packaging.
 - 6) Wood crates.
 - 7) Plastic pails.

1.04 SUBMITTALS

- A. Waste Management Plan: Submit 3 copies of plan within 14 days of date established for the Notice to Proceed.
- 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 or by volume.
 - 4. Quantity of waste recycled, both estimated and actual in tons or by volume.
 - 5. Total quantity of waste recovered (salvaged plus recycled) in tons or by volume.
 - 6. 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. Submittal shall be on the attached form.

- D. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Records shall be in the form of manifests and weight tickets.
- E. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Records shall be in the form of manifests and weight tickets.
- F. Sustainability Submittal: Submit Contractor's Construction Waste Certification Form (Refer to Appendix A of this Section), signed by Contractor, tabulating total waste material, quantities diverted, and means by which it is diverted.
- G. 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. 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.

1.06 WASTE MANAGEMENT PLAN

- A. General: Develop plan consisting of waste identification, waste reduction work plan, and cost/revenue analysis. Include separate sections in plan for demolition and construction waste. 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 demolition, 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.
 1. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
 2. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
 3. 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.

D. Cost/Revenue Analysis: Indicate total cost of waste disposal as if there was no waste management plan and net additional cost or net savings resulting from implementing waste management plan. Include the following:

1. Total quantity of waste.
2. Estimated cost of disposal (cost per unit). Include hauling and tipping fees and cost of collection containers for each type of waste.
3. Total cost of disposal (with no waste management).
4. Revenue from recycled materials.
5. Savings in hauling and tipping fees that are avoided.
6. Handling and transportation costs. Include cost of collection containers for each type of waste.
7. Net additional cost or net savings from waste management plan.

1.07 PLAN IMPLEMENTATION

A. General: Implement waste management plan as approved by Authority. 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 Section S01500 "Temporary Facilities and Controls" for operation, termination, and removal requirements.

B. Waste Management Coordinator: Designate a site staff person or persons as 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.

- 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 three 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 Section S01500 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

1.08 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.
- C. 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.

- a. Inspect containers and bins for contamination and remove contaminated materials if found.
2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove recyclable waste off Owner's property and transport to recycling receiver or processor.

1.09 RECYCLING DEMOLITION WASTE

- A. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
 1. Pulverize concrete to maximum of 4" size.
 2. Crush concrete and screen to comply with requirements of Section 02060 "Building Demolition".
- B. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.
 1. Pulverize masonry to maximum 4" size.
 2. Crush masonry and screen to comply with requirements of Section 02060 "Building Demolition".
- C. Asphaltic Concrete: Crush to size required by recycling facility. Separate concrete debris from asphalt.
- D. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered

wood products, panel products, and treated wood materials.

- E. Metals: Separate metals by type.
 - 1. Structural Steel: Stack members according to size, type of member, and length.
 - 2. Remove and dispose of bolts, nuts, washers, and other rough hardware.
- F. Asphalt Shingle Roofing: Separate organic and glass-fiber asphalt shingles and felts. Remove and dispose of nails, staples, and accessories.
- G. Gypsum Board: Stack large clean pieces on wood pallets and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.
- H. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.
 - 1. Separate suspension system, trim, and other metals from panels and tile and sort with other metals.
- I. Carpet: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.
 - 1. Store clean, dry carpet in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.
- J. Plumbing Fixtures: Separate by type and size.
- K. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.
- L. Lighting Fixtures: Separate lamps by type and protect from breakage.
- M. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

- N. Conduit: Reduce conduit to straight lengths and store by type and size.

1.10 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 deliveries 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. 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.

C. Gypsum Board: Stack large clean pieces on wood pallets and store in a dry location.

1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

1.11 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.
- C. Disposal: Transport waste materials off Owner's property and legally dispose of them.

END OF SECTION

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SECTION S01535
SAFETY PROGRAM

1.01 SAFETY PROGRAM REQUIREMENTS

- A. Establish and implement a Site Safety Program to ensure protection of persons and property on the Site and surrounding areas.
- B. As part of the Site Safety Program, prepare a Site Safety Plan.
- C. The Site Safety Program shall be in compliance with the most stringent requirements of the Authority's Site Safety Manual; the 2014 New York City Building Code including, but not limited to, Chapter 33 entitled "Safeguards During Construction or Demolition"; the New York City Fire Code and other codes and regulations having jurisdiction. As part of the Site Safety Program, provide additional precautions and safeguards as indicated on the Drawings, as specified herein, and where required for proper protection of persons and property.

1.02 SUBMITTALS

- A. Site Safety Plan
 - 1. Submit for review a Site Safety Plan to the Authority's Safety Unit within 5 days of Notice to Proceed (NTP).
 - 2. The Site Safety Plan shall be prepared, signed and sealed by a N.Y.C. licensed Site Safety Manager certified by the New York City Department of Buildings.
 - 3. The Site Safety Plan shall include, but not be limited to, the following:
 - a. Complete plans of the entire site, including building interiors, areas inside the property line, and surrounding areas outside the property line.
 - b. Location of sidewalk sheds, fences, egress ways inside the building, sanitary facilities, scaffolding, fire protection, demolition

safety zone and all other required elements. Indicate all areas of the building, site and surrounding areas that will be impacted by the Work. Show temporary facilities, equipment, work areas, storage areas, contractor's access ways, and all locations where the public or school occupants may be affected in the course of the Work.

- c. Separate drawings for multiple phasing periods, if applicable.
- 4. Conduct all inspections and probes necessary to determine the impact of the Work on areas adjacent to, and above or below the Work areas. Include all affected areas in the Safety Plan.

1.03 COORDINATION AND SAFETY MEETINGS

- A. When directed by the Authority's Representative, attend a meeting with school officials to coordinate the Safety Program with school functions and the construction schedule.
- B. Schedule and attend all safety meetings as described in the Authority's Safety Manual. Safety meetings shall be held at least once per week.

1.04 SAFETY FACILITIES AND CONTROLS

- A. Provide and maintain all temporary facilities and controls required for implementation of the Site Safety Program.
- B. Provide sidewalk sheds where indicated in the Contract Documents, where required by law, and wherever the Work has the potential of creating an overhead hazard that could lead to serious injury or death.
- C. Unless approved in writing by the Authority, sidewalk sheds, on-site sheds, and fences shall not be dismantled or relocated as work proceeds at various locations of the building. All protection shall remain in place at all times until the Authority's Representative directs its removal in writing.

- D. Protective sheds located within the property line, on-site, for protection from overhead hazards shall be constructed in the same manner as required by Code and the Contract Documents for sidewalk sheds and shall have the same auxiliary elements including electrical lighting.
- E. Where overhead protection is required, partial closing of sidewalks or streets will not be permitted. Proper protection shall be provided by means of sidewalk sheds or full street closing. Full street closing shall include the street and the sidewalks on both sides of the street.
- F. Protect all unenclosed openings for the duration of the project as required by Section BC 3308 of the 2014 NYC Building Code.

1.05 CORRECTION OF SAFETY DEFICIENCIES

- A. No unsafe condition shall be left uncorrected.
- B. Where a deficiency noted during a safety inspection does not entail the existence of a hazardous condition, the maximum time for correction of the deficiency shall be 24 hours, except where a shorter response time is required by the Authority's Safety Manual, other Contract Documents, local regulations, or the Authority's Representative. New York City Fire Department inspection deficiencies and all hazardous conditions shall be acted upon immediately and corrected before leaving the site.

END OF SECTION

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SECTION S01550
INDOOR AIR QUALITY (IAQ) REQUIREMENTS

1.01 SUMMARY

- A. This Section includes general requirements and procedures for the Contractor for maintaining and controlling indoor air quality during construction.

1.02 RELATED SECTIONS

- A. Existing Premises Work Section S01900

1.03 SUBMITTALS

- A. IAQ Management Plan: Submit required management plan as set forth hereinafter.
- B. Submit six digital photographs documenting Indoor Air Quality measures implemented.
- C. Submit cut sheets of filtration media proposed for use.
- D. Submit letter stating that carpeting in occupied areas adjacent to work areas was HEPA vacuumed daily.

1.04 QUALITY ASSURANCE

- A. Subcontractors and their employees shall be provided instruction and training by the Contractor as defined in the IAQ Management Plan.
- B. The IAQ Management Plan shall highlight the requirements of the Sheet Metal and Air Conditioning National Design/Builders Association (SMACNA), IAQ Guidelines for Occupied Buildings under Construction, 2nd Addition 2007, ANSI/SMACNA 008-2008 (Chapter 3) and shall include the principles and practices set forth in this Section.

1.05 INDOOR AIR QUALITY MANAGEMENT PLAN

- A. Contractor's IAQ Construction Plan shall include procedures to prevent indoor air quality problems resulting from the construction/renovation process in

order to help sustain the comfort and well-being of construction workers and building occupants.

1. The Plan shall identify the requirements incorporated from the Sheet Metal and Air Conditioning National Design/Builders Association (SMACNA), IAQ Guidelines for Occupied Buildings under Construction, 2nd Addition 2007, ANSI/SMACNA 008-2008 (Chapter 3). Identify potential contaminant pathways in the plan.
2. Contractor's detailed plan shall be based on the particular characteristics of the Project, and include the items listed in this Section as a minimum. In addition utilize the following control approaches as applicable for the Project:
 - a. Protecting stored items of the HVAC systems
 - b. Containing the work area;
 - c. Limit or avoid use of permanent HVAC systems during demolition and construction;
 - d. Reducing emissions;
 - e. Intensifying housekeeping;
 - f. Rescheduling work hours; or
 - g. Moving occupants.

1.06 HVAC PROTECTION

- A. Store HVAC equipment and all parts of the HVAC system in a clean, dry location. Until HVAC equipment and system items (ducting, registers, air handler components, fans, motors, etc) have been installed, they shall be kept covered with plastic film or in a location where it will not be exposed to moisture, dust, or other contaminants.
- B. Seal all HVAC inlets and outlets. Use of the HVAC system shall be avoided during construction until drywall construction is complete. Temporary ventilation may be installed to remove contaminants. All air inlets and outlets shall be sealed during construction. These include outside air inlets, grilles, diffusers, supply ducts, return ducts, ceiling plenums, VAV (variable-air volume) plenum intakes, and window ventilator or air conditioning units. Openings shall be sealed with plastic film and tape that can be removed cleanly.

- C. Seal HVAC components during installation. For ducting runs that require several days to install, sections shall be sealed off as they are completed. Seals shall be removed prior to continuing the ducting run. Other components of the HVAC system shall be subjected to the same requirements to protect them from contamination.
- D. Use temporary filtration media. If the HVAC system is to be used while construction work is being done, temporary filtration media shall be installed at each return grill. Such filtration media shall have a minimum filtration efficiency (Minimum Efficiency Reporting Value-MERV per ASHRAE 52.2) of 8. After Substantial Completion use new filtration with a MERV rating of 13 in areas of the work where dust producing activities are generated.
- E. Inspect filters regularly. When the HVAC system is being used during construction and temporary filters are installed, filters shall be inspected weekly and replaced as needed.
- F. When outdoor construction activities generate dust, combustion emissions, or other contaminants, operable windows and outside air supplies to enclosed portions of the building shall be protected in a manner that prevent contaminants from entering the building without harming the equipment.

1.07 SOURCE CONTROL

- A. Protect against moisture exposure. Building materials should be kept dry with special care taken with materials susceptible to the growth of mold and bacteria such as wood, porous insulation, paper, and fabric. Schedule deliveries so that materials that are susceptible to mold growth are installed after the enclosure is watertight. Cover building materials to prevent rain damage, and if resting on the ground, use spacers to allow air to circulate between the ground and the materials.
- B. Water damaged materials should be dried within 24 hours. Due to the possibility of mold and bacterial growth, materials that are damp or wet for more than

24 hours may need to be discarded. Immediately remove materials showing signs of mold and mildew, including any with moisture stains, from the site and properly dispose of them. Replace moldy materials with new, undamaged materials.

- C. In the event of rain or groundwater gaining entry to the building interior during construction, notify the Authority.
- D. Avoid tracking pollutants into work areas.
 - 1. Control access to the building interior to minimize the tracking in of contaminants.
 - 2. Provide temporary entryway surfaces designed to remove moisture and contaminants from workers shoes.
 - 3. Prevent the ingress of rodents and pests.
 - 4. Do not permit smoking inside the building.

1.08 PATHWAY INTERRUPTION

- A. Incorporate contaminant pathway interruption methods in the Indoor Air Quality Management Plan. Methods of pathway interruption detailed in the SMACNA IAQ Guidelines for Occupied Buildings include:
 - 1. Depressurize the work area while maintaining the required filtering and rate.
 - 2. Pressurize adjacent occupied space. Including temporary rebalancing. Ensure that the HVAC system remains protected from construction emissions.
 - 3. Erect barriers to contain construction area.
 - 4. Locate pollutant sources away from critical air flow pathways.
 - 5. Temporarily seal the building. Where construction emissions are occurring on the roof or adjacent to a building, contaminants may be drawn in through cracks in the outside air intake

if the building is under negative pressure or other entries.

1.09 HOUSEKEEPING

- A. Minimize accumulation of dust and other contaminants. Construction practices shall be used that minimize the production of dust and other contaminants from construction activities. Use integral dust-collection systems on machinery that generates dust. Where possible, confine dust-generation activities to areas where clean-up can be carried out easily and contaminants will not be tracked to other areas.
- B. Suppress Dirt. Wetting agents or sweeping compounds shall be used to keep dust from becoming airborne. Use other methods if wetting will harm surfaces being protected.
- C. Clean up dust. Cleaning frequency shall be increased when dust accumulation is noted. Use equipment designed to retain dust within the clean up media.
- D. Clean up spills. All spills and excess applications of solvent-containing products should be cleaned up using approved methods as soon as practicable. Water spills shall be mopped up promptly.
- E. Keep work area dry. The entire area shall be kept as dry as practicable by promptly repairing any leaks that allow rainwater entry and mopping up any water accumulation. Use dehumidification if necessary for prompt drying of wetted spaces.
- F. Un-vented combustion (e.g., propane or diesel "salamander" space heaters) shall not be used.
- G. Seal containers containing volatile liquids. Containers of fuel, paints, finishes, and solvents shall be kept tightly sealed and preferably stored outside of the building when not in use.

1.10 SEQUENCING AND SCHEDULING

- A. Schedule the installation of porous materials, exclusive of CMU and sprayed-fireproofing, only after closing in building or providing weather-tight

protection. Porous materials, such as insulation and drywall, shall not be installed in a building until the envelope is weather-tight.

- B. Furnishing shall not be installed until interior finishes (paints, stains and sealants) have been applied and have fully cured.
- C. Provide adequate ventilation during curing period. To aid in curing of interior finishes and other products used during construction and to remove pollutants after drywall installation is complete, provide adequate ventilation with 100% outside air, and proper filtration. In humid periods or when very high-moisture materials are present, supplementary dehumidification may be required during this curing period.

1.11 CONSTRUCTION INDOOR AIR QUALITY MANAGEMENT

- A. Comply with SMACNA IAQ Guideline for Occupied Buildings under Construction.
 - 1. If Authority authorizes the use of permanent heating, cooling, and ventilating systems during construction period as specified in Section S01500 "Temporary Facilities and Controls," install filter media having a MERV 8 according to ASHRAE 52.2 at each return-air inlet for the air-handling system used during construction.

END OF SECTION

LIST OF SUBMITTALS

<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>
IAQ Management Plan:	_____	_____
Six Photos of IAQ measures:	_____	_____
Cut Sheets of Filtration Media:	_____	_____
HEPA vacuuming of carpet letter:	_____	_____

SECTION S01630
PRODUCT SUBSTITUTIONS

1.01 SUMMARY

- A. Products, materials, systems and equipment (collectively called "products") specified within the technical sections (Divisions 2 through 16) and Drawings shall be used for this Project unless approval for submitted "Or Equal" substitutions is obtained from the Authority.
- B. Consideration for approval of substituted "products" is as stipulated in Article 4 of the General Conditions, Section 4.04, entitled "Or Equal Clause".
- C. The Contractor shall allow ample time, as stipulated by Article 1.02 below, for the Authority to review each substitution submission. If at any time during the review process the Contractor believes that the review process is adversely affecting the completion dates, the request is to be considered denied. The Contractor shall immediately proceed with submitting and utilizing the specified product(s). Under no circumstances will an extension of time be granted nor additional costs be paid for any reason whatsoever relating to the review process.
- D. Basis of Design: "Products" specifically designated on the drawings by manufacturer name(s) and model numbers are the Basis of Design (e.g. mechanical equipment such as roof top units, boilers, etc.). Use of "products" of other manufacturers meeting the requirements of the specification, including those manufacturers and products listed in the specification, shall be considered an "Or Equal" substitution. Factors for consideration shall include function, dimension, in-service performance, physical properties, appearance, and other characteristics. Refer to Article 1.04 for information as to the Contractor's responsibilities for accommodations needed as a result of an approved "Or Equal" substitution. If an "Or Equal" product will not fit into the location designed without reconfiguring the space, the "product" is not to be submitted.
- E. The Contractor's request for substitutions with "alternate" "products" (those that do not meet the Contract requirements, i.e. not an "or Equal") will be evaluated on a case-by-case basis within the sole discretion of the Authority. The schedule for submission and review of "alternate" "products" shall be the same as described in Article 1.02.

1.02 SUBMITTALS**A. Substitution Submittal Schedule**

1. The construction completion dates shall not be adversely affected by the substitution of specified items. Complete requests for substitutions must be submitted so as to allow sufficient time for review, fabrication, delivery, installation, and all construction modifications necessitated by the substitution. Should the package be incomplete, additional information will be requested by the Authority. The additional information must be submitted with the same time considerations.
2. Requests for substitution will only be considered if received in a time frame that will allow for the review process required by this specification as well as ordering of the material without delay to the project, whether the product is approved or disapproved. At a minimum, product must be submitted sixty days prior to the intended ordering date of the item that will allow installation to commence per the Detailed Baseline Project Schedule. The Contractor is responsible for determining the actual submission time frame required to go through the substitution process, account for submission of a specified item in case the proposed product is rejected, and manufacturer and delivery time to the project site.
3. The following items, as applicable to the project, require additional time for review. In addition to the period indicated above, an additional 2 weeks above that provided in paragraph A.2 above shall be allowed for the review process:
 - a. Architectural systems and components
 - 1) Windows & Skylights
 - 2) Synthetic Turf
 - 3) Playground Equipment
 - 4) Roofing
 - 5) Waterproofing Systems
 - 6) Self-leveling Underlayments
 - 7) Door hardware
 - b. HVAC systems and components
 - 1) Boilers and appurtenances
 - 2) Chillers

- 3) Custom and Commercial Packaged Rooftop Heating and Cooling Units/Air Handling Units/Chilled Beams/Displacement Induction Units.
 - 4) Digital and Pneumatic Controls
 - 5) Oil Leak Detection System and components
 - 6) Gas Leak Detection System and components
- c. P&D systems and components
- 1) Roof Drains used in Roof Detention Systems
 - 2) Acid Waste System and components
 - 3) Water heater and components
 - 4) Drinking Fountain, Combination Sink & Drinking Fountain and Cuspidor
 - 5) Plumbing fixtures and accessories
 - 6) Gas Booster Pump and accessories
 - 7) Potable Water System and components
- d. Fire Suppression systems and Components
- 1) Sprinkler System and components
 - 2) Fire Standpipe System and components
- e. Electrical critical systems and components
- 1) Fire Alarm System and components
 - 2) Intrusion Alarm System and components
 - 3) Video Surveillance System and components
 - 4) Lighting Controls
 - 5) PA System
 - 6) Direct/Indirect Lighting Systems
- f. Multiple Discipline systems and components
- 1) Laboratory Equipment and Furniture
 - 2) Emergency Generator System
 - 3) Vertical Conveying Systems
4. Within twenty-one days of receipt of the request for substitution to the Architect/Engineer of Records Office, the Authority may request additional information or documentation for the evaluation of the request. Within forty-two days of receipt of the original request, or twenty-one days of receipt of the additional information or documentation, whichever is later, the Authority will notify the Contractor of acceptance or rejection of the proposed substitution. If a decision on the use of a proposed substitute cannot be made or obtained within the time allocated, the Contractor must use the products specified by name. No time extensions will be granted due to the

approval process or the rejection of a substitution.

B. Substitution Submittal Procedure

1. Each substitution submitted to the Authority for consideration shall be separate and distinct from a regular submittal and stamped as such. Submit six (6) copies of each request. Each request shall identify the material, item of equipment, installation method etc. proposed for substitution. Include the related Contract Specification and Contract drawing numbers(s). Provide complete documentation showing compliance with the specified requirements. Such documentation shall include, but not be limited to the following:
 - a. Product Data, including drawings, fabrication, and installation procedures.
 - b. Samples, where samples of the specified product are required, or subsequently requested.
 - c. A detailed comparison of significant qualities of the proposed substitution with those of the material or work specified. Significant qualities may include elements such as size, weight, durability, performance, life cycle, visual effect, code compliance, maintenance requirements, energy usage, compatibility with other portions of the Work, and environmental considerations.
 - d. Coordination information, including a list of changes or modifications to be made to other parts of the Work including the Work to be performed of other trades and for construction performed by others that will become necessary to accommodate and to accept the proposed substitution. Provide coordination drawings showing the interface and changes to the original design for all trades to expedite the review and subsequent filing of the changes.
 - e. Warranty information, with any deviations from the Contract requirements highlighted.

f. For alternate substitutions, the submittal must clearly demonstrate the benefit, in cost and/or time, of implementing the substitution.

2. Failure by the Contractor to include the above requirements in the submittal may cause rejection of the submittal in its entirety.

1.03 APPROVAL DECISION

A. The decision for approval or rejection of a product substitution shall rest solely with the Authority.

1.04 ACCOMMODATIONS FOR SUBSTITUTIONS

A. The costs of all accommodations and modifications to the structure or systems necessitated by the use of an accepted "or Equal" or "alternate" substitution (e.g. steel modifications, revised openings, added supports, power modifications, etc.) shall be borne by the Contractor. Any time impact related to the accommodations and modifications necessitated by the use of an accepted "or Equal" or alternate" substitution shall be borne by the Contractor. Furthermore, the Contractor shall be responsible for any fees charged by the Designer of Record that relate to acceptance and incorporation of the substitution into the Design Documents. The fees for the redesign will not apply if the product is from a product listed in the specific specification section for which the substitution is being made.

1.05 OPTIONS

A. When Contractor's options are allowed for use of certain products, materials, systems, and equipment for this Project, conditions shall be as set out in the respective technical Sections.

END OF SECTION

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SECTION S01650
FACILITY START-UP, DEMONSTRATION, AND TRAINING

1.01 START-UP AND DEMONSTRATION

- A. The Contractor shall start-up and demonstrate, in the presence of the Authority's Representative (Project officer) and its designees, the proper operation of all systems and equipment required by this Contract; refer to respective technical Sections for detailed procedures. If procedures are not specified for specific items of systems and equipment, follow that recommended by the item manufacturer.

1.02 SUBMITTALS

A. Training Outline

1. Provide an outline of the intended training to be accomplished at each session for each system.
2. Training shall be broken into 2 distinctive parts:
Operation of systems and equipment and maintenance of systems and equipment.

B. Training Schedule

1. Provide a detailed training schedule chart that shall be updated monthly, or more frequently if necessary. The schedule shall be presented in a column format with the columns showing the following information:
 - a. System or equipment and corresponding specification section.
 - b. Submittal date of training syllabus for each system or equipment.
 - c. Acceptance date of the O&M manuals for each system or equipment.
 - d. Date of approval for required shop drawings needed to maintain the system or equipment.
 - e. Start dates and finish dates for the installation and functional performance testing of each system or equipment.

- f. Start date and finish date of training of each system or equipment.
 - g. Acceptance date of the system or equipment training.
 - h. Proposed parties involved for each system or equipment training.
 - i. Comments
 - 2. A draft of the training schedule shall be submitted in hard copy and in electronic format on CD-ROM, or other media accepted by the Authority. The Authority will inform the Contractor of the required parties to be trained for each of the systems and equipment as well as the dates the users will be available for training. The Contractor shall incorporate into the training schedule chart.
- C. Training shall be scheduled to coincide with the following:
- 1. Operations and Maintenance (O&M) Manuals for systems and equipment must be submitted prior to the training sessions(s) for each system or type of equipment. If approval of any O&M manuals is required under this Contract, the Contractor shall allow ample time for approval. Manuals shall be submitted in accordance with Section S01730.
 - 2. Required shop drawings addressing maintenance of the system or equipment must be submitted prior to training.
 - 3. System or equipment shall have successfully passed their functional performance testing and be ready to be operated by the school personnel prior to training.

1.03 TRAINING - GENERAL

- A. The Contractor shall provide instruction for each system or equipment which shall address the operation of the system or equipment as well as the maintenance of the system or equipment.
- B. The Contractor shall provide the services of factory-trained representatives to instruct and train designated

Authority and Department of Education personnel in the proper operation and proper maintenance of each system or equipment.

- C. The Contractor and the Authority's Representative shall mutually agree upon the times set for the instruction and training. Each training session shall be planned to be no more than 4 hours in a day where the specific session duration is not specifically indicated (e.g. four sessions at two hours each, etc).
- D. The Contractor shall document the attendance at each Training Session presented for each system and type of equipment. Upon the completion of the training curriculum for the particular system or piece of equipment, the Contractor shall obtain an attendance sheet signed by all trainees that have been designated by the Authority as requiring such training. Any training session for which attendance is not documented shall be redone at no cost to the SCA.

1.04 MEP SYSTEM AND EQUIPMENT TRAINING

- A. The custodian of the school will have access to the worksite. However, the Contractor is to take no direction regarding the work from the custodian.
- B. The Contractor shall furnish the services of factory-trained representatives, who shall provide instruction for the operation, troubleshooting and maintenance of each mechanical system and type of equipment.
- C. The Contractor shall provide no less than eighty (80) hours of instruction of Operational and Maintenance instruction for the following items, in addition to training specifically called for in the technical sections. These hours shall be apportioned as follows (the training may or may not be consecutive):
 - 1. Forty (40) hours dedicated to the operation and maintenance requirements of the heating and ventilating system.
 - 2. Sixteen (16) hours dedicated to operation and maintenance requirements of the refrigeration equipment.
 - 3. Twenty-four (24) hours dedicated to the operation and maintenance of the temperature control system,

pumps and all other systems and equipment installed under this Contract.

4. The exact dates and hours for the instruction periods indicated in 1, 2, and 3 above shall be coordinated by the Authority and the user.
5. If the Authority determines that the training was inadequate, additional training shall be provided at no additional cost to the Authority.

END OF SECTION

SECTION S01720
RECORD DOCUMENTS

1.01 CONTRACTOR PROJECT RECORD DOCUMENTS

- A. The purpose of the Contractor Project Record Documents is to record the actual location of the Work in place including, but not limited to, underground lines, concealed piping within buildings, clean-out locations, concealed valves and control equipment, connections, switches, and cut-outs, and to record changes in the Work.
- B. In addition to the sets of Contract Documents that are required by Contractor on the Site to perform the Work, the Contractor shall maintain at the Site one copy of all Drawings, Specifications, and Addenda that are part of the Contract as awarded, and also Bulletins, RFI responses, modifications, approved shop drawings, field directives, and other approved changes. These are collectively referred to as "Project Record Documents". Each of these documents shall be clearly marked "Project Record Copy" as indicated below, maintained in a clean and neat condition available at all times for inspection by the Authority and shall not be used for any other purpose during the progress of the Work.
1. Each record copy shall bear the legend "PROJECT RECORD COPY" in heavy block lettering, 1/2" high and contain the following data:

PROJECT RECORD COPY

Contractor's Name _____

Contractor's Address _____

Made by _____ Date _____

Checked by _____ (Contractor's Agent) Date _____

2. Where possible, changes from the Contract as awarded Documents shall be conspicuously encircled.
- C. Contractor Project Record Documents Requirements
1. The Contractor shall mark-up the "Project Record Documents" to show:

- a. Approved changes in the Work, either by Bulletin or field directive.
 - b. Location of underground Work and concealed Work.
 - c. Details not shown in the original Contract Documents.
 - d. All relocations of Work.
 - e. All changes in dimensions.
 - f. All access doors.
 - g. Actual location of all plumbing, fire protection, heating, ventilating, air conditioning, electrical, fire alarm, and security assemblies, equipment, and devices.
2. As applicable for the project, such information shall include, but shall not be limited to:
- a. Footing depth in relation to finished grade elevations.
 - b. All changes in floor elevations.
 - c. All structural changes.
 - d. All substitutions.
 - e. Elevations and locations of all underground utilities, services, or structures referenced to permanent above-ground structures or monuments.
 - f. Designation of all utilities as to the size and use of such utilities.
 - g. All invert elevations of manholes.
 - h. The location of all utilities, services and appurtenances concealed in building structures that have been installed different from that required by the Contract.
 - i. Duct sizing and routing.
 - j. Revisions in electrical circuitry.

- D. The Contractor shall keep the "Project Record Documents" up-to-date from day to day as the Work progresses. Appropriate documents shall be updated promptly and accurately; no Work shall be permanently concealed until all required information has been recorded.
- E. Each month, copies of these Project Record Documents will be examined by the Authority's Field Representative prior to recommending the approval of the partial payment request to ascertain that the record prints reflect the changes to date.
- F. Each of the documents shall have on it the project information required for submittals as specified in Section S01300.

1.02 ELECTRONIC RECORD DOCUMENTS

- A. In addition to the paper copies at the site that the Contractor is to maintain for general review during the project as described in Article 1.01, the Contractor is to integrate the project record information (as-built conditions) into an electronic submission for the Final Record Drawings.
- B. The Contractor will be provided the AutoCAD (dwg) files of the Contract Drawing set for its use, which the Contractor may use for creation of the electronic Final Record Drawings ("As-builts") files.
- C. Drawing changes issued by the AEOR during the course of construction will be issued as Portable Document Format (pdf) files, which the Contractor may use to create AutoCAD files and use to integrate into the electronic Final Record Drawings ("As-builts") files.

1.03 FINAL RECORD DOCUMENTS

- A. Final Record Shop Drawings: If installed equipment is at variance with the respective approved shop drawings, the Contractor shall furnish to the Authority's Field Representative revised shop drawings indicating the actual completed installation one month prior to Substantial Completion as a pdf document through the Authority's ESUBMITTAL application.
- B. Mechanical Coordination Drawing: At the conclusion of the project, submit the final coordinated mechanical installation drawing showing the interfaces of all P&D,

HVAC, and Electrical items as a pdf document through the Authority's ESUBMITTAL application.

- C. Final Record Drawings (referred to in the industry as "As-builts"):
1. One month prior to substantial completion, the Contractor shall submit **the** Final Record Drawings, incorporating all changes appearing on the Contractor "Project Record Documents" onto the original set of bid drawings. The changes to the Contract Documents shall be clearly indicated. The title block for the drawings shall include the name of Contractor and, if applicable, the name of the Consultant who prepared the drawings and LLW# or Design No., as well as the Project information indicated to be provided for all submittals in Section S01300 and the words "As-built". The documents are to be created using AutoCad and submitted for review as a pdf document as a single file through the Authority's ESUBMITTAL application. Upon acceptance, both the final pdf file and a zip file of the final AutoCAD drawings are to be submitted.
- D. Shop Drawings for Permanent Records: Where specified in the individual technical sections of Divisions 2 through 16, submit the required shop drawings as a pdf document in the Authority's ESUBMITTAL application.
- E. The Department of Building's Electrical Division job number for the Contract shall appear on all electrical drawings or other materials submitted, together with the Contract Number and name of the project and the Project information indicated to be provided for all submittals in Section S01300.
- F. The originals of the Contractor's "Project Record Documents" shall be submitted by the Contractor to the Authority when all the Work is completed and shall be approved by the Authority before the Contractor requests final payment. Refer to Section G01700, "Project Closeout", for other requirements associated with final acceptance of the work.
- G. All of the above listed requirements of this Article shall be at the Contractor's expense.

END OF SECTION

SECTION S01900
EXISTING PREMISES WORK

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. This section applies to all work conducted in existing premises. This includes work that may generate dust and debris, work that disturbs painted surfaces assumed or known to be lead-based paint and/or that disturbs ballasts, light bulbs, batteries, Mercury Containing Equipment, electronics or other hazardous materials not specifically covered in other specifications.
- B. Furnish all labor, materials, equipment, and incidentals required to remove, handle, store, and dispose of all PCB containing and non-PCB containing ballasts, light fixtures, fluorescent bulbs as specified, as shown on the Drawings and Specifications and as directed by the Authority. Work shall be done in accordance with all applicable City, State and Federal laws and regulations and SCA protocols.
- C. Abate and dispose of all asbestos containing material (ACM) as specified in section 02081, as shown on the Drawings, and as directed by the Authority. Work shall be done in accordance with all applicable City, State and Federal laws and regulations and SCA protocols.
- D. Unless the Authority provides information regarding the lead content of specific painted surfaces, all interior painted surfaces are assumed to contain lead-based paint. Manage all waste and waste water as described in Articles 1.28 and 1.29, including determining if it is Toxicity Characteristic (e.g. lead containing) hazardous waste. Architectural and electronics wastes that would otherwise be hazardous waste due to metals (e.g., scrap metal with lead-based paint, computers) may only be recycled if the contractor meets the New York State Department of Environmental Conservation (NYSDEC) hazardous waste recycling regulations (e.g., 6 NYCRR 371.1(c)(7)) notification). The Contractor shall provide all labor,

equipment and materials for performance of the Work in accordance with the Contract Documents.

E. All requirements of this specification that refer to "lead-based paint work in 'target' areas" apply to all work in:

1. 1st Grade, Kindergarten, pre-K, LYFE centers, Special Ed and Pregnant Student Program areas as well as any spaces in which these students visit regularly at least 2 days/week provided that each day's visit lasts at least 3 hours and the combined weekly visits last at least 6 hours, and the combined annual visits last at least 60 hours, and
2. "Common areas" routinely used by children under age 6, such as restrooms and cafeterias (but not hallways, stairways, and garages) and the exterior sides of the building that are immediately adjacent to classrooms or common areas for children under 6.

F. This section shall be used in conjunction with other Specifications that also apply, notably where building materials contains asbestos or "PCB-containing caulk" containing more than 50 parts per million (ppm) of Polychlorinated Biphenyls (PCBs).

1. Where painted caulk, light fixture or ballast wire insulation or other building materials being removed is also an Asbestos Containing Material (ACM), follow applicable provisions of both Specification 02081 and this specification.
2. Where painted caulk being removed is also a PCB-containing caulk, follow applicable provisions of both Specification 02082 and this specification.

1.02 SITE REQUIREMENTS

A. Noise Control: Provide mufflers on all equipment to be used by the Contractor. Observe local laws regarding noise control.

1.03 HEALTH AND SAFETY

- A. Toxic Effects: The Contractor shall assume all responsibility for any toxic effects to workers from the dusts, vapors or residues generated in their work, including the use of any substances or equipment used by the Contractor during construction.
- B. Chemical/Biological Hazards: The known chemical/biological hazards on site include lead-based paint containing material, PCB containing ballasts and light fixtures, fluorescent lamps, asbestos containing materials, and debris. The Contractor shall provide materials, equipment and training to its workers to ensure their protection from these and any other hazards which may be identified during the work. All personnel who work with ACM shall have appropriate asbestos certifications.
- C. Physical Hazards: The Contractor shall provide safety equipment and training to his workers to ensure their protection from any physical hazards including but not limited to trip/fall hazards, working at elevation, heat stress, contact with energized (hot) active equipment, noise, overhead bump hazards, and electrical shock that may be present during the Work.
- D. OSHA Regulations: The Occupational and Safety Health Administration (OSHA) regulations (29 CFR 1926 and 1910) applicable to the work shall be strictly complied with during the course of this project by the Contractor's workmen, tradesmen, materialmen, and subcontractors, and of visitors to the project site. This includes, but is not limited to, the OSHA Hazard Communication Standard (29 CFR 1910.1200) requiring training employees, access to hazardous material information and warning labels.
- E. Accident Prevention: The Contractor shall provide and maintain all safety measures necessary to properly protect workmen, comply with the latest edition of the "Manual of Accident Prevention in Construction" issued by the Associated General Contractors of America, Inc. and maintain an accurate record of all accidents which occur during the project. The Contractor shall immediately report an injury or loss of life to the

Authority, and a copy of the accident report to his insurer provided.

- F. Emergency Response: The Contractor shall establish an Emergency Response Team made up of members of his work force trained for and capable of responding to an accident, fire, or other emergency. The Contractor shall designate a site Safety Coordinator to train the team on location and use of site fire/life safety equipment. At minimum, the Team shall be knowledgeable in first aid, CPR, fire extinguisher use, and evacuation procedures.
- G. Emergency Actions: In an emergency affecting the safety of life, the work, or adjoining property, the Contractor, to prevent such threatened loss or injury without special instruction or authorization from the Authority or the Engineer, is hereby permitted to act at his discretion.

1.04 WORK SUPERVISION AND COORDINATION

- A. Contractor's Supervisor: From the start of work through completion, the Contractor shall have a responsible and competent supervisor who shall meet the qualifications in Article 1.06 on site during all working hours. When the Supervisor must leave site during work, a temporary Supervisor shall be appointed.
- B. Quality of Work: The Supervisor shall supervise and inspect the Work competently and efficiently, devoting such skills and expertise as necessary to ensure the Work is performed in accordance with the Contract Documents, and that all Work is of good quality and workmanship.

1.05 SUBMITTALS

- A. Pre-Project Submittal:

- 1. Waste Management Plan

- A Waste Management Plan for PCB and Universal Waste shall be prepared by the Contractor and the Contractor must obtain approval of the Waste Management Plan by NYCSCA IEH Division a minimum of

two weeks prior to the start of site activities. In the Waste Management Plan, the Contractor shall provide, at a minimum:

- a. Licenses and certifications, including PCB training, for all personnel to be used on the project.
- b. Provide a listing, including company name, name of owner, and address of facility, of the off-site disposal facility(ies), for the specific material to be disposed and a copy of each facility's permit (NYSDEC and/or equivalent out of state) and a complete listing of the facility's pre-acceptance testing and disposal requirements for the specific material. Provide this information for each waste stream listed in Table 1 in Article 1.29.
- c. Provide a listing, including company name and address, of proposed waste haulers. Provide for each proposed waste hauler a copy of the valid 6 NYCRR 364 Waste Transporter Permit. Contractor shall furnish a list approved by the Authority that identifies the make, model, truck number and registration plate number of each of the trucks that shall transport the material to the designated facility(ies). All proposed destination facilities, listed as required by c above, shall be listed in the waste transporter permits provided.
- d. If applicable, provide a completed waste profile form for the proposed facility(ies) along with a cover letter on Contractor letterhead certifying that the Contractor has provided the disposal facility with the analytical data. Contractor must verify in writing that full disclosure has been provided to the disposal facility.

- e. Specimen copy of the waste manifest, partially completed.
 - f. Permits for the Transporters (364, A901, EPA Transporter ID, PCB Handler, etc); and
 - g. Approval letters from the final disposal facility to the TSDF, and from the TSDF to the Contractor (or NYCSCA)).
2. Provide Certificates of Insurance naming the Authority, Department of Education, and the City of New York as additional insured.
3. Health and Safety Plan (HASP): Provide a written HASP to protect workers and school occupants from possible hazards based on the Contractor's evaluation of tasks to be performed, (including work with PCB-containing and/or presumed PCB-containing light fixtures and ballasts, ACM, hazardous wastes and universal wastes), and addressing procedures for work place safety (including meeting 29 CFR 1926.62 for lead-based paint considering the OSHA Permissible Exposure Limit (PEL) for PCBs instead of lead as the trigger for applicable requirements). The lead standard provisions considered relevant to PCB include exposure assessment, compliance program, protective work clothing and equipment, housekeeping, hygiene facilities and practices and employee information and training. An acceptable alternative program would be equivalent to that for ACM. The Contractor shall submit the HASP at least two (2) weeks prior to commencing construction activities for Authority review addressing, at minimum:
- a. Hazard Communication. Identification of physical and health hazards associated with the work, communication to employees, and name of the person responsible for Hazard Communication Program implementation.
 - b. Heat stress assessment/prevention Guidelines.
 - c. Procedures for using ladders safely.

- d. Electrical safety procedures.
 - e. Hazard/exposure assessments and determination of engineering controls, Personal Protective Equipment and/or monitoring needed to ensure exposure is within OSHA requirements.
 - f. Training.
 - g. Certifications (e.g., asbestos, for ACM work).
4. Emergency Action Plan: Provide a written Emergency Action Plan that outlines actions to be performed for emergencies including fire, accident, power failure, safety system failure, breach of work area dust barrier, unexpected hazardous material or waste contamination at the site or adjoining grounds, or hazardous material or waste releases. This Plan shall identify how emergencies are announced, escape routes, and procedures to account for all employees after evacuation. The Plan shall identify persons responsible for fire/life safety duties including Site Safety Coordinator, fire prevention equipment and control of fuel hazards, and the Emergency Response Team (see Paragraph "Emergency Response" of Article 1.03). It shall be readily available for review by all workers.
5. Fall Protection Plan: Provide a written Fall Protection Plan that outlines actions to be performed to protect personnel working at elevation including specific fall protection devices to be used, training provided to personnel for same and training of designated competent person in charge of and responsible for the elevated work site.
6. Provide proof of arrangements for transport and disposal of hazardous, universal and electronics wastes with transporter and disposal or recycling sites that are permitted to accept wastes with the constituents known to be present (e.g., asbestos, PCB, etc.). Provide copies of permits

for the hazardous waste hauler, and disposal or recycling site (including each disposal and transit state) to the Authority at least three (3) weeks prior to commencing construction activities for Authority review. If pre-work survey testing indicated there is no lead-based paint, this submittal for lead is only required upon receiving results from waste testing (per Article 1.28) which indicate that construction waste is hazardous waste due to lead.

7. Provide a copy of the "c7" notification to NYSDEC for each recycling facility used to recycle architectural wastes containing lead-based paint (e.g., scrap metal) or electronics waste (e.g., computers, computer peripheral devices, computer monitors, computer projectors, televisions, VCRs, DVD players, printers, fax machines, audio equipment) that would otherwise be hazardous waste at least three (3) weeks prior to commencing construction activities for Authority review, when required by NYSDEC regulations (6 NYCRR 371.1(c)(7)). In the event revised NYSDEC regulations no longer require notification, meet regulatory requirements in effect when the work is performed and provide a copy of communications referencing the facility's capability, permits and agreement to accept the wastes for recycling. For electronics, the communication must reference that it follows all federal, state and local regulations applicable to a Collector, Dismantler, or Recycler of Used Electronic Equipment.
8. Provide manufacturer's literature on all proposed job related equipment and products to be used on this project that require SCA approval. Provide Material Safety Data Sheets (MSDS) for chemicals to be used (e.g., solvents, wetting agents).
9. Provide a sample of the daily log proposed for use. Minimally, it should include date(s) and time(s) when all personnel enter and leave lead-based paint or other hazardous material work area(s).
10. Structural Stability Drawings

11. Provide a detailed PCB Management Plan that describes all aspects of the work to be performed and PCB precautions for this project based on a hazard assessment of the possible disturbance or removal of PCB containing ballasts during the project and the requirements of the specifications. The Contractor shall submit the management plan to the Authority at least three (3) weeks prior to commencing construction activities for Authority review. The PCB Management Plan shall include:
 - a. A summary of all work to be conducted and a more detailed description of all work activities that could disturb ballasts during the project.
 - b. A listing of all types of ballasts, including locations, which will be disturbed during the project (e.g., window frame, window sash glazing, door frame, roof parapet stone, exterior wall, sidewalk).
 - c. A description of controls for dusts generated as part of the project. The minimum dust control requirements for projects that may disturb PCBs are described in Articles 1.21, and 1.23 through 1.25. All dust controls shall meet the requirements of 29 CFR 1926.62 for lead in construction or equivalent as described in Article 1.09.
 - d. HVAC isolation.
 - e. Cleaning activities.
 - f. A description of the methods of removing PCB-containing light fixtures as part of the project. The minimum requirements are described in Articles 1.23 through 1.25.
 - g. Waste sampling, handling, characterization and management, as detailed in Articles 1.28. Waste recycling and disposal, as detailed in Articles 1.26 through 1.29.

- h. Information regarding the PCB containing waste hauler, transport route and disposal site (including permits for the disposal site and every transit state).

12. Occupant Protection Plan

- a. Provide an "Occupant Protection Plan" as required by Section BC 3303.10.
- b. Plan must be maintained at site for duration of the project.

B. During Work Submittal:

- 1. Schedule of Work Changes: Any changes in the Schedule of Work proposed by the Contractor shall be submitted for approval within seven days of the commencement date of the proposed change. Submit a revised Schedule at the end of each week.
- 2. Submit all waste analysis results used to determine if construction waste is hazardous and a copy of waste profiles approved by the disposal sites immediately upon receipt by the Contractor.
- 3. Evidence that those signing manifests have received DOT Hazardous Materials Shipping Training (initial and refresher every 3 years per USDOT regulations).
- 4. A signed, and completed copy of each waste shipping record form used (e.g., hazardous waste manifests, universal and electronics waste shipping papers), associated submittals (e.g., Land Disposal Ban notifications/certifications), and records of the disposal facility's acceptance of the waste, shall be submitted within twenty-four hours of the Contractor's preparing or receiving them.

C. Post Project Submittal:

- 1. A copy of the bound logbook.

2. Compilation in chronological order of all project personal air monitoring records, if applicable.
3. Compilation of all completed and signed Waste Shipment Record forms, waste manifests, waste analysis results/waste profiles, bills of lading, or disposal/recycling receipt records pertaining to this project.
4. End of job "Contractor Notification Statement" required by EPA for work disturbing lead-based paint in "target" areas stating that the required notices remained Posted throughout the work (pro forma requirement of 40 CFR 745.84(c)(3)).
5. Copies of digital photographs (electronic files) taken during activities disturbing lead-based paint or PCB ballast in accordance with Article 1.06.

1.06 QUALITY ASSURANCE

- A. Work of this Section involving lead-based paint shall be overseen on-site by the Contractor's Lead-Paint Supervisor who must have received OSHA awareness training and training on the requirements of the Contractors program to comply with 29 CFR 1926.62 and have a minimum of three years experience in supervising either lead abatement, Asbestos Abatement or other hazardous substance abatement/remediation projects.
- B. All lead-based paint work after April 22, 2010, in 'target' areas (see paragraph 1.01.E.) in pre-1978 schools disturbing lead-based paint must at minimum be directed by a "Certified Renovator" who will ensure that all work practice requirements are met (40 CFR 745.85), train all workers (40 CFR 745.89 and 90(a) and (b)(2)) and meet all other regulatory obligations (e.g., 40 CFR 745.90).
- C. The Contractor shall perform inspections of building material debris to confirm the absence of assumed lead-based paint or shall have TCLP data showing the waste is non-hazardous before the Contractor labels any interior building component waste as non-hazardous waste instead of hazardous waste and offers it for shipment off-site.

- D. Work of this Section involving light fixtures, shall be overseen on-site by the Contractor's PCB Management Supervisor, who must have received awareness training in accordance with Article 1.10, be thoroughly familiar with the requirements of the Contractor's PCB Management Plan and have a minimum of three years experience in supervising either removal of PCB-containing ballasts/light fixtures, lead abatement, Asbestos Abatement or other hazardous substance abatement/remediation projects.
- E. The contractor shall perform the inspections required in Article 1.10 of this specification and confirm the absence of PCB's before it labels any building component waste, cleanup waste or debris as non-hazardous waste instead of New York State hazardous waste and offers it for shipment off-site.
- F. Digital Photographs shall be taken by the Lead-Paint Supervisor or the PCB Management Supervisor, as appropriate, documenting the quality of the work performed in accordance with this Specification Section during lead-based paint disturbance or light fixture disturbance where PCB content is assumed, or is known to contain PCB concentration equal to or above 50 ppm, of the activities/areas listed below, when applicable and required.
 - 1. Workers in PPE.
 - 2. Workers utilizing HEPA vacuums.
 - 3. Air filtration devices (if utilized).
 - 4. Workers establishing dust barriers, wrapping/covering objects inside and outside the barrier and performing other critical dust control measures.
 - 5. Exposed soil underneath scaffolding (before and after) and other horizontal surfaces affected by the work (e.g., roof areas near parapet work).
 - 6. Protection of areas beneath scaffolding (i.e. plastic).

7. Windows in the work area (during window removal from opening, plasticized).
8. Air intakes, air conditioners and radiators in the vicinity of the work area (plasticized)
9. Waste storage drums and dumpsters with labels.
10. Work area before and after final clean-up and visual inspection.
11. Interior and exterior window sills (before and after).
12. Interior courtyard conditions (before and after).

1.07 PROTECTION

A. General Safety Restrictions

1. The operation of the fire alarm telegraph, the interior fire alarm system, gongs, bells and telephones shall not be interfered with.
2. Nothing shall be done to in any way block the streets at or about exits, or the exits themselves.
3. There shall be no unauthorized interference with the free and unobstructed use of hallways, stairways, toilets and rooms.
4. Whenever work is carried on during school sessions, not more than one stairway shall be closed off from free and safe use at any time, and this only after written permission is obtained from the Authority. Closing of a stair or exit will require the Contractor to file a Temporary Egress Plan.
5. No part of the building or premises shall be closed to the use of the occupants without the permission of the Authority. When such permission has been given, erect temporary partitions and barriers wherever required to ensure the absolute safety of the occupants of the building and premises. If an entrance or

stair is to be closed, the Contractor is to perform an egress analysis and to file a Temporary Egress Plan.

6. Maintain on the premises a complete file of Material Safety Data Sheets for all materials, arranged by specifications section number. The file shall be available to the Authority's Representative for reference at all times.

B. Precautions Against Fire

1. Take every precaution in the performance of the Work to prevent fires.
2. Smoking shall not be permitted within the premises at any time.
3. New York City Fire Department (FDNY) regulations shall govern the storage and use of flammable materials. Flammable materials and fire-producing equipment shall not be left unattended in locations accessible to pupils. All polyethylene sheeting shall be flame retardant in accordance with NFPA 701.
4. Rubbish shall be removed as hereinafter specified.
5. Fire extinguishers and other protective equipment shall be provided as required by regulations.
6. During all interruptions of Work, flammable mixtures shall be stored in designated locations.

C. Fire Watch

A Fire Watch shall be provided in accordance with Section S01500 - Temporary Facilities and Controls as required by FDNY and as required by pertaining sections of this Contract.

D. Temporary Maintenance of Hazardous Conditions

1. Upon receipt of the Notice to Proceed, carefully inspect all existing work which is required to be repaired, altered or removed. Any such work

which is found to be weakened, structurally unsafe or otherwise hazardous, shall be immediately put in a safe condition and so maintained until such time as the permanent work in connection therewith is completed.

2. Any restrictions regarding sequence of operations and locations of work do not apply to the elimination of hazardous conditions; all parts of the premises will be available at all times for the performance of such work.

E. Protection of Property

1. The Contractor shall be responsible for all damage to all new and existing work on the premises due to the Contractor's operations, and shall provide and maintain adequate protection against such damage.
2. The premises shall not be used as a work shop to the detriment of any portion thereof.
3. Desks, tables, benches and other furniture and equipment shall not be used as workbenches; neither shall materials and furniture be piled thereon without proper protection. Where painted surfaces to be disturbed are known or assumed to contain lead-based paint in accordance with Article 1.01, or where PCB ballast/fixture removal shall occur, all furniture shall be completely covered and sealed in one layer of 6-mil polyethylene sheeting. The sheeting shall not be removed until clean-up is complete. When test results are provided by the Authority that indicates surfaces do not contain lead-based paint, all furniture shall be protected by drop cloths or 6-mil fire-retardant polyethylene sheeting.
4. Provide decking on floors, steps, platforms, pavements and roofs where subject to damage from heavy traffic.
5. Provide protection of existing roofing and flashing and limit traffic to prevent any damage to the existing work. As a minimum provide a

protective compressible layer of polyisocyanurate roof insulation board, 1" minimum thickness, over the existing membrane, and cover this cushion layer with a layer of hard protective board.

Where there is a warranty in effect, the protection shall be acceptable to the roofing manufacturer such that the existing roof warranty is not jeopardized. Obtain the manufacturer's written approval of the protection methods and submit it to the Authority prior to beginning work on the roof.

6. Protect doors and door jambs when conveying rubbish and materials.
7. Provide and maintain barricades to confine dust to work areas.
8. Provide watertight enclosures over openings at roof and walls; provide watertight protection where tank houses, bulkheads and other roof structures are removed; remove temporary waterproofing protection for installation of new permanent work.
9. All damage to adjoining work due to failure to provide adequate protection shall be corrected by the Contractor at the Contractor's expense.
10. After completion of the Work, the Contractor shall thereafter protect Work until it is accepted.

F. Protection of Public

1. The Contractor shall be responsible for all injury to persons due to the Contractor's operations and shall provide and maintain adequate protection against such injury.
2. Provide guards, rails, barricades, fences, sidewalk sheds, catch-platforms, decking, night lighting, and all other items as required by New York City Building Laws and as further required to provide adequate protection.

3. Protect sidewalks and curbs around the premises so they may be safely used by the public at all times.
4. Provide barricades around work areas as required to prevent pupils and other unauthorized persons from entering therein.
5. Provide plumbing and temporary drainage as required to keep all pits, trenches and other excavations, and the adjoining areas of the premises, dry during the course of the work.
6. Prevent exposure of persons to hazardous materials, offensive odors, noxious or toxic fumes or gases. Ensure that such contaminants are not re-circulated through the ventilation systems, or through windows and openings, to occupied areas. Ventilate work areas prior to re-occupancy, to make certain that odors and gases are properly dissipated. Notify the Authority's Representative to conduct an inspection of affected areas prior to re-occupancy.

G. Stability and Integrity of Existing Structures

1. Shoring of members and protection of the existing structure during construction is the responsibility of the Contractor and shall comply with the requirements of the NYC Building Code.
2. The most stringent requirements of the Building Code, Contract Drawings, Specifications, or any authorities having jurisdiction shall govern this Work.
3. Coordinate Work of this Section with Work of all other Divisions so as to properly, and completely, install all Work as indicated on Drawings or specified.
4. The Contractor shall engage the services of a third party Registered Professional Engineer (not a direct employee) to prepare details of bracing, shoring, and other construction required to maintain the structural safety and integrity of the existing structure during construction

operations as per Section BC 1704.20.7 of the 2014 NYC Building Code.

- a. The Contractor's Engineer shall file Form PW-1 with the Building Department, thereby becoming the Engineer of Record for such protection work and is responsible for shoring and bracing of all members requiring such and for preparation of all design and shop drawings and their approval by the Building Department prior to permit. Drawings must be submitted to the Architect/Engineer of Record (AEOR) for review.
- b. As per Section BC 1704.20.7.1, the documents prepared by the Contractor's engineer shall include requirements for monitoring the subject structure and/or adjacent structures including a monitoring plan, and specify the scope and frequency of monitoring, acceptable tolerances, and reporting criteria when tolerances are exceeded. Any monitoring program required by the Contract Documents shall be included in the Contractors plan.
- c. The SCA will engage a Special Inspection Agency to perform the Special Inspection described in paragraph BC 1704.20.

1.08 POTENTIALLY HAZARDOUS MATERIALS DISCOVERED DURING WORK

- A. The Authority endeavors to identify materials subject to demolition and disturbance that may contain hazardous materials (i.e., asbestos, lead and PCB-containing caulk, mold) prior to defining the work; however, hidden materials may be discovered upon demolition or removal of building components.
- B. Work shall be stopped and the Authority shall be immediately notified whenever caulk, paint or potential asbestos containing material that is not part of a previously sampled homogenous group is discovered. The Authority will confirm whether the material is part of a previously sampled homogenous group or requires sampling and analysis for asbestos,

lead and/or PCBs and will determine whether and when work in that area can resume.

- C. Where microbial/mold growth is encountered during construction/demolition operations that has not been previously identified to be removed, or if the quantity of mold encountered differs from what was specified, the Contractor shall notify the Authority immediately and await further direction for steps to remediate the condition responsibly while ensuring overall occupant, worker and building health. In all cases, the Authority's environmental consultant shall perform the mold assessment. Corrective work to stop the water infiltration source shall occur prior to rebuilding of the area.

1.09 PRECAUTIONS AGAINST LEAD PAINT EXPOSURE

- A. Provide precautions against lead paint exposure where existing paint is to be removed or disturbed and the paint is known or assumed to contain lead. When removing or disturbing existing paint on surfaces that have not been tested by the Authority for lead content, the existing paint shall be assumed to contain lead and shall be treated as if it is lead based paint.
1. Where existing paint is to be removed or disturbed, provide dust barriers (Refer to Article 1.21, herein) and other means of containing dust, dirt, paint particles, and debris to the immediate work area. Workers shall not track dust and paint particles through occupied areas. Where possible, provide separate work area access for workers.
 2. Comply fully with OSHA Lead in Construction Standard (29 CFR 1926.62) and the EPA Lead Based Paint Poisoning Prevention Rule (40 CFR 745), most recent version thereof.
 3. Post warning signs clearly defining the work area which read "WARNING: Authorized Personnel Only" along with any other required signs (e.g., for ACM/Lead) posted for the duration of renovation until cleaning verification is completed.

4. Interior renovation precautions shall include, but are not limited to:
 - a. Remove all movable objects from the work area, including furniture, rugs, and window coverings. Cover all non-movable objects with 6 mil fireproof plastic sheeting with all seams and edges taped or otherwise sealed.
 - b. Close and cover all duct openings in the work area with taped-down 6 mil fireproof plastic sheeting.
 - c. Close windows and doors in the work area. Doors used as an entrance to the work area must have a dust flap (3-layer plastic sheeting) that allows workers to pass through while confining dust and debris to the work area. All other doors as well as fixed closets, cabinets, refrigerators, etc. which remain in the work area must be covered with 6 mil fireproof plastic sheeting and sealed.
 - d. Cover the floor surface, including installed carpet, with taped-down 6 mil fireproof plastic sheeting or construction paper in the work area 6 feet beyond the perimeter of surfaces undergoing renovation, to the dust barrier, or a sufficient distance to contain the dust, whichever is greater.
 - e. Use precautions to ensure that all personnel, tools, and other items, including the exteriors of waste containers, are free of dust and debris before leaving the work area (e.g., by HEPA vacuuming or wet wiping).
5. Exterior renovation precautions shall include, but are not limited to:
 - a. Close all doors and windows within 35 feet of the renovation on the same floor as the renovation and on all floors below within

the same horizontal distance from the renovation.

- b. Ensure that doors within the work area that will be used during the work are covered with 6 mil fireproof plastic sheeting in a manner that allows workers to pass through.
- c. Place 6-mil fire-retardant poly protection on all grade areas including under scaffolding to collect falling debris. Such protection shall also be placed on roofs and on top of side walk bridges in the vicinity of the work area. Plastic shall be extended from the building to a distance of 15 feet from the building and at least 15 feet laterally beyond each side of the work. Joints must be taped or otherwise secured to maintain coverage of the required areas and protect plastic from the effects of wind or rain.
- d. Take other necessary precautions to ensure that dust and debris from the renovation does not contaminate other buildings or other areas of the property or migrate to adjacent properties (e.g., promptly removing waste and debris, suspending work and rolling up plastic before high wind conditions, etc.).

6. Prohibited and restricted practices include:

- a. Open-flame burning or torching of lead-based paint.
- b. Use of tools that remove lead-based paint through high speed operation (e.g., sanding, grinding, power planing, needle gun, abrasive blasting, or sandblasting) unless equipped with a HEPA dust collection system including an attached shroud connected to a HEPA vacuum system for capture of dust and information on proposed tool model and design is submitted in advance for approval by the Authority.

- c. Operating a heat gun on lead-based paint is permitted only at temperatures below 1100 degrees Fahrenheit.
- 7. Clean-up: Provide daily and work completion clean-up in accordance with Article 1.27, as a minimum clean-up requirement. Provide more frequent clean-up as conditions require. Provide a thorough final clean up as specified in Article 1.27.
- 8. Waste Management and Disposal: Segregate waste and debris that contains lead-based paint from all other waste and debris for the purposes of waste characterization to minimize the potential quantity of hazardous waste generated. Place waste in DOT-approved container, remove from premises, and dispose of all existing paint materials, dust, dirt, and debris removed from existing painted surfaces, in compliance with New York City, New York State, and Federal regulations. No painted debris coated with known or assumed lead-based paint shall be transported in open containers at any time during the project. All debris shall be disposed of in accordance with Article 1.28 herein.
- 9. If caulks are disturbed during paint removal or abatement, analyze the paint waste for total PCBs in addition to lead TCLP testing unless test results are provided by the Authority.

B. Contractors Bid Amount

- 1. For purposes of bidding, the Contractor's Bid Amount shall include disposal of all painted waste and debris as non-hazardous "Construction and Demolition" (C&D) waste and disposal of all related project waste (plastic, cleanup waste, water, etc.) in accordance with applicable regulations.
- 2. The Contract Amount shall be adjusted by Change Order if TCLP testing, as described herein in Article 1.28, determines that some or all painted waste is considered hazardous in accordance with

Environmental Protection Agency (EPA) Resource Conservation and Recovery Act (RCRA) regulations.

1.10 PRECAUTIONS AGAINST PCB BALLAST, LIGHT BULB AND MERCURY CONTAINING EQUIPMENT CONTAMINATION

- A. Fluorescent light ballasts, light bulbs, Mercury Containing Equipment (MCE), lead-acid batteries and universal waste batteries (e.g., rechargeable, lithium or button batteries) shall be carefully removed before an area or equipment is demolished or disturbed by the work.
1. All fluorescent light ballasts are presumed to contain more than 50 ppm of PCBs, unless labeled "No PCBs". If labeled "No PCBs", the ballasts recycling or disposal is not regulated by TSCA and may be recycled or disposed of as solid waste.
 2. Light bulbs (the bulb or tube portion of an electric lighting device) may be universal waste. All fluorescent (including compact fluorescent), high intensity discharge, mercury vapor, high pressure sodium, and metal halide lamps may release mercury if broken.
 3. All devices that contain elemental mercury integral to its function (e.g., thermometers, thermostats, barometers, manometers, temperature and pressure gauges, and mercury switches) are considered MCE and can be managed as universal waste if they remain sealed and undamaged. If you remove mercury from MCE, it is no longer Universal Waste and must be managed as hazardous waste or a determination made that it is not hazardous (40 CFR 273.4(b)(3)).
- B. Provide all necessary precautions when ballasts, light bulbs and MCE are disturbed or removed to protect students, teachers, building occupants and workers from PCB and mercury exposure and/or prevent environmental contamination. For ballast and light fixtures, refer to Articles 1.10, 1.23, 1.24 and 1.25. Do not remove mercury from MCE, only remove the MCE or ampules intact in accordance with Universal Waste regulations.

- C. If leaking ballasts, broken mercury containing light bulbs or broken or leaking MCE are identified, the Authority's IEH Division shall be notified immediately.
- D. Personnel performing the work must receive OSHA Hazard Communication, PCB awareness training, training and work practices training related to PCB and mercury hazards and handling ballasts, light bulbs and MCE, as applicable to the work. Training on work practices will include, but not be limited to, health hazards, hazard control procedures, electrical hazards, lock-out/tag-out, dust control measures, waste labeling/management, security, cleanup, and other NYCSCA and regulatory required work practices. Personnel managing hazardous waste or universal waste shall be trained in hazardous and universal waste management.
- E. All known or suspected PCB containing light ballasts, light bulbs, MCE, lead-acid batteries and universal waste batteries shall be disposed of in accordance with Article 1.29 herein, titled "DISPOSAL OF PCB BALLASTS, LIGHT BULBS, MCE, UNIVERSAL WASTE BATTERIES AND ELECTRONICS WASTE".

1.11 NON-INTERFERENCE WITH SCHOOL FUNCTIONS

- A. Perform the Work in such a manner that normal school functions may be carried on throughout the period of work with a minimum of interference. Before commencing work in any portion of the premises normally used for school functions, meet with the Authority's Representative and the school Principal and perfect a working agreement. Noise shall be kept to a minimum.
- B. In general, the Contractor shall not use or work in rooms, corridors, stairs, or elevators designated for students or school personnel.
- C. The Authority may assign a stair for Contractor use during working hours. Refer to the Phasing Exhibit. The Contractor shall only use the stair for access to

floors and shall not in any way obstruct the stair or make it unsuitable for use as an exit by the school's occupants.

1.12 **FRATERNIZATION**

- A. Contractor shall prohibit all contact between Contractor's employees (including Subcontractor's employees and visitors to the site) and the students and school staff.

1.13 **WORK SCHEDULE AND PHASING**

A. General

- 1. All Work must be performed according to a Work schedule outlined in the Phasing Exhibit that will not disrupt school activities. Any Work that is disruptive to school activities shall be performed as Mandatory Work After School Hours.

All decisions affecting the normal operation of the school shall be coordinated with the School's Principal through the Authority's Representative.

- B. All removal activities shall be conducted during off-hours when students and teaching staff are not in the building. Adequate time must be scheduled for projects with removal of ACM wiring or other ACM materials, as these ACM/PCB projects have the added requirement for air sampling and analysis.

- C. Work that shall be performed only when the school is totally unoccupied shall be as follows:

- 1. Asbestos abatement.
- 2. Light fixture/PCB Ballast removal.
- 3. Lead abatement.
- 4. PCB Caulk removal.
- 5. Contaminated soil remediation.
- 6. Structural Work critical to the integrity of the building.

7. Any Work generating dust, offensive odors, noxious or toxic fumes or gases (including but not limited to those containing chemicals or mineral dusts listed in 40 CFR 1910.1000 - Air Contaminants, Tables Z-1, Z-2, and Z-3) that cannot be contained within an isolated Work area.
8. Boiler start-up and testing.
9. Ventilation system start-up and testing.
10. Burning, welding, brazing, sweating

D. Voluntary Overtime Work:

When permission to perform overtime or alternate shift Work is requested by the Contractor for the Contractor's own purposes, in order to meet schedules or for the Contractor's own convenience, the Overtime Work (including the cost of overtime custodial services) shall be considered to have been included in the Contract Price and no increase in the Contract Price, or Extra, will be granted for the Overtime Work. Contractor shall pay all incurred overtime custodial services and all costs necessary to maintain the construction operation including but not limited to permits, temporary heat, temporary lighting, and temporary power.

E. Mandatory Overtime Work

If at any time, in the judgment of the Authority, any item of Work is behind the established construction progress schedule, or is causing a delay that will affect the contract completion date, the Authority may order the Contractor to increase The Contractor's Work force or to work the Contractor's forces and the forces of any Subcontractor overtime, at the Contractor's expense, until such time as all items of work have progressed to be in accordance with the accepted construction progress schedule. The Contractor shall pay all incurred overtime custodial services and all costs necessary to maintain the construction operation including but not limited to permits, temporary heat, temporary lighting, and temporary power.

F. Ordered Premium Overtime Work

1. The Authority reserves the right to order and pay for rescheduling any regularly scheduled Work (other than that Work hereinbefore classified under Voluntary and Mandatory Overtime Provisions) as Premium Work or to add Premium Work to the regularly scheduled Work.
2. Such Premium Work will be made by Change Order of Extra Work as identified elsewhere in the Contract Documents.
3. Extra payment for Change Order of Extra Work shall be paid only for the actual difference between "regular labor rates" and "overtime labor rates," and the cost of any additional labor, material, permits, custodial and ancillary services (if any); plus an amount in accordance with the provisions of the Contract for any and all other costs, overhead, and profits that might be incurred by the Contractor, as determined by the Authority.

G. Payment of Fees for Custodial Services/DOB and Other Agency Permits

1. On receiving permission from the Authority to perform Work in the building(s) after the building(s) is vacated and for ordered Premium Work on Saturdays, Sundays, Holidays and after the regular hours of duty on business days, the Contractor shall obtain a "custodial permit" and provide compensation for the custodial staff at the rate specified by the custodial contract in force at the time of construction.
2. Obtain and pay for all after hours work permits from the Department of Buildings.

H. Contractor's Procedure for Performing Overtime or Ordered Premium Work To Be Done Prior To Commencing Work:

1. Make arrangements to schedule and pay for duly authorized custodial permits, as specified in

paragraph G, "Payment of Fees for Custodial Services", above.

2. Make immediate arrangements to provide such ancillary services, if any, as may be required by the School Boards, Working Men, and Community, including, but not limited to:
 - a. Sanitary facilities and drinking water.
 - b. Power and light.
 - c. Heating, Ventilating and Air Conditioning.
 - d. Fire Protection.
 - e. Security.
 - f. Dust Protection.
 - g. Clean-up and debris removal.
 - h. Obtain permit from Supervisory bureau.

I. Contractor's Procedure During Overtime and Ordered Premium Work periods:

1. Proceed expeditiously with Work.
2. Do not begin any Work in any space unless all of the required materials and labor to complete that Work are at the job when Overtime or Ordered Premium work is scheduled to begin.
3. Complete all Work in each phase by all trades that have Work to be accomplished in each phase and inside each defined area.
4. All other limitations and restrictions governing Contract Work during school sessions shall apply to Overtime and Ordered Premium Work.

J. Opening Permits (For Work Involving Wet Mopping & Wiping)

1. For work that must be performed on holidays, weekends and after-school-hours, the Contractor

shall obtain from the Department of Buildings an "After-Hour Work Permit", and shall arrange to schedule and pay for extra custodial services as specified in paragraph titled "Payment for Custodial Services", in this Article.

1.14 CHANGE IN LEVELS

A. Where finished floor and yard levels are raised or lowered as a result of Work specified, the Contractor shall make corresponding adjustments to existing floor registers, trap screws, plugs, catch basins, covers to cesspools and dry wells, coal holes, fresh air inlets, grates, fences, railings, tracks and all other work adversely affected by the change in levels, as required to restore proper relationship between these articles and the new floor or yard surface.

1.15 WATER

A. Water required for construction may be taken only from existing hose bibbs or Janitor's Sink Closets.

1.16 ELECTRIC CURRENT

A. Except where required to maintain proper school functions, the existing electrical outlets on the premises will be available to the Contractor for the operation of low amperage power-driven tools.

1.17 STORAGE SPACE

A. Storage space, if available, will be designated or assigned by the Authority. Interior space will be assigned for storage of material liable to damage by weather. Provide any additional protection required and assume all responsibility for damage to materials. Do not store or temporarily leave materials in locations other than those assigned for storage.

1.18 MECHANICAL WORK

A. The removing of sanitary, heating and ventilating and electric work, including plumbing fixtures, pipes, metal ducts, radiators, lighting fixtures, wires, bells, telephones, and other incidental removals, and the repairing, altering, extending and replacing of

such work will be done by the Contractor, as required for the completion of the Work.

- B. All work damaged, disturbed or otherwise affected by the alterations shall be repaired.

1.19 MOVING OF FURNITURE, ARTICLES, AND FIXTURES

- A. When the moving of furniture, shades, clocks, pictures, maps, plaster casts and other articles or fixtures is made necessary in the carrying on of the alterations, repair work, painting, cutting of openings through or removing of existing walls and partitions, or for any other such reason, the removing, resetting and relocating together with the necessary repairing, shall be carefully done as a part of this Contract.
- B. Existing window shades, toilet accessories and other appliances shall be replaced and left in good condition; those which cannot be replaced shall be left in care of the Custodian.
- C. All removed work shall be protected.

1.20 EXISTING MATERIALS

- A. Unless otherwise specified, it is intended that new materials shall be furnished, but if during the progress of Work it is found that existing materials, other than for plumbing work, are sound and of proper quality and dimensions, as required by the Drawings and Specifications, the Contractor may use the such materials, provided they are acceptable and have first been approved in writing by the Authority, who will determine the proper allowance to be made for the omission of new materials.

1.21 TEMPORARY DUST PARTITIONS AND BARRIERS

- A. Dust Partitions (non-Fire-rated)

Provide temporary dust-tight partitions and doors complying with all requirements of the City of New York City Building Code and all authorities having jurisdiction.

1. Partitions shall extend tightly between walls and partitions, and tightly from floor to ceiling, at locations indicated on the Drawings.
2. Partitions shall be of 2"x4" stud framing, 16" on center with 2"x 4" sill and cap members. Framing shall be entirely covered both sides with 5/8", gypsum wall boards. Provide 3" sound attenuation mineral fire blankets between studs. Both sides of the partition shall be finished with 1/4" x 2" tempered hardboard batten strips over all joints, horizontal and vertical.
3. Provide continuous neoprene gasketing at juncture of Partition with walls, floor and ceilings or underside of structure.
4. Provide at least one, hollow metal door and frame assembly in each partition, where required for access. Door shall be 36" wide by 84" high and each door shall be equipped with hardware as specified in Section 08710 - Finish Hardware: 1½ pairs of butts; a closer; pulls (2 required); rim latch operable by knob-release from work area, key-operated from the other side (furnish three (3) keys); and sill protection sweep.

B. Dust Partitions (Fire-rated)

1. Construct same as in A., above, except provide for 1-hour fire-rated construction: use Type X gypsum board; use 1-hour rated steel door and frame.

C. Dust Barriers

1. Construct of PVC piping framework, telescoping, with holes and pegs to allow adjustment of heights. Cover framework completely with fire-retardant polyethylene film, 6-mils minimum thickness, with flap for access. Install at doorways to form vestibule between work area and other areas. Tape junctures to obtain dust-tight barrier. Construct in manner to provide easy assembly and disassembly.

2. If paint known or assumed to be lead-based in accordance with Article 1.01 is present on surfaces to be disturbed or demolished, follow all precautions in Article 1.09. When test results are provided by the Authority which indicate that the paint is not lead-based paint, all objects in the room shall be covered with drop cloths or 6-mil fire-retardant polyethylene sheeting.
3. Closet doors, cabinets, refrigerators, drawers, etc. which remain in the work area during demolition shall, at minimum, be sealed with duct tape (or equivalent) at all openings where dust may penetrate. As an alternative, the Contractor may completely cover the object and all openings in one layer of 6-mil fire-retardant polyethylene sheeting, sealed on all edges to prevent the penetration of dust.
4. The Contractor shall continuously inspect adjacent non-work areas and ensure that these areas are free of any dust or debris generated by the work.

1.22 USE OF EXISTING SCHOOL ELEVATORS

- A. The use of an existing school elevator is not permitted otherwise stated in the Phasing Exhibit. If use of an existing elevator is allowed in the Phasing Exhibit, the Contractor understands that throughout the project duration the elevator will be utilized by the school during school hours. The Contractor shall be responsible for, and must adhere to, the following:
 1. The Contractor shall be responsible for, and shall provide all necessary labor and material for, the operation, maintenance and protection of this elevator during the period of its use for this project. The Contractor shall protect walls and floor with 1/2" plywood panels and shall maintain a clean and proper operating condition in the elevator, pits, shaft ways and machine rooms, and shall bear the cost of making any replacement or servicing required during such operation.

2. The Contractor shall be responsible for any damage to the elevator during the entire period of such use.
 3. The Contractor shall be responsible for the operation of this elevator from the beginning of the earliest work shift to the end of the latest work shift.
 4. Use of the elevator by another Contractor working at the Site shall be coordinated with the Authority.
- B. Immediately prior to the commencement of the Contractor's use of the School elevator, the Contractor shall have the elevator inspected by a qualified elevator repair subcontractor. The Contractor shall send a written report to the Authority's Field Representative and to the Director, Program Management, Division of School Facilities stating the condition of the elevator and any existing damage of the elevator, and all its related operating equipment, particularly describing all damages and deficiencies observed in the condition of any part of the elevator and its related operating equipment. The Authority's allowing the use of an elevator does not in any way imply or otherwise indicate that the elevator is in working condition.
- C. At the conclusion of the Contractor's use of the elevator, the Contractor shall advise the Authority's Field Representative, who shall arrange for an inspection by the Authority to ascertain, aside from the normal depreciation of the equipment, the existence of any damages for which the Contractor shall be responsible and to assure that the elevator is in safe and satisfactory condition.
- D. The Contractor shall remove protection and clean the elevator daily at the completion of the latest work shift.
- E. The hours during which the Contractor may use the elevator shall be as indicated by the Phasing Exhibit.

1.23 INTERIOR LIGHT FIXTURE INSPECTION

- A. The Contractor shall allow for interior light fixture inspection conducted by the IEH Division, which shall occur concurrently with fixture removal activities. Pre-kindergarten, kindergarten, first grade and special education classrooms with light fixture leakage that is visible from the exterior shall be deemed priority areas and inspected prior to or concurrent with fixture removal activities. Interior fixture inspection in other areas shall occur as part of the fixture removal activity.
- B. Interior light fixture inspection prior to light fixture removal
 - 1. Remove from the room or move to the side of the room furniture and all other movable items.
 - 2. Install 6-mil polyethylene sheeting (poly) on the floor directly beneath the potential priority area light fixture and extending approximately five feet in all directions. Non-movable objects within this five foot area shall be covered with one layer of poly. The poly shall be secured to the floor using duct tape or other acceptable means to prevent a tripping hazard.
 - 3. Shut off and lock out all electric power to the light fixtures.
 - 4. Use PPE, including chemically resistant gloves (e.g., nitrile) and safety glasses, as a minimum. Change gloves frequently.
 - 5. Remove the lamp cover or grille of the light fixture exposing the fluorescent lamps.
 - 6. Remove the fluorescent lamps, if necessary to open up the fixture, and store in a safe manner.

7. Allow for visual inspection by a representative of the IEH Division the exposed section of the light fixture.
8. Remove the ballast enclosure cover within the light fixture, exposing the ballast.
9. Maintain effective contamination control at all times to prevent the spread of discharge debris and/or dust to other sections of the room.
10. Allow for visual inspection of the exterior of ballast and the interior exposed section of the light fixture, including housing and wires, by a representative of the IEH Division.
11. If leakage or staining is associated with a suspect PCB ballast (i.e. not labeled No-PCB) or with a historic leak, removal of the PCB ballast(s) from these rooms will take priority. PCB Ballast removal protocols shall be followed in accordance with Articles 1.24 and 1.25.

1.24 PROTOCOLS FOR REMOVAL OF LIGHT FIXTURES WITH NON-ACM ELECTRICAL WIRING

- A. The work area preparation and removal of the light fixtures without ACM electrical wiring shall be conducted as follows:
 1. Move to the side of the room movable and loose items not removed from work areas.
 2. Install three polyethylene sheeting flaps on each doorway and seal all openings/penetrations in the work area including exhaust and supply ventilation system vents. Where feasible, open windows to help ventilate areas during work and/or add HEPA filtered local exhaust ventilation.

3. Enclose fixed objects within the work area with a minimum of one layer of 6-mil polyethylene sheeting sealed airtight with tape.
4. Install six-mil polyethylene sheeting on the floor directly beneath the light fixture(s) and extending approximately five feet in all directions. Non-movable objects within this five foot area shall be covered with one layer of sheeting. The sheeting shall be secured to the floor to prevent a tripping hazard.
5. De-energize all electric power to the light fixtures prior to opening a fixture. Install temporary lighting as necessary.
6. During removal of the light fixtures and ballasts, workers shall wear PPE including disposable coveralls, chemically resistant gloves (i.e., nitrile) and safety glasses, as a minimum. Change gloves frequently. Respiratory protection, consisting of respirators equipped with combination P100 and organic vapor cartridges, is required wherever the usage of engineering and work practice controls alone are not adequate to reduce exposures to or below the permissible exposure limit (PEL).
7. Remove the lamp cover or grille of the light fixture exposing the fluorescent lamps.
8. Remove the fluorescent lamps and store in a safe manner or carry directly to the authorized waste container meeting the requirements for storage and disposal.
9. Allow for visual inspection of the exposed section of the light fixture for potential PCB staining or leakage by a representative of the IEH Division.

10. Remove the ballast enclosure cover within the light fixture exposing the ballasts.
11. Remove the ballast and the exterior of the ballast (including all six sides). Conduct and allow for visual inspection of the interior exposed section of the light fixture including housing (with ballast removed), cover and wires by a representative of the IEH Division for any leakage or staining.
12. If leaking or staining is identified on the ballast or light fixture, remove the impacted item and place directly in the authorized waste container meeting the requirements for storage and disposal. Wrap in two layers of clear six-mil polyethylene sheeting, placed in waste container and disposed of as remediation PCB waste. Leaking ballasts shall be removed from the fixture and drummed (leaking PCB ballast drum) and incinerated at a U.S. EPA-approved TSCA permitted high temperature incinerator.
13. If no leaking or staining is identified on the ballast or light fixture, inspect the ballast to determine if it is labeled "No PCBs". If so labeled, the ballast may be recycled or disposed of as a solid waste and the fixture (but not the ballast(s)) may be recycled or disposed of as C&D waste. If the ballast is not labeled "No PCBs", it is assumed to be a PCB ballast and shall be removed, drummed (non-leaking PCB ballast drum), and recycled/incinerated at a U.S. EPA-approved TSCA permitted ballast recycling facility. Non-impacted fixtures can be disposed of as recycle or C&D waste.
14. Carry any waste generated directly to the authorized waste dumpster or container meeting the requirements for storage and disposal.

15. Subsequent to completion of removal of all clean-up and waste materials from the work area, provide the IEH Division forty-eight (48) hour written notification prior to removing any waste from the site.
16. Waste shall be removed from the site only during normal working hours unless otherwise specified. No waste may be taken from the site unless the Contractor and a representative of the IEH Division are present and the Contractor has provided and received from the IEH Division approval of pre-removal waste documentation and has correctly manifested waste.

1.25 PROTOCOLS FOR REMOVAL OF PCB LIGHT FIXTURES WITH ACM INSULATION ON ELECTRICAL WIRING

- A. A site-specific variance issued by the NYCDEP is required prior to start of the work. The work area preparation and removal of the light fixtures with ACM electrical wiring shall be conducted in accordance with the NYCDEP approved variance and in accordance with section 02081.
1. If leaking or staining is identified on the ballast or light fixture, remove the impacted item and place directly in the authorized waste container meeting the requirements for storage and disposal. Wrap in two layers of clear six-mil polyethylene sheeting, place in an approved waste container and dispose of as PCB and ACM remediation waste. Drum leaking ballasts (leaking PCB ballast drum) and dispose of as PCB waste. Following removal of fixture, strip back wire, cover exposed wire with wire nut, and wrap end of wire insulation in electrical tape to allow for fixture installation work to proceed without impacting remaining ACM wiring.

2. Any waste generated shall be carried directly to the approved waste dumpster or container meeting the requirements for storage and disposal.

1.26 REMOVAL OF RUBBISH

- A. Remove all rubbish (e.g., dirt, refuse, empty containers and packages, removed materials that become property of Contractor) from the premises as the work progresses. No rubbish of any kind shall be stored in any rooms, halls, passageways or yards and no accumulation of rubbish shall be allowed to remain in or about the premises at any time during the course of the work for more than 24 hours.
- B. All painted debris shall be disposed of in accordance with Article 1.28 herein, titled "DISPOSAL OF PAINTED WASTE AND DEBRIS". All presumed or known ACM waste shall be managed in accordance with Section 02081 and all presumed or known PCB-containing caulk waste shall be managed in accordance with Section 02082.
- C. Debris coated with paint known or assumed to be lead-based in accordance with Article 1.01, herein, shall under no circumstances be removed from the Work area in open containers.
- D. Debris coated with PCBs from leaking PCB ballasts shall be managed in accordance with Article 1.29.
- E. Should the Contractor fail to keep the building, /premises and surrounding sidewalks and streets clean and free from rubbish resulting from the Work, then the Authority may have such rubbish removed by others in accordance with the terms of the Contract. In such event, there shall be withheld from any payment to the Contractor a sum determined by The Authority sufficient to cover the cost of removal by other parties.

1.27 CLEAN-UP

- A. Daily Cleaning
 1. The Contractor shall provide daily wet mopping of floors subject to construction dust in all areas affected by the Work.

2. All vertical and horizontal surfaces shall be cleaned and have a polished appearance and have no accumulation of dust, dirt, marks, streaks, smudges or fingerprints. All lighting fixtures and related work shall be clean.
- B. Upon completion of the Work, the Contractor shall provide thorough clean-up of all areas affected by the Work as follows:
1. In general, clean-up requirements are limited to the removal of all rubbish, spatters, stains, smears, finger marks, foot tracks, from finish surfaces and the broom cleaning of floors, yards, sidewalks, and other areas on the premises that are affected by the Work.
 2. Where work that causes the dissemination of dust has been performed in the work area and within two feet of the work area, clean-up operations shall include, in addition to the operations hereinbefore specified, the following:
 - a. All paint chips, waste and debris shall be collected without dispersing any of it and sealed in a disposal container.
 - b. Remove dust mats, construction paper and protective dust barrier sheeting by misting with water, detaching it, folding it dirty side inward, and either taping to seal it or sealing it in heavy-duty bags. Sheeting separating contaminated rooms from non-contaminated rooms must remain in place until after removing other sheeting. Dispose of sheeting as waste.
 - c. Clean interior walls starting at the ceiling and working down to the floor by either HEPA vacuuming or wiping with a damp cloth. Thoroughly HEPA vacuum all remaining surfaces and objects in the work area, including furniture and fixtures. The HEPA vacuum must be equipped with a beater bar when vacuuming carpets and rugs.

- d. Wipe all remaining surfaces and objects in interior work areas, except for carpeted or upholstered surfaces, with a damp cloth. Mop uncarpeted floors thoroughly, using a mopping method that keeps the wash water separate from the rinse water, such as the 2-bucket mopping method or wet mopping system (i.e., mop head designed to be used with disposable absorbent cleaning pads, a reservoir for cleaning solution, and a built-in mechanism for distributing cleaning solution onto a floor, or a method of equivalent efficacy).
 - e. Inspect all interior and exterior work areas (an EPA certified renovator is required for lead-based paint work inspection). Repeat the above cleaning if any dust, debris or residue is present or as required to restore work areas to the same state of cleanliness existing before work began. Repeat the inspection after re-cleaning.
- 3. In performing dust-creating work, provide dust enclosures and foot mats to minimize the spread of dust and foot marks. Refer to Article 1.21 of this Section.
 - 4. This final clean-up is in addition to the required daily removal of rubbish.

C. Wet Wiping and HEPA Vacuuming

The Contractor shall provide wet wiping, and HEPA vacuuming of all interior surfaces (including furniture) in all areas affected by the Work, immediately prior to the releasing of the areas for school use.

1.28 DISPOSAL OF PAINTED WASTE AND DEBRIS

A. Water

- 1. The Contractor shall not dispose of water used to wash abated surfaces, wash the work area or water used to assist in the removal of paint in the City sewer system without first obtaining a

permit for such disposal from the New York City Department of Environmental Protection (DEP). Until such a permit is obtained or the waste water is characterized and disposed at a licensed waste disposal facility (in accordance with paragraphs B and C below), all water shall be containerized as described in Subparagraph C.1 below.

2. The Contractor shall ensure that water is separated from solid waste (i.e., paint residue, chemical stripper) and the method used for separation is clearly described in the DEP application.
3. The Contractor shall test the water for the parameters listed below. In addition, the Contractor may be asked by the DEP to test for other parameters not listed.
 - a. Total Petro-Hydrocarbons
 - b. pH
 - c. RCRA Seven Metals
 - d. Cyanide
 - e. Flashpoint
 - f. Total Solids
4. The cost of water testing and analyses, permit application process and off-site disposal is the responsibility of the Contractor.

B. Testing and Hazardous Waste Determination

1. Perform Toxicity Characteristic Leaching Procedure (TCLP) testing of all painted waste and debris streams generated. If there are both lead-based paint areas and non-lead-based paint areas in the scope of work, the waste from lead-based paint areas must be segregated and separately sampled and analyzed. Non-lead-based paint waste stream analysis is required because the TCLP test and thresholds are different from lead-paint test

and thresholds. The Authority may waive this requirement, but only if it has prior in-place waste or other data that has already determined whether the waste is hazardous.

- a. Collect at least one representative composite sample of each waste stream containing LBP painted surfaces and one representative composite sample of each waste containing non-LBP painted surfaces. An example representative sampling and analysis procedure would be to collect at least ten (10) grab samples per waste type with all layers of waste material (plaster/sheetrock, paint, etc.).
 - b. Ship samples under Chain of Custody to an NYSDOH ELAP-certified lab with instructions to composite grab samples into one composite sample per waste type and test Toxicity Characteristic Leaching Procedure (TCLP) extraction for lead.
 - c. All laboratory analysis shall be conducted in an expeditious manner, with results not to exceed 72 hours turnaround.
2. TCLP testing of water is not necessary provided the Contractor has obtained a permit from the DEP for the disposal of water into the City sewer system. If a permit has not been obtained, all water shall be analyzed for lead and managed according to the procedures described in Section C below.
 3. Submit to the Authority the analysis results and waste profile approved by the disposal site indicating the determination of whether the waste is hazardous.

C. Storage and Disposal

1. Package and label waste
 - a. All waste (and water if no DEP permit has been obtained for sewer disposal) shall be kept in covered or sealed containers,

secured, labeled and stored in a designated secured storage space on site until test results categorize all waste to be hazardous or non hazardous.

- b. Waste shall be stored in a manner that will not allow entry of any hazardous material into the environment (e.g., DOT approved containers). Container lids or bin covers shall be firmly secured, except during filling. The containers shall be marked with the contents, tare weights (for rollovers), the origin and date of collection of the material and weather resistant indelible ink labels warning of the potential hazards associated with the material. The containers shall be keyed to the samples taken. Hazardous waste shall also be labeled "Hazardous Waste" in accordance with the applicable provisions of 40 CFR 262.32 and 49 CFR 172.304.
- c. All waste, after being evaluated in accordance with the Toxicity Characteristic Leaching Procedure (TCLP) test, shall be disposed of in accordance with all applicable local, Federal, State and county Regulations.
- d. Submit to the Authority for approval information regarding the Hazardous Waste transporter and disposal site permits demonstrating that they are permitted to transport and dispose the waste.

2. Storage of waste on site

- a. Hazardous waste must remain on-site until accepted by a licensed hazardous waste transporter for shipment to a licensed disposal facility.
- b. The site shall be in a suitable location, acceptable to the Authority, on well-drained ground not subject to flooding (40 CFR Part 264.18) or run-off. The area shall be enclosed by a fence or a designated locked

area, adequately protected from vandalism or unauthorized access (40 CFR Part 264.14), and prominent warning signs shall be displayed around the perimeter. If the site is also used for equipment and supplies, the waste containers shall be segregated within the site (e.g., placing in an assigned area surrounded with a temporary "fence" of ribbons or thin rope). All drums shall be placed on pallets or dunnage to prevent corrosive attack from moist soil. The containers shall be arranged so that the labels are visible at all times. A warning sign shall be posted where hazardous waste is being stored reading:

*"HAZARDOUS WASTE STORAGE AREA
NO SMOKING OR EATING"*

Note: At the completion of each work shift, if all hazardous or suspected-hazardous waste generated cannot be stored in a suitable secured area that will prevent unauthorized access to the public (e.g., container with rigid construction materials and a lockable access door), the Contractor shall arrange for the transportation and disposal of the material each day of the project.

3. Transportation requirements

- a. Each waste transporter shall possess a valid Waste Hauler's permit issued pursuant to NYSDEC regulations, 6 NYCRR Part 364. If the waste is to be transported and disposed of out of New York State, permits from states through which waste will be transported and where it will be disposed may be required. The Contractor shall provide all required permits for review and approval of the Authority.

4. Disposal requirements

- a. Each waste disposal facility shall possess all permits and/or licenses required under

NYSDEC regulations (6 NYCRR Part 360), RCRA, New York City DEP, as well as any other federal, state or local permits or licenses required for removal, packaging, transportation and disposal of hazardous waste. The Contractor shall provide a copy of required permits for review and approval of the Authority.

- b. All hazardous waste removed hereunder shall be lawfully treated and disposed by the Contractor at an EPA permitted Treatment, Storage and Disposal Facility (TSD).
- c. The Contractor shall not ship wastes until TSD facilities and transporters used are approved by the Authority. The Authority reserves the right to inspect the Contractor's transporters, equipment, equipment storage facility and TSD facility at any time.
- d. All wastes, containers, and other items removed hereunder shall be lawfully treated and disposed of by Contractor within thirty (30) days after removal from the site.
- e. Contractor shall submit evidence to the authority that those signing manifests have received DOT Hazardous Materials Shipping Training (initial and refresher every 3 years per 49 CFR USDOT regulations).
- f. The Contractor shall immediately forward the "Retained by Generator" copy of all hazardous waste manifests and associated documents (e.g., Land Disposal Restriction notification) to the SCA IEH Department within 24-hours of the signing of the shipping papers by fax (ATTN: WASTE MANIFEST COORDINATOR at 718-472-8500) or email (IEHWASTEMANIFEST@nycsca.org) or via alternate means when directed by the Authority. Completed shipping documents shall contain the information required under 40 CFR Part 262 Subpart B (hereinafter the "Manifest Form") and 6 NYCRR Part 372. The

Authority will forward copies of the manifest to the generator state and disposal states. The signed Disposal Site copy of the manifest required to be returned within 30 days of shipment shall also be forwarded to the IEH Department within 24 hours of receipt. Also forward Certificates of Disposal which specify where each component of the hazardous wastes is ultimately treated or disposed, Manifest number, and address and EPA identification number for the generator facility.

- g. The Contractor shall immediately notify the Authority in writing of any problems that would require the return of waste to the Authority or of any violation of any environmental law or regulation which would result in any enforcement action related to the waste and, when needed, shall identify an alternative TSD and obtain written approval from the Authority for disposal at such TSD.
- h. The Contractor shall provide completed shipping documents, either "Non-Hazardous Waste Manifest" or "Bills of Lading", for all non-hazardous waste removed from the Authority's property. Shipping documents shall accompany each waste shipment and include information on the quantity and type of waste, the destination and disposal firm accepting the waste, the waste transporter name, and the date shipped.

D. Recycling

- 1. Architectural wastes that would otherwise be hazardous waste due to lead-based paint (e.g., scrap metal) may only be recycled if the contractor submits a "c7" notification to NYSDEC for each recycling facility when required by NYSDEC regulations (6 NYCRR 371.1(c)(7)). The Contractor shall provide the Authority a copy the "c7" notification or alternate required information as described in Article 1.05.

E. LQG and SQG Hazardous Waste Management Requirements

1. The contractor shall conduct the work using methods that do not result in exceeding the hazardous waste Large Quantity Generator (LQG) or Small Quantity Generator (SQG) thresholds (considering any existing school waste generation) or shall meet all LQG or SQG compliance requirements and provide the Authority with all LQG or SQG documentation required to demonstrate compliance at least two weeks before exceeding the thresholds (or before the effective date of the requirement, e.g., biennial reports).
 - a. SQG – generates (in a calendar month) >100 kg and <1,000 kg and also stores (at any time) ≤6,000 kg of hazardous waste (assuming it is not acute hazardous waste).
 - b. LQG – generates (in a calendar month) ≥1,000 kg or stores >6,000 kg of hazardous waste (assuming it is not acute hazardous waste).
2. The Contractor shall notify the Authority in advance if their methods are projected to result in exceeding the LQG and SQG thresholds. The Contractor shall track the rate of hazardous waste generation and total quantity accumulated during the work and shall notify the authority before exceeding the LQG and SQG thresholds.
3. If the Contractor will exceed the LQG or SQG thresholds, the Contractor shall meet all applicable regulatory requirements including:
 - a. Maintain housekeeping and adequate aisle space for emergency access, provide immediate access to emergency communications (e.g., phone, radio), and document weekly inspections of all hazardous waste storage areas.
 - b. Maintain and test emergency equipment.
 - c. Determine if there is an existing EPA hazardous waste generator identification number. If not, submit a "Notification of

Regulated Waste Activity Form" (EPA Form 8700-12) to the Authority concurrent with transporter and disposal facility permits.

- d. Prepare a Hazardous Waste Contingency Plan (6 NYCRR 373-3.4(c), (g)) for Authority submittal to local emergency response organizations. Have a Facility Emergency Coordinator on-site or on call at all times to make notifications and coordinate emergency response. For Large Quantity Generator (LQG), a Quick Reference Guide shall be submitted with the Hazardous Waste Contingency Plan in accordance with the provisions of 40 CFR 262.262(b) and (c).
- e. Follow the requirements of this specification for minimizing Hazardous Waste generation and certify on hazardous waste manifests that a waste minimization "program is in place."
- f. Train all personnel handling hazardous waste (6 NYCRR 373-3.2).

1.29 DISPOSAL OF PCB BALLASTS, LIGHT BULBS, MCE, UNIVERSAL WASTE BATTERIES AND ELECTRONICS WASTE

A. Generally Applicable Requirements

- 1. In accordance with paragraph 1.05.A.1, submit to the Authority for approval information regarding the waste transporter and disposal site permits demonstrating that they are permitted to transport and recycle or dispose waste PCB Ballasts, light bulbs, MCE, universal waste batteries and electronics wastes (as applicable).
- 2. Waste shall be managed to prevent the release of any waste or component to the environment and secured on-site until removed by a licensed transporter for shipment to a licensed recycling or disposal facility. Each waste type shall be placed in a separate container or package that is structurally sound, adequate to prevent breakage, compatible with the contents and meets DOT shipping requirements. Such containers shall

remain closed and lack evidence of leakage, spillage or damage that could cause leakage. Store in a secured, dry location acceptable to the authority that has warning signs to prevent unauthorized access and prevents waste containers from damage.

3. The Contractor shall immediately notify the Authority's IEH Division of leaking ballasts, broken mercury containing light bulbs, broken or leaking MCE, or leaking batteries and state whether it understands how to immediately respond to prevent the spread of contamination, clean up the released material and manage the waste it in accordance with applicable regulations. Any hazardous waste generated from cleanup of leaks or breakage of these wastes shall be handled in accordance with applicable regulations and applicable provisions of Article 1.28 and this Article.
4. The Contractor shall remove all wastes from the Site within 60 days of generation, including any hazardous wastes from cleanup of leaks or breakage.
5. The Contractor shall provide a copy of completed shipping documents (e.g., "Non-Hazardous Waste Manifest" or "Bill of Lading") for all waste removed from the Authority's property which includes the quantity and type of waste, the destination recycling or disposal facility, the waste transporter name, and the date shipped.
6. Documents from the recycling or disposal facility that acknowledge acceptance of materials shall be submitted within thirty (30) days of shipment.
7. Waste management protocols shall be in accordance with those provided and accepted in paragraph Article 1.05.A.
8. All waste shall be handled, stored, and disposed of in accordance with all applicable local, state, and federal regulations.

9. PCB containing and non-PCB containing ballasts, fluorescent lamps, debris and light fixtures shall be managed in accordance with the attached Table 1.

B. PCB Ballasts

1. The Contractor shall assume that fluorescent light ballasts contain PCB capacitors and potting material unless ballast contains a "No PCBs" label.
2. The Contractor shall handle, manage, and recycle or dispose of all PCB Ballasts in accordance with 40 CFR Part 761.50 and Part 761.62.
3. If ballast contains a "No PCBs" label, the ballast may be recycled or disposed of as solid waste.
4. Storage and disposal of PCBs is regulated by the U.S. Environmental Protection Agency (EPA) under the Toxic Substances Control Act (TSCA) and 40 CFR Part 761. Any waste generated shall be bagged up and carried directly to an approved waste dumpster or container meeting the requirements for labeling, storage, and disposal. Wastes not associated with ballast leakage may be segregated from wastes potentially impacted by leaking ballasts.

C. Light Bulbs

1. All light bulbs shall be considered "universal waste lamps" unless manufacturer's information or test results are obtained demonstrating that they are below the TCLP hazardous waste threshold. This includes all lamps with sockets that have lead-containing solder (including most incandescent and halogen lamps) and all mercury-containing lamps (including all regular and compact fluorescent, high intensity discharge, mercury vapor, high pressure sodium, and metal halide lamps).
2. The Contractor shall handle, manage, and dispose of all universal waste light bulbs in accordance

with 6 NYCRR 374-3. Each container shall be labeled or marked clearly with any one of the following phrases:

- a. "Universal Waste - Lamp(s)", or
- b. "Waste Lamp(s)", or
- c. "Used Lamp(s)".

D. Mercury Containing Equipment (MCE)

- 1. All elemental mercury containing thermometers, thermostats, barometers, manometers, temperature and pressure gauges, and mercury switches are considered MCE.
- 2. Do not remove mercury from MCE, only remove the MCE or ampules intact in accordance with Universal Waste regulations.
- 3. The Contractor shall handle, manage, and dispose of all MCE in accordance with 6 NYCRR 374-3. Each container shall be labeled or marked clearly with any one of the following phrases:
 - a. "Universal Waste - Mercury Containing Equipment," or
 - b. "Waste Mercury-Containing Equipment", or
 - c. "Used Mercury-Containing Equipment."

E. Universal Waste and Lead-Acid Batteries

- 1. All rechargeable, lithium, button and other batteries that are not lead-acid, carbon-zinc or alkaline are considered universal waste.
- 2. All lead-acid batteries shall be recycled in accordance with 6 NYCRR 374-1.7.
- 3. The Contractor shall handle, manage, and dispose of all universal waste batteries in accordance with 6 NYCRR 374-3. Each container shall be labeled or marked clearly with any one of the following phrases:
 - a. "Universal Waste - Universal Waste Battery(ies)", or
 - b. "Waste Battery(ies)", or

c. "Used Battery(ies)."

F. Electronics Waste ("E-Waste")

1. All "used electronics", when disposed, are considered potentially hazardous wastes unless properly recycled as "electronic waste" or "E-waste". Used electronics include computers, computer peripheral devices, computer monitors, computer projectors, televisions, VCRs, DVD players, printers, fax machines, audio equipment, and any other devices containing circuit boards. Used electronics do NOT include "household" appliances (e.g., clothes washers, clothes dryers, refrigerators, freezers, microwave ovens, ovens, ranges or dishwashers) that are required to be recycled as "bulk metal" items in New York City.
2. The Contractor shall first confirm with the Authority and the school's Custodian and Principal in advance that the Department of Education had the opportunity to relocate, reuse or recycle all electronics and that remaining equipment is the Contractor's responsibility to properly manage.
3. The Contractor shall handle, manage, and dispose of all E-waste in a way that keeps it dry, secure and prevents release of any hazardous component to the environment. E-waste shall be secured until shipped or otherwise labeled or marked clearly to identify that it is E-Waste requiring recycling by a Collector, Dismantler, or Recycler of Used Electronic Equipment meeting all applicable federal, state and local regulations.
4. The Contractor shall immediately clean up and place in a container broken components that could cause a hazardous substance release to the environment and must properly clean-up any debris and residues. The Contractor shall sample and analyze any broken components or cleanup waste to determine whether it is hazardous waste. Broken Cathode Ray Tube (monitor or TV) glass with no attached metal is not eligible for the hazardous scrap metal exemption and cannot be sent to a

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recycler. Hazardous waste must be managed as described in Article 1.28.

TABLE 1

Description	Handling/Packaging	Waste Container	Disposal Method
PCB impacted Fixtures with ACM Wires, Clean-up Waste, and Debris. All PCB Fixtures, Cleanup Waste, and Debris are assumed to contain PCBs and ACM (Asbestos >1%)	Wrap the fixture, cleanup waste, PPE, and debris in transparent 6 mil poly. Place the wrapped and marked material in the PCB/ACM waste accumulation area or directly into the designated waste container.	Waste is typically placed into a sealed roll on/roll off style container.	Disposal in TSCA permitted and ACM permitted landfill. (Must also comply with section 02081)
PCB impacted Fixtures without ACM Wires, Clean-up Waste, and Debris. All PCB Fixtures, Cleanup Waste, and Debris are assumed to contain PCBs	Wrap the fixture, cleanup waste, PPE, and debris in transparent 6 mil poly. Place the wrapped and marked material in the PCB waste accumulation area or directly into the designated waste container.	Waste is typically placed into a sealed roll on/roll off style container.	Disposal in a TSCA permitted (40 CFR 761.75) landfill.
Non-Impacted (No PCB leak or stain) Fixtures with ACM Wires Unless deemed asbestos free by the licensed	Non-Impacted fixtures with ACM wire will be wrapped in 6 mil poly, then affix the appropriate ACM labels. The wrapped and labeled waste shall be placed	Waste is typically placed into a sealed roll on roll off style container.	Disposal at an ACM approved landfill.

TABLE 1

Description	Handling/Packaging	Waste Container	Disposal Method
inspector, all non-impacted Fixtures are assumed to contain ACM	into the designated ACM container.		
Non-Impacted Non-Leaking PCB Ballasts	When intact non-impacted ballasts are removed from the fixture, ballast type and condition information are recorded by a representative of the IEH Division. The number and type of ballasts are recorded by the contractor as ballasts are placed into the designated "Intact Ballasts" drum.	Ballasts shall be placed into a new 1A2/Y1.8/200 fifty-five gallon capacity steel disposal drum. The following information must be on the drum: Accumulation Start Date, Drum ID #, and a description of the waste - "NON LEAKING PCB Ballasts for Recycling." The total number of ballasts and weight in kg of the contents of the drum must be available to be recorded on the manifest at time of pickup.	Recycling at a TSCA approved facility.

TABLE 1

Description	Handling/Packaging	Waste Container	Disposal Method
Leaking PCB Ballasts or Ballasts with possible PCB impacts	When leaking ballasts are removed from the fixture, ballast type and condition information are recorded by a representative of the IEH Division. The number and type of ballasts are recorded by the contractor as ballasts are placed into the "LEAKING PCB Ballast" designated drum.	Ballasts shall be placed into a new 1A2/Y1.8/200 fifty five gallon capacity steel disposal drum. The following information must be on the drum: Accumulation Start Date, Drum ID #, and a description of the waste - "LEAKING PCB Ballasts for Incineration." The total weight in kg of the contents of the drum must be available to be recorded on the manifest at time of pickup.	Incineration in a TSCA approved (40 CFR 761.70) incinerator.
Non-Impacted Non-PCB Ballasts (i.e., ballasts with "No PCBs" label)	When intact, non-impacted ballasts are removed from the fixture, ballast type and condition information are recorded by a representative of the IEH Division. The number and type of ballasts are recorded by the contractor as ballasts are placed into the designated "Non-PCB" ballast drum.	Waste shall be placed into new 1A2/Y1.8/200 fifty- five gallon capacity steel drums for recycling. The waste is typically placed into a sealed roll on/roll off style container for landfilling.	Recycling at a TSCA approved facility or disposed of at a municipal solid waste landfill.

TABLE 1

Description	Handling/Packaging	Waste Container	Disposal Method
Intact Fluorescent Lamps	Intact fluorescent lamp should be place into crush rated fiber drums and/or boxes for shipping of fluorescent lamps. The fiber drum or box should be coded using codes established by the NYCSCA.	Intact lamps are to be placed in crush rated fiber drums or boxes. When the box is placed into service it should have no other markings accept the UN/DOT information and the rating and manufacturer of the box. The fiber drum shall be marked with following information: Accumulation Start Date, Drum ID #, and a description of the waste - "Universal Waste - INTACT Fluorescent lamps for Recycling"	Universal Waste Recycling
Broken Lamps	When a lamp is broken it is to be treated as a hazardous waste. The Contractor shall use caution and use the appropriate spill clean-up kit to clean-up the broken lamp. The debris and the clean-up material should be place into a drum labeled hazardous waste.	Broken lamps along with the clean-up waste must be placed into a new steel 55 gallon DOT/UN 1A2/Y1.8/200. The proper EPA and DOT labels must be immediately placed on to the drum and the hazardous waste label completely filled out.	Hazardous Waste Retort

1.30 DOMESTIC WATER SYSTEM DISINFECTION

- A. In accordance with the NYC Plumbing Code and Department of Health regulations, disinfection and water quality sampling are required for all projects involving new, repaired or replaced potable water systems (including, but not limited to, piping, fixtures, hot water tanks, service connections, etc.).
- B. If during execution of contracted Work that does not require water disinfection, there is a change of scope that subsequently involves any alteration of the potable water system, the Authority's IEH Division must be consulted to determine the applicability of water disinfection and testing prior to placing the system into operation. Upon review, the Authority will provide the required direction.
- C. Disinfection and water quality testing are not required for the installation or replacement of faucets or other plumbing fixtures (i.e., valves, hose bibs, temperature or flow gauges, etc.) that do not involve the replacement or installation of piping. However, in these instances, special procedures have been developed and will be provided by the Authority's IEH Division that must be strictly followed.

1.31 REMOVAL AND DISPOSAL OF MOLD CONTAMINATED NON-ACM MATERIAL

- A. Non-ACM material previously found and listed to contain mold and scheduled for removal or material that is discovered during the progress of the work to contain mold is to be remediated and disposed of utilizing the following protocols:
 - 1. Effective January 1, 2016, applicable regulations for a New York City School and related support environments include licensing requirements for microbial assessment, remediation and abatement consultants/contractors as per the New York State (NYS) Department of Labor Law, Article 32.
 - 2. Technical content in support of these requirements is derived largely by source guidance which can be found in current industry-recognized Standards of Care including the New York City Department of Health & Mental Hygiene

(NYCDOHMH) document "Guidelines on Assessment and Remediation of Fungi in Indoor Environments" and the United States Environmental Protection Agency (USEPA) document "Mold Remediation in Schools and Commercial Buildings", with supplemental professional guidance from the Institute of Inspection, Cleaning and Restoration (IICRC) document American National Standards Institute (ANSI)/IICRC S500 2006 document, "Standard and Reference Guide for Professional Water Damage Restoration" and the IICRC S520-2008 document, "Standard and Reference Guide for Professional.

- B. Removal of ACM material containing mold is part of the asbestos abatement process.

END OF SECTION

* * *

LIST OF SUBMITTALS

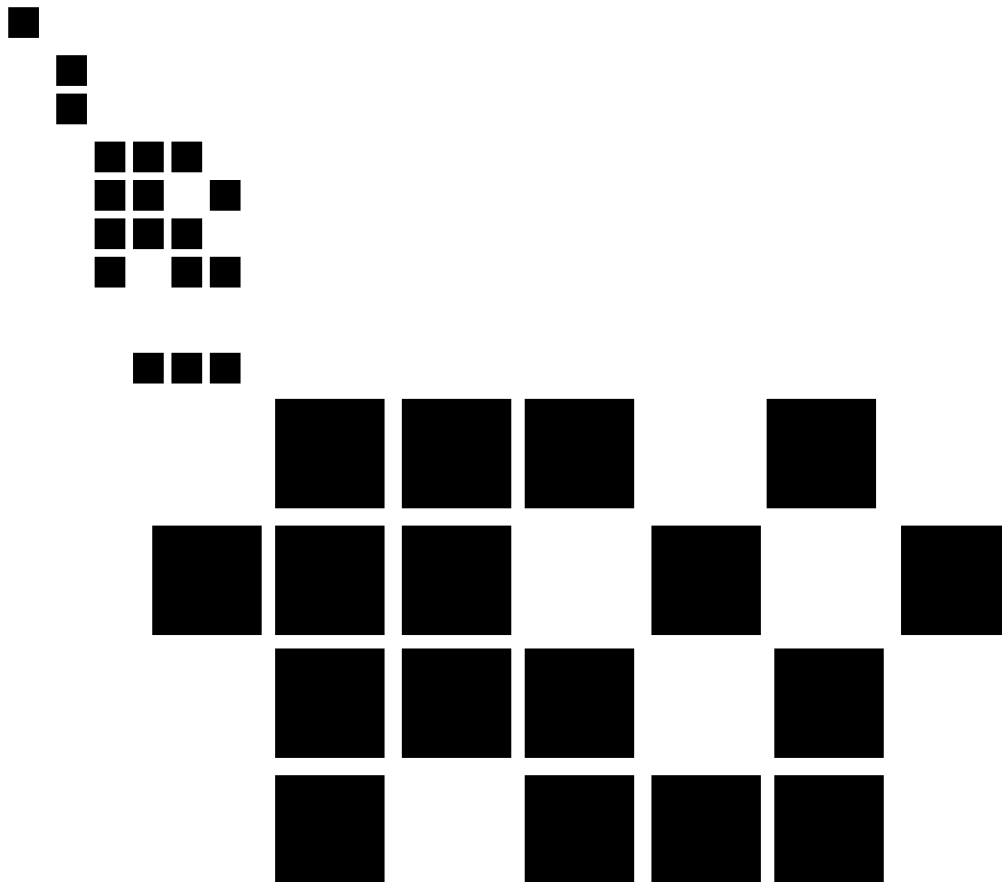
<u>SUBMITTAL</u>	<u>DATE SUBMITTED</u>	<u>DATE APPROVED</u>
Pre-project Submittals:	_____	_____
1. Waste management Plan		
2. Certificate of Insurance		
3. Health and Safety Plan		
4. Emergency Action Plan		
5. Fall Protection Plan		
6. Proof of arrangements		
7. c7 notification to NYSDEC		
8. Manufacture's literature On equipment		
9. Daily log sample for hazardous waste		
10. Structural Stability Drawings		
11. PCB Management Plan		
12. Occupant Protection Plan		
During Work Submittals:	_____	_____
1. Schedule of Work Changes		
2. Waste analyses results		
3. DOT Hazardous materials Shipping Training certificate		
4. Each shipping Record		
Post Project Submittals:	_____	_____
1. Bound log book		
2. Air monitoring records		
3. Completed waste shipment records		
4. EPA "Contractor Notification Statement"		
5. Digital photographs		



Specifications

**Bard College High School
Manhattan**

**Waste System-Parapets-Exterior Masonry
Design No. D019998**



A. Nina Kubota
President and CEO

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